Maura Healey, Governor
Kimberley Driscoll, Lieutenant Governor
Phillip Eng, Interim MassDOT Secretary
Jonathan L. Gulliver, Undersecretary and Highway Administrator

# Town of Deerfield

## Deerfield – Intersection Improvements on Greenfield Road
## MassDOT Project No. 613708

## Notice of Intent

Deerfield Conservation Commission
March 2026

Prepared by:
MassDOT District 2 Environmental Section

811 North King Street, Northampton, MA 01060
Tel: (857) 368-2000, Fax: (857) 368-0200
mass.gov/massdot

Maura Healey, Governor
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MassDOT
Massachusetts Department of Transportation
Highway Division

March 16, 2026

Deerfield Conservation Commission
8 Conway Street, Deerfield Municipal Offices
South Deerfield MA, 01373

RE: Notice of Intent
Intersection Improvements on Greenfield Road (Routes 5 and 10) at Mill Village Road and North Main Street (MassDOT Project #613708)
Deerfield, MA

Dear Members of the Deerfield Conservation Commission:

MassDOT respectfully submits this Notice of Intent for Intersection Improvements on Greenfield Road (Routes 5 and 10) at Mill Village Road and North Main Street in the Town of Deerfield. The proposed project will address road safety issues at the intersection of Route 5&10 and Mill Village Road. The project will require work in Bordering Vegetated Wetland (BVW), Isolated Vegetated Wetland (IVW), Bank, Riverfront Area, and Buffer Zone.

This Notice of Intent has been prepared in accordance with Massachusetts Wetland Protection Act, M.G.L. c.131 S.40 (the Act), and implementing regulations (310 CMR 10.00). The proposed activities can also be reviewed as a limited project per 310 CMR 10.53(3)(f) which allows for (in part) maintenance, repair and improvement of existing roadways substandard intersections, and improving inadequate drainage systems. As a State agency, MassDOT is not subject to local wetland bylaws. As demonstrated in this NOI filing, MassDOT will minimize and mitigate impacts to jurisdictional areas to the maximum extent practicable. In addition, as cited in 310 CMR 10.05 (4)(a), MassDOT does not need to notify abutters. A copy of this Notice of Intent has been sent to the Western Regional Office of the Massachusetts Department of Environmental Protection (MassDEP).

The total filing fee for this NOI is $750 under the state regulations. A check for $387.50 made out to the Town of Deerfield will be submitted under separate cover. The $362.50 fee for the Commonwealth of Massachusetts will be submitted on eDEP. We respectfully request that you place this project on your next scheduled Conservation Commission Public Hearing. If you have any questions, please do not hesitate to reach out to Stormwater and Wetlands Analyst, Robin Hunter, at robinson.b.hunter@dot.state.ma.us or at (857) 283-6302.

Sincerely,

Patricia A. Leavenworth

Patricia Leavenworth, P.E.
District Highway Director

Cc: Robin Hunter, MassDOT RH
Paula K. Simmons, P.E., MassDOT PKS
Melissa Lenker, MassDOT
MassDEP Western Regional Office

811 North King Street, Northampton, MA 01060
Tel: (857) 368-2000, Fax: (857) 368-0200
mass.gov/massdot

**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

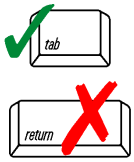
Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Deerfield
City/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 (**Note:** electronic filers will click on button to locate project site):

Greenfield Rd (Rt 5/10) at Mill Village Rd and North Main St
Deerfield (b. City/Town) | 01373 (c. Zip Code)

Latitude and Longitude:
42.498651 (d. Latitude) | -72.609485 (e. Longitude)

N/A - roadway (f. Assessors Map/Plat Number) | (g. Parcel /Lot Number)

2. Applicant:

Patricia (a. First Name) | Leavenworth (b. Last Name)
MassDOT - District 2 (c. Organization)
811 N King Street (d. Street Address)
Northampton (e. City/Town) | MA (f. State) | 01060 (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):

Robin (a. First Name) | Hunter (b. Last Name)
MassDOT - District 2 (c. Company)
811 N King Street (d. Street Address)
Northampton (e. City/Town) | MA (f. State) | 01060 (g. Zip Code)
(857)-283-6302 (h. Phone Number) | (i. Fax Number) | robinson.b.hunter@dot.state.ma.us (j. Email address)

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

$750 (a. Total Fee Paid) | $362.50 (b. State Fee Paid) | $387.50 (c. City/Town Fee Paid)

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

# WPA Form 3 – Notice of Intent

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Provided by MassDEP:

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## A. General Information (continued)

6. General Project Description:

Intersection improvement. See attached Project Narrative

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. ☐ 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 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☒ Yes ☐ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

310 CMR 10.24(7)(c)
2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 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:

N/A - roadway
a. County

b. Certificate # (if registered land)

c. Book

d. Page Number

## 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, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

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.

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

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## B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

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

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| a. ☒ Bank | 10 (beneficial) 1. linear feet | 0 2. linear feet |
| b. ☒ Bordering Vegetated Wetland | 1,120 1. square feet | 615 2. square feet |
| c. ☐ Land Under Waterbodies and Waterways | 1. square feet<br>3. cubic yards dredged | 2. square feet |

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| d. ☐ Bordering Land Subject to Flooding | 1. square feet<br>3. cubic feet of flood storage lost | 2. square feet<br>4. cubic feet replaced |
| e. ☐ Isolated Land Subject to Flooding | 1. square feet<br>2. cubic feet of flood storage lost | 3. cubic feet replaced |
| f. ☒ Riverfront Area | Bloody Brook - inland<br>1. Name of Waterway (if available) - **specify coastal or inland** | |

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: 18,286 square feet

4. Proposed alteration of the Riverfront Area:

| a. total square feet | b. square feet within 100 ft. | c. square feet between 100 ft. and 200 ft. |
|---|---|---|
| 13,210 | 3,635 | 9,575 |

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. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

**Note:** for coastal riverfront areas, please complete **Section B.2.f**. above.

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

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## B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and 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.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| a. ☐ Designated Port Areas | Indicate size under Land Under the Ocean, below | |
| b. ☐ Land Under the Ocean | 1. square feet<br>2. cubic yards dredged | |
| c. ☐ Barrier Beach | Indicate size under Coastal Beaches and/or Coastal Dunes below | |
| d. ☐ Coastal Beaches | 1. square feet | 2. cubic yards beach nourishment |
| e. ☐ Coastal Dunes | 1. square feet | 2. cubic yards dune nourishment |

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| f. ☐ Coastal Banks | 1. linear feet | |
| g. ☐ Rocky Intertidal Shores | 1. square feet | |
| h. ☐ Salt Marshes | 1. square feet | 2. sq ft restoration, rehab., creation |
| i. ☐ Land Under Salt Ponds | 1. square feet<br>2. cubic yards dredged | |
| j. ☐ Land Containing Shellfish | 1. square feet | |
| k. ☐ Fish Runs | Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above<br>1. cubic yards dredged | |
| l. ☐ Land Subject to Coastal Storm Flowage | 1. square feet | |

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 or B.3.h above, please enter the additional amount here.

a. square feet of BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings

**Massachusetts Department of Environmental Protection**
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# WPA Form 3 – Notice of Intent

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## C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – 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

   **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**

   8/1/2021
   b. Date of map

   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.2.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 (including description of impacts outside of wetland resource area & buffer zone)

   (b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see https://www.mass.gov/ma-endangered-species-act-mesa-regulatory-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.

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Provided by MassDEP:
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## C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review).
Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*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 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 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☐ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Bourne to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: dmf.envreview-south@mass.gov

North Shore - Plymouth to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: dmf.envreview-north@mass.gov

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

c. ☐ Is this an aquaculture project? d. ☐ Yes ☐ No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).

**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

Provided by MassDEP:
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Document Transaction Number
Deerfield
City/Town

## C. Other Applicable Standards and Requirements (cont'd)

**Online Users:** Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

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 (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   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) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   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.

## D. Additional Information

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

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

**Online Users:** Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

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. (Electronic filers may omit this item.)

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.

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

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## D. Additional Information (cont'd)

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.

Routes 5 and 10 at North Main Street and Mill Village Road - 75% NOI Plans
a. Plan Title

MassDOT
b. Prepared By

c. Signed and Stamped by

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☒ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

## E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

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

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

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

# WPA Form 3 – Notice of Intent

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## 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 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.

| | |
|---|---|
| Patricia A. Leavenworth | 03/16/2026 |
| 1. Signature of Applicant | 2. Date |
| | |
| 3. Signature of Property Owner (if different) | 4. Date |
| Robinson Hunter | 3/16/26 |
| 5. Signature of Representative (if any) | 6. Date |

**For Conservation Commission:**
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

**For MassDEP:**
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

**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.

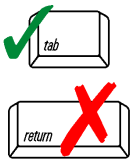
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

**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

**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:

| | |
|---|---|
| Greenfield Rd (Rt 5/10) at Mill Village Rd and North Main St | Deerfield |
| | b. City/Town |
| c. Check number | d. Fee amount |

2. Applicant Mailing Address:

| | |
|---|---|
| Patricia | Leavenworth |
| a. First Name | b. Last Name |

MassDOT - District 2
c. Organization

811 N King Street
d. Mailing Address

| | | |
|---|---|---|
| Northampton | MA | 01062 |
| e. City/Town | f. State | g. Zip Code |

| | | |
|---|---|---|
| h. Phone Number | i. Fax Number | j. Email Address |

3. Property Owner (if different):

| | |
|---|---|
| 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 |

## B. Fees

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

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

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

**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 Project Fee:** Determine the total project fee by adding the subtotal amounts from Step 4.

**Step 6/Fee Payments:** To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/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

## B. Fees (continued)

| Step 1/Type of Activity | Step 2/Number of Activities | Step 3/Individual Activity Fee | Step 4/Subtotal Activity Fee |
|---|---|---|---|
| Category 2e - limited project | 1 | $500 | $500 |
| Riverfront 50% | 1 | $250 | $250 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**Step 5/Total Project Fee:** $750

**Step 6/Fee Payments:**

| | |
|---|---|
| Total Project Fee: | $750 a. Total Fee from Step 5 |
| State share of filing Fee: | $362.50 b. 1/2 Total Fee **less $**12.50 |
| City/Town share of filling Fee: | $387.50 c. 1/2 Total Fee **plus** $12.50 |

## C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

**To MassDEP Regional Office** (see Instructions): 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. (E-filers of Notices of Intent may submit these electronically.)

Maura Healey, Governor
Kimberley Driscoll, Lieutenant Governor
Phillip Eng, Interim MassDOT Secretary
Jonathan L. Gulliver, Undersecretary and Highway Administrator

Appendix A

Town of Deerfield
Intersection Improvements on Greenfield Road (Routes 5 and 10) at Mill Village Rd and North Main St.
MassDOT Project No. 613708
Notice of Intent

PROJECT NARRATIVE

811 North King Street, Northampton, MA 01060
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LIST OF APPENDICES

## 1.0 Introduction

The Massachusetts Department of Transportation (MassDOT) is seeking an Order of Conditions from the Deerfield Conservation Commission to authorize work to construct a roundabout on Greenfield Road in Deerfield, MA. This Notice of Intent has been prepared pursuant to the Massachusetts Wetlands Protection Act, M.G.L. c.131 S.40 (WPA), and its implementing regulations (310 CMR 10.00). As a state agency, MassDOT is not subject to local wetland bylaws. In addition, as cited in 310 CMR 10.05 (4)(a), MassDOT is exempt from abutter notification.

This project is intended to improve safety at the Greenfield Road, Mill Village Road, and North Main Street intersection. This project will improve the approaching roadway geometry and sight distance, and includes bicycle and pedestrian accommodations in the form of a shared use path.

Work at the intersection consists of full depth construction for a proposed single lane roundabout and a shared use path. Highway lighting and drainage system improvements are also proposed. Other project work includes construction of a wetland replication area, pavement fine milling, water main relocation, traffic signs, pavement markings, erosion and sedimentation controls, and other incidental work. The proposed activities can also be reviewed as a limited project per 310 CMR 10.53(3)(f) which allows for (in part) maintenance, repair and improvement of existing roadways and improving inadequate drainage systems.

This project area is located at the intersection of Greenfield Road (Routes 5&10) at Mill Village Road and North Main Street in Deerfield, MA (See Appendix B, Figures 1 and 2). The work will include approximately 375 square feet (SF) of permanent impacts and roughly 745 SF of temporary impacts to Bordering Vegetated Wetlands (BVW), approximately 3,430 of permanent impacts and 9,780 SF of temporary impacts to Riverfront Area (RFA), and 10 linear feet (LF) of permanent beneficial impacts to Bank. Impacts to an isolated wetland in the southwestern quadrant of the intersection also occur, including approximately 690 SF of permanent impacts and 90 SF of temporary impacts.

## 2.0 Existing Conditions

Mill Village Road and North Main Street currently have stop signs at the intersection with Greenfield Road, and there is no stop control on Greenfield Road at this intersection. With the current design of the intersection, drivers frequently exceed the speed limit. Due to a lack of controls to reduce speed, and the geometry of the intersection, drivers stopped at the existing stop signs may have difficulties seeing upcoming traffic, and this has resulted in multiple collisions. See Appendix C for site photographs.

Wetland Resource Areas within the Project footprint include BVW, RFA, and Inland Bank. See Appendix B, Figure 3. Wetland Resources.



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## 2.1 Wetland Resource Areas

Jurisdictional wetland resource areas in the vicinity of the Project area were delineated by MassDOT District Environmental staff (See Appendix D for Wetland Delineation Report). The study area was evaluated for the presence of regulated wetland resources using State methodologies and jurisdictional definitions, including Massachusetts Department of Environmental Protection guidelines, (310 CMR 10.58(2)). Resource boundary flags were placed in the field to mark the limit of BVW and inland Bank. The locations of resource area boundaries were mapped using a Leica GS18 global navigation satellite system (GNSS) real-time kinematic (RTK) receiver with sub-meter accuracy. Spatial files were imported into ESRI ArcGIS Pro 3.0.0 software to develop resource maps. Descriptions of resource areas identified in the field are provided below.

### Streams and Watershed

Bloody Brook is a perennial stream which flows into the Mill River. It is located at the eastern edge of the project area. Although within the immediate vicinity of the project Bloody Brook is not identified as an impaired waterbody, downstream it crosses the Connecticut River Mainline train tracks and is listed as an impaired waterbody for dissolved oxygen, Escherichia Coli (E. Coli), total phosphorus, and turbidity at that point (MassDEP 2023).

According to the most recent approved FEMA FIRM 2501150006B (effective date July 2, 1980), the study area is not a mapped flood zone (Figure 4).

### Inland Bank

Bank was delineated for Bloody Brook and unnamed intermittent streams tributary to Bloody Brook. Bank is considered to be coincident with the Ordinary High Water Mark (OHWM) of these streams. Bank marked with flag series B-100 through B-105 appears to have been excavated through the former railroad bed in the west of the project, collecting water draining from the mowed field to the west of the study area. This stream drains into the BVW flagged as series 1-100. Water then flows through a poorly defined channel into a catch basin. Bank marked with flag series B-200 through B-219 is located underneath the power lines, with water flowing south into an intake that flows to Bloody Brook. Bank associated with Bloody Brook was flagged with series BF-RB-1 through BF-RB-6 (for the right bank) and series BF-LB-1 through BF-LB-7 (for the left bank). The existing drainage outfall for the site outlets directly into Bloody Brook.

### Bordering Vegetated Wetlands

Four BVWs were mapped on site (Figure 3). The BVW to the northwest of the intersection (flagged with series 1-100 through 1-119) is dominated by sensitive fern (*Onoclea sensibilis*) on its eastern side, transitioning into an area dominated by red osier dogwood (*Cornus sericea*) and red maple (*Acer rubrum*) further west. This wetland drains to a small area of Bank that flows into a catch basin connected to Bloody Brook. The wetland to the northeast of the intersection (flagged with series 1-200 through 1-221) is a wet meadow dominated by soft rush (*Juncus effusus*) in the wettest areas to the east, with species such as northern blackberry (*Rubus flagellaris*), red osier dogwood, and


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goldenrod (*Solidago* spp.) present in drier areas closer to the roadway. The BVWs associated with constructed ditches to the south of Mill Village Road (flagged with series WF-300 through WF-313 and WF-350 through WF-354) are joined by a 12-inch culvert and drain to an inlet connected to Bloody Brook. These wetlands are dominated by jewelweed (*Impatiens capensis*), interrupted fern (*Osumnda claytoniana*), and red osier dogwood in the understory. The BVW associated with Bloody Brook (flagged with series WF-400 through WF-405) is dominated by sensitive fern, poison ivy (*Toxicodendron radicans*), and red osier dogwood.

In addition to the BVWs described above, two isolated wetlands are mapped on Figure 3. These wetlands did not have any apparent surface water or culverted connection to any other waterbodies.

#### Riverfront Area

RFA is measured 200-feet horizontally from the MAHWL of Bloody Brook.

#### Buffer Zone

The buffer zone extends 100-feet from the BVWs and Bank, therefore it includes roadways, driveways, mowed fields, and forested areas.

## 2.2 Rare, Threatened and Endangered Species

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) MassDIS datalayers (based on the 15th edition of the Atlas, August 2021) were reviewed and Priority and Estimated Habitats are not present within the Project Area (see Figure 5).

## 2.3 Other Environmental Resources

According to MassGIS data layers and classifications provided in 314 CMR 4.00, the project area does not occur within an Outstanding Resource Water (ORW), Surface Water Protection Zone, or Area of Critical Environmental Concern (ACEC) (Figure 6).

# 3.0 Alternatives Analysis

#### Alternative 1 – No Build

The no build alternative, which would not impact wetland resource areas, would not change the intersection control. This would lead to continued safety concerns in a high collision intersection, therefore there would be no improvements to safety. MassDOT is committed to the safety of the Commonwealth and the no build alternative does not align with those goals.



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### Alternative 2 – Traffic Signal

A traffic signal would succeed in reducing the number of crashes in the intersection and would result in reduced impacts to wetland resource areas, however it offers the lowest safety mitigation, longest delays for certain approaches, and requires the highest maintenance costs.

### Alternative 3 – Preferred

This alternative includes constructing a roundabout, which will aid in reducing collisions and slowing traffic. Reported traffic data collected from 2018 to 2023 showed eighteen crashes at this intersection, several of which resulted in serious injuries. Constructing a roundabout which includes bicycle and pedestrian accommodations will reduce the risk to the traveling public. Although there will be temporary and permanent impacts to BVWs, Bank of Bloody Brook, and RFA, this alternative most significantly improves safety for road users. Impacts to wetland resources under this alternative have been reduced by steepening the shoulder grades of the roundabout and reducing the size of the shared use path from the standard 10 feet to 8 feet.

## 4.0 Proposed Project

The proposed project includes the construction of a modern single lane roundabout with pedestrian and bicycle facilities, intersection lighting, drainage structures, signs and markings. The roundabout includes an asphalt pavement roadway, a cement concrete truck apron with a raised center landscaped island. The outside diameter of the circular roundabout is one hundred and forty feet. All roadway approaches curve and yield into the circular roundabout center. To help slow speeds and to direct vehicles in a counterclockwise roundabout direction, the approach travel lanes are divided by raised splitter islands. The higher speed Route 5/10 approaches have longer raised splitter islands with successively smaller curves that safely slow speeds in advance of the circulatory roundabout. The roundabout has mountable low reveal curbing and aprons along the roadway edges and along the outside center apron edge to accommodate large farm vehicles and tractor trailers.

The existing failed 24-inch drainage outfall/headwall that discharges directly into Bloody Brook will be removed, and the replacement outfall will be set back approximately 60 feet away from the brook. The new outfall is designed with a flared end section and rip rap protection to prevent erosion to Bloody Brook and moved further upland to provide additional overland flow prior to discharging to adjacent wetlands and Bloody Brook.

The project also includes construction of a 615 SF wetland replication area to offset permanent impacts to BVWs.

## 4.1 Work in Resource Areas

### Bordering Vegetated Wetlands

Permanent earthen fill will be placed in the 200- and 350-series wetlands and the isolated wetland in the southwestern quadrant of the intersection to create the slopes of the roundabout. A grass swale


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will be constructed in the southwestern quadrant of the intersection, impacting the 350-series wetlands and the isolated wetland. Flow within this swale will enter a 12-inch reinforced concrete pipe connecting the 350- and 300-series wetlands, which will replace the existing degrading 12-inch corrugated metal pipe. Temporary impacts to the 300-series wetland and the isolated wetland in the southwestern quadrant of the intersection would occur due to access for utility work.

Temporary impacts to the 400-series wetland would occur due to construction access and grading to remove the existing failing 24-inch reinforced concrete drainage pipe and for the relocation of the 24-inch drainage outfall. The replacement outfall is designed with a flared end section and rip rap protection to prevent erosion to Bloody Brook and moved further upland. This daylighted section will provide additional overland flow prior to stormwater flows entering adjacent wetlands and Bloody Brook. The invert of the existing outfall is 210.19 feet in elevation, and the invert of the proposed flared end section is 211.78 feet.

### Bank

10 linear feet (LF) of permanent beneficial impacts to Bank would occur from removal of the existing failed headwall.

### Riverfront Area

Temporary impacts to RFA will occur from grading of roundabout slopes, creation of the wetland replication area, and construction access. Permanent impacts will occur from conversion of vegetated areas to impervious surface for the roundabout and associated shared use path.

### Buffer Zone

Work within Buffer Zone includes filling to expand roundabout embankment slopes, conversion of vegetated areas to impervious surface for the roundabout and associated shared use path, and construction of the wetland replication area.

**Table 1 – Summary and Characterization of Estimated Resource Area Impacts (not including in-kind paving/resurfacing)**

| Resource Area | Impact Type | Impacts | Total |
|---|---|---|---|
| BVWs | Temporary | 745 square feet (SF) | 1,120 SF |
| | Permanent | 375 SF | |
| Bank | Temporary | 0 linear feet (LF) | 10 LF |
| | Permanent | 10 LF | |
| Riverfront Area (0-100 foot) | Temporary | 3,575 SF | 13,210 SF |
| | Permanent | 60 SF | |
| Riverfront Area (100-200 foot) | Temporary | 6,205 SF | |
| | Permanent | 3,370 SF | |


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## 4.2 Anticipated Construction Sequencing

The anticipated construction sequencing for the project is proposed to be completed in five phases of work. Prior to ground disturbance, temporary erosion and sediment control barriers will be installed at the limits of work as shown on the plans. Means and methods of construction during each phase are determined by the contractor.

Phase 1 will include installation of drainage structures and pipes outside of the existing roadway, full depth roadway reconstruction and widening, shared used path construction, installation of street lighting conduit, as well as construction of the wetland replication area.

Phase 2 will include installation of drainage structures and pipes within the existing roadway and full depth roadway reconstruction.

Phase 3 will include construction of the western half of the roundabout truck apron.

Phase 4 will include construction of the eastern half of the roundabout truck apron.

Phase 5 will include installation of curb, sidewalk, and remaining portions of shared use path, highway lighting, guardrail, final surface course paving, pavement marking, signage, landscaping, and restoration of any temporary wetland impacts not previously restored.

## 5.0 Stormwater Management

According to the WPA and Stormwater Management Regulations, the project meets the criteria of a redevelopment project per the definitions found in 310 CMR 10.04. In accordance with the DEP Stormwater Management Handbook, Standards 1,8, 9, and 10 must be met fully, while the remaining standards must be met to the maximum extent practicable (MEP). The project meets standards 2, 3, and 4 to the MEP. The proposed drainage design will add new catch basins for the proposed roundabout geometry and at new low points where roadway drainage will be optimized for more efficient flows. All new catch basins will utilize deep sumps where proposed to provide additional stormwater treatment. The proposed drainage system will improve the quality of stormwater runoff, pull the 24" outfall to Bloody Brook further upland and will overall maintain the historic drainage patterns, distributing runoff to the existing discharge points. See attached Stormwater Report prepared by McFarland Johnson (Appendix F).

## 6.0 Construction Mitigation Measures

The project has been designed to incorporate construction Best Management Practices (BMPs) to ensure adequate protection to wetland resource areas during construction. Any disturbed areas will be stabilized and restored following the completion of project activities. This will be achieved specifically by limiting alteration within resource areas to the maximum extent practicable while still meeting the project goals. Additionally, a 615 SF wetland replication area is proposed to offset the 375 SF of permanent impacts to BVW.


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### Erosion and Sedimentation Controls

Sedimentation barriers will be checked on a regular basis and following significant storm events. Sediment controls will remain in place during all phases of the project and will be removed once the area is sufficiently stabilized. Please refer to Project Plans for erosion and sedimentation control details and the proposed locations of controls.

### Construction stockpiling locations

All stockpile locations and staging areas will be located away from resource areas, floodplain, buffer zones and stormwater conveyances where feasible. In the event stockpiled materials must be left on site overnight, the piles will be covered with tarps and surrounded by erosion control measures (e.g. wattles, compost filter tubes).

### Spill Control

Appropriate spill kits will be kept on-site at all times. Equipment will not be maintained or refueled in or adjacent to resource areas and secondary containment will be provided. Concrete trucks will not wash out chutes or equipment in proximity to resource areas or storm drains. Washout material will be appropriately contained until cured and disposed of properly.

### Wetland Replication and Restoration

A 615 SF wetland replication area is proposed in an upland area immediately adjacent to the 200-series wetland, in the northeastern quadrant of the roundabout. The wetland replication includes excavation, shrub planting, and seeding with a native seed mix. Excavation is proposed to a depth of approximately 217.4 (North American Vertical Datum of 1988 [NAVD 88]). This elevation was chosen to allow for a strong hydrologic connection between the replication area and the adjacent wetland and is based on reference elevations in the 200-series wetland. Plantings of red-osier dogwood are proposed, based on the vegetation within the adjacent wetland and other nearby wetlands. A native seed mix consisting of wet meadow species is proposed within the replication area. See the Wetland Replication Plan in Appendix E for additional details. Temporarily impacted wetlands will be seeded with a native seed mix adapted to part-shade conditions. The wetland replication and restoration will be conducted under the supervision of a wetland specialist with at least 5 years of experience.

## 7.0 Regulatory Compliance

According to the Wetlands Protection Act regulations, on-site wetland resource areas are presumed significant in varying capacities to flood control, storm damage prevention, prevention of pollution, wildlife habitat, fisheries habitat, protection of public water supply, and protection of groundwater supply.

The work being proposed under this NOI is being filed under the WPA as a Limited Project, per 10.53(3)f, "*Maintenance and improvement of existing public roadways, but limited to widening less than a single lane, adding shoulders, correcting substandard intersections and improving drainage*


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*systems*", and 10.53(6), "*Notwithstanding the provisions of 310 CMR 10.58, the Issuing Authority may issue an Order of Conditions permitting as a limited project the construction, rehabilitation, and maintenance of footpaths, bikepaths, and other pedestrian or nonmotorized vehicle access to or along riverfront areas but outside other resource areas, provided that adverse impacts from the work are minimized and that the design specifications are commensurate with the projected use and are compatible with the character of the riverfront area. Generally, the width of the access shall not exceed ten feet of pavement, exempt within an area that is already altered (e.g., railroad beds within rights of way). Access shall not be located in vernal pools or fenced in a manner which would impede the movement of wildlife.*"

The project has been designed to comply with the General Performance Standards listed in 310 CMR 10.00 to the maximum extent practicable.

General Performance Standards

## Bordering Vegetated Wetland (BVW)

Table 2 – Bordering Vegetated Wetland General Performance Standards

| Performance Standard | Response |
|---|---|
| 310 CMR 10.55(4)(a)] - Where the presumption set forth in 310 CMR 10.55(3) is not overcome, any proposed work in a Bordering Vegetated Wetland shall not destroy or otherwise impair any portion of said area. | MassDOT has designed the Project to avoid wetland impacts to the maximum extent practicable. Unavoidable permanent BVW impacts (approximately 375 square feet) will occur as a result of the construction of the roundabout. Mitigation for direct wetland impacts will be provided (refer to Section 6). |
| [310 CMR 10.55(4)(b)] the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5000 square feet of Bordering Vegetated Wetland if the replacement area will function in a manner similar to the area that will be lost | The proposed work will comply with these performance standards for wetland replication. The project will result in permanent impacts to 375 square feet of BVW. Approximately 615 square feet of wetland replication is proposed, for a replication ratio of 1.6:1. The proposed mitigation involves the regrading of an upland area adjacent to the existing series 200 wetland. Please refer to Section 6 for more details on the proposed replication area. |
| [310 CMR 10.55(4)(c)] – BVW loss | Not applicable because there is no net loss of bordering vegetated wetlands. |
| [310 CMR 10.55(4)(d)] Protection of Rare Species | Per the the Massachusetts Natural Heritage and Endangered Species Program (NHESP) MassGIS datalayers (based on the 15th edition of the Atlas, August 2021) there is no presence of Priority or Estimated Habitat within the Project Area, therefore no impacts to rare species are anticipated. |


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| Performance Standard | Response |
|---|---|
| | |
| [310 CMR 10.55(4)(e)] - Area of Critical Environmental Concern | Based on a desktop review of the most recent Mass GIS data (April 2009), the Project is not located within an Area of Critical Environmental Concern. |

## Bank, 310 CMR 10.54(4)

The removal of the existing failed headwall will result in 10 linear feet of permanent impacts to Bank, see Table 3 for compliance with the performance standards .

Table 3 – Bank General Performance Standards

| Performance Standard | Response |
|---|---|
| [310 CMR 10.54(4)(a)] Work on a Bank shall not impair the bank | The project will improve the current condition of the Bank of Bloody Brook by removing the failed concrete headwall and re-establishing an earthen bank. |
| [310 CMR 10.54(4)(b)] – Structures in/on Bank | The existing headwall will be removed, and the drainage outlet will be relocated approximately 60 feet away from the Bank. |
| [310 CMR 10.54(4)(c)] Protection of Rare Species | Per the the Massachusetts Natural Heritage and Endangered Species Program (NHESP) MassGIS datalayers (based on the 15th edition of the Atlas, August 2021) there is no presence of Priority or Estimated Habitat within the Project Area, therefore no impacts to rare species are anticipated. |
| [310 CMR 10.55(4)(e)] - Area of Critical Environmental Concern | Based on a desktop review of the most recent Mass GIS data (April 2009), the Project is not located within an Area of Critical Environmental Concern. |

## Riverfront Area (RFA), 310 CMR 10.58 (5)

The northeast quadrant of the project is located within RFA associated with Bloody Brook. Work will temporarily alter or permanently redevelop approximately 13,210 SF of grassed or vegetated RFA along the edge of the roadway and within the drainage easement. Redevelopment projects must comply with the following standards cited under 310 CMR 10.58(4) and roadway maintenance is allowed limited project review under 10.53(3).



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Table 4 – Riverfront Area General Performance Standards

| Performance Standard | Response |
|---|---|
| 10.58(4)(a) Protection of Other Resource Areas | BVWs are located within RFA. The General Performance Standards for BVWs are met. |
| 10.58(4)(b) Protection of Rare Species | There is no presence of Priority or Estimated Habitat within the Project Area, therefore no impacts to rare species are anticipated. |
| 10.58(4)(c) Practicable and Substantially Equivalent Economic Alternatives | There are no practical or substantially equivalent economic alternatives that would still meet Project Goals. |
| 10.58(4)(d) No Significant Adverse Impact | |
| 1.a At a minimum, a 100-foot wide area of undisturbed vegetation is provided | 1.a The existing failed outfall at Bloody Brook is located within the 100-foot RFA. The replacement outfall will be pulled back approximately 60 feet from Bloody Brook, which will result in improved post-project conditions. Vegetation impacts have been minimized to the maximum extent practicable. |
| 1.b Stormwater is managed according to standards established by the Department in its Stormwater Policy. | 1.b This project is considered redevelopment. It has been designed to meet stormwater standards to the maximum extent practicable. Please see attached Storm Water Report (Appendix F) |
| 1.c Proposed work does not impair the capacity of the riverfront area to provide important wildlife habitat functions. | 1.c No NHESP priority habitat is located within the project. Temporary impacts will be restored following construction. Relocation of the drainage system outfall away from Bloody Brook will improve wildlife habitat by replacing approximately 60 LF of failing drainage pipe with an open connection with Bloody Brook. Permanent impacts associated with roundabout construction will not substantially impact/impair wildlife habitat, as the majority are located in close proximity to the existing roadway, which provides minimal habitat for wildlife. |
| 1.d Proposed work shall not impair groundwater or surface water quality by incorporating erosion and sedimentation controls and other measures to attenuate nonpoint source pollution. | 1.d Construction-term erosion prevention and sediment controls will be implemented to minimize the potential for surface runoff or non-point source pollution from entering the adjacent resource areas. |



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## 8.0 Summary

The proposed project improves the safety of the intersection, provides accommodations for bicyclists and pedestrians, and improves the existing drainage system. The project was planned and designed to avoid wetland and waterbody impacts where practicable. Impacts to BVW, Bank, RFA, and buffer zone were minimized to the greatest extent practicable while meeting the project's intended purpose and need, and wetland replication is proposed to offset permanent impacts to BVW and wetland restoration will occur for temporarily impacted wetlands. Efforts were made to improve site stormwater by including deep sump catch basins throughout the project. Following construction, temporarily impacted upland areas will be restored to pre-existing conditions through application of loam & seed.



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Appendix B

Town of Deerfield
Intersection Improvements on Greenfield Road (Routes 5 and 10) at Mill Village Rd and North Main St.
MassDOT Project No. 613708
Notice of Intent

SITE FIGURES

Figure 1. USGS Locus
Figure 2. Aerial
Figure 3. Wetland Resources
Figure 4. FEMA FIRM
Figure 5. NHESP Map
Figure 6. Other Environmental Resources

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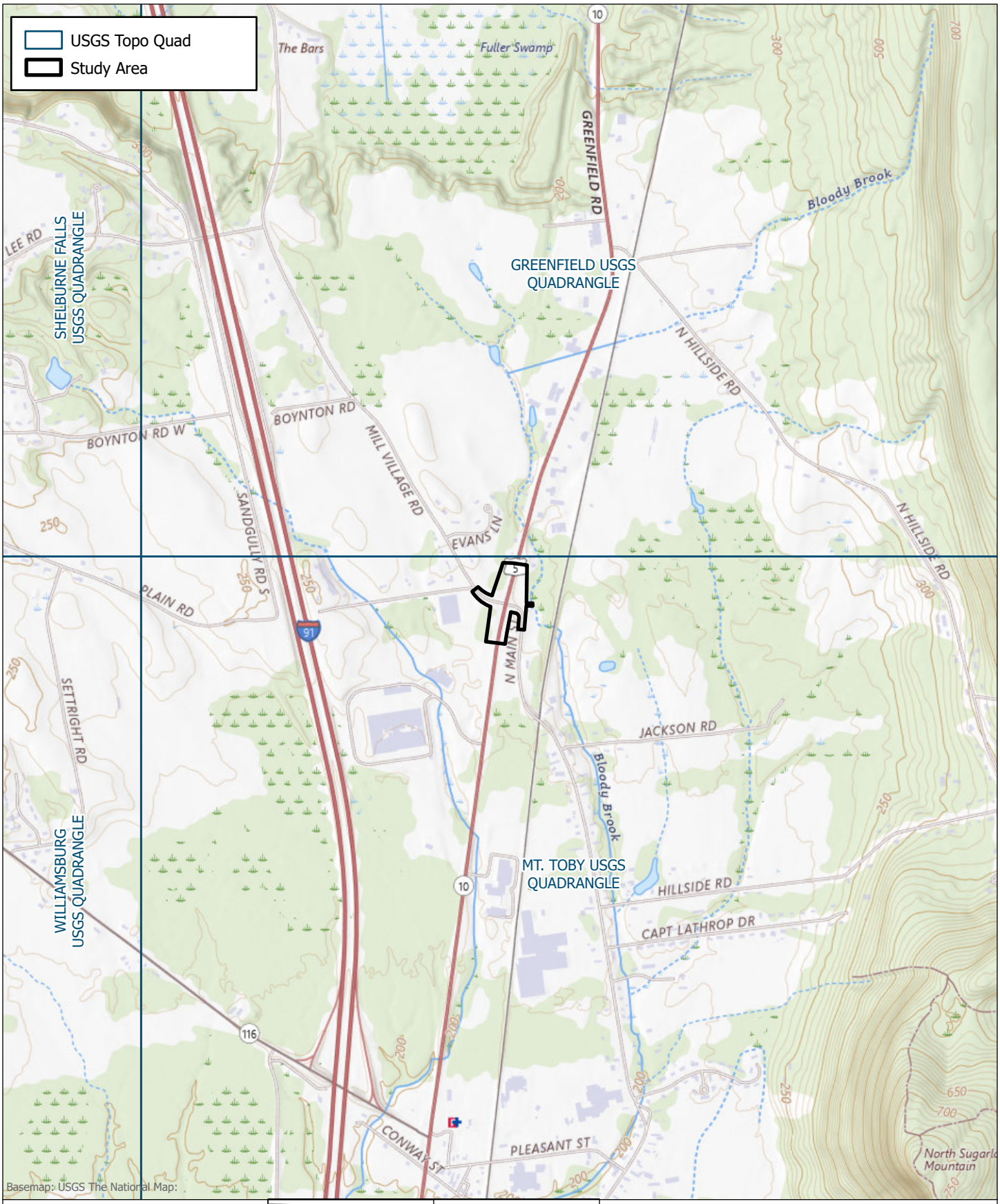
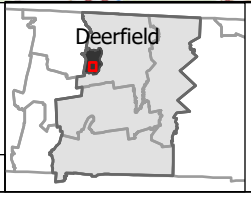



massDOT Massachusetts Department of Transportation Highway Division

District 2

Prepared: 8/21/2025, R. Hunter




0 500 1,000 2,000

Feet

N

1:24,000

**Figure 1 - USGS Project Location**
Deerfield
Route 5/10 at Mill Village Road and North Main Street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District 2

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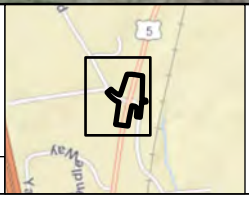

0 37.5 75 150
Feet

N

1:1,800

**Figure 2 - Aerial**
Deerfield
Route 5/10 at Mill Village Road and
North Main Street

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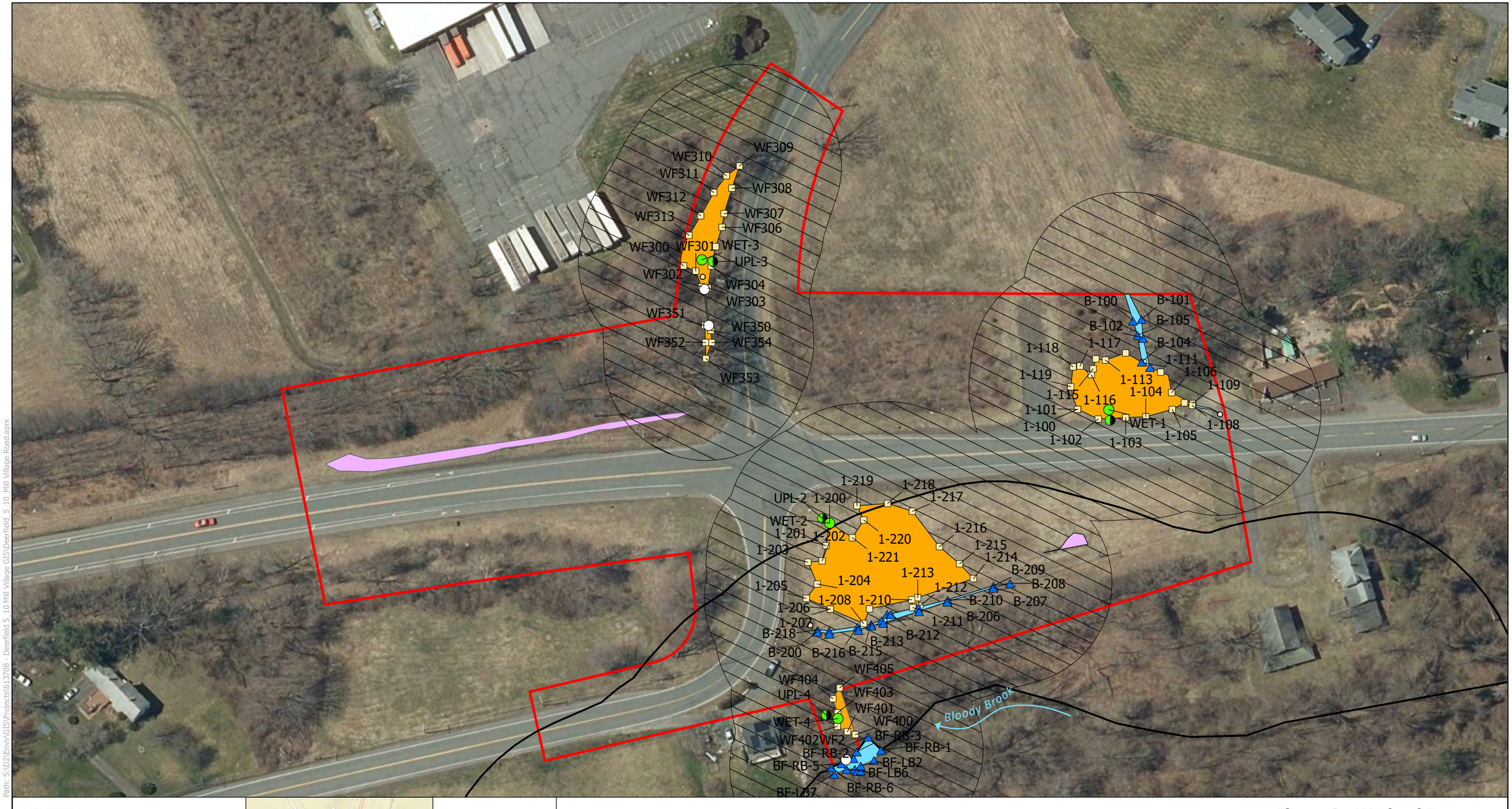


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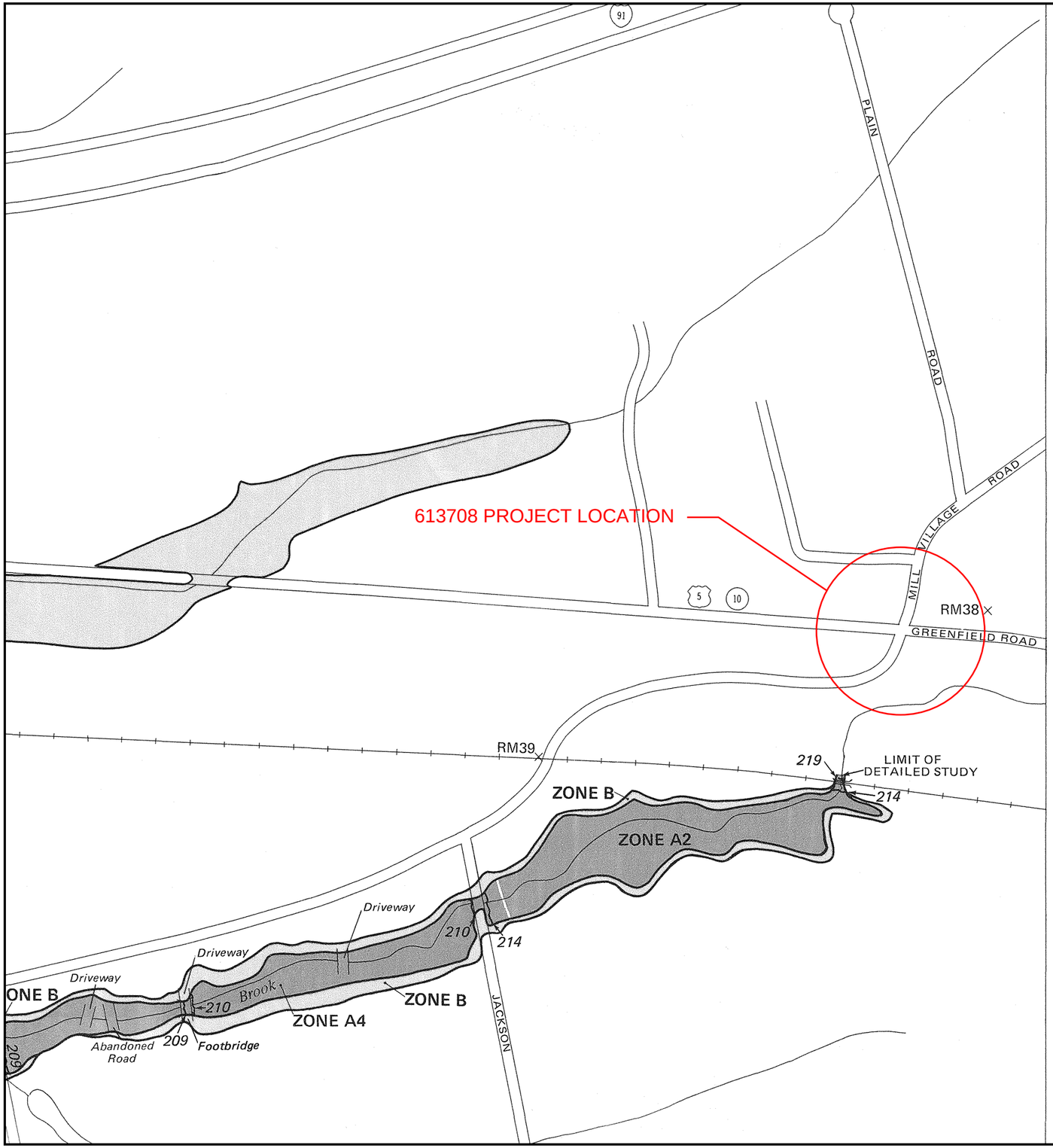
Massachusetts Department of Transportation
Highway Division

District 2

Prepared: 9/30/2025, R. Hunter

**Figure 3 - Wetland Resources**
Deerfield - Rt 5/10 at Mill Village Rd

Path: S:\D2\EnvirGIS\Projects\613708 - Deerfield_5_10 Mill Village GIS\Deerfield_5_10_Mill Village Road.aprx




action); base flood elevations and flood hazard factor determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V may be protected by flood control structures.

This map is for flood insurance purposes only; it does not neces sarily show all areas subject to flooding in the community o all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Ma Panels.

INITIAL IDENTIFICATION:
SEPTEMBER 13, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
JULY 30, 1976

FLOOD INSURANCE RATE MAP EFFECTIVE:
JULY 2, 1980

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE da shown on this map to determine when actuarial rates apply t structures in the zones where elevations or depths have been esta lished.

To determine if flood insurance is available in this communit contact your insurance agent, or call the National Flood Insuranc Program, at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE
400 0 400 FEET

APPROXIMATE SCALE
400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

# FIRM
## FLOOD INSURANCE RATE MAP

TOWN OF
**DEERFIELD,**
**MASSACHUSETTS**
FRANKLIN COUNTY

PANEL 6 OF 12
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
250115 0006 B

EFFECTIVE DATE:
JULY 2, 1980

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

Figure 4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District 2

Prepared: 6/9/2025, R. Hunter

0 37.5 75 150

Feet

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**Figure 5 - NHESP Habitats**
Deerfield
Route 5/10 at Mill Village Road and North Main Street

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Massachusetts Department of Transportation
Highway Division

District 2

Prepared: 2/9/2026, R. Hunter

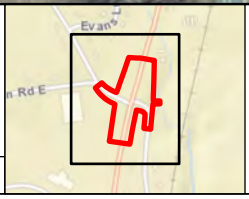

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**Figure 6 - Other Env. Resources**
Deerfield
Route 5/10 at Mill Village Road and North Main Street

\\MHD-FSP-D2-V01\shareddata\D2_00NEW SHAREPOINT\Projects\Environmental\GIS\Projects\613708 - Deerfield 5_10 Mill Village GIS\Deerfield_5_10_Mill Village Road.aprx

Appendix C

Town of Deerfield
Intersection Improvements on Greenfield Road (Routes 5 and 10) at Mill Village Rd and North Main St.
MassDOT Project No. 613708
Notice of Intent

PHOTOGRAPHS

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## Appendix C– Site Photographs

**Photo 1**: Deerfield St at the intersection of Mill Village Rd (left) and N. Main St (right), facing north.

**Photo 2**: Existing failed drainage headwall at Bloody Brook. Facing south.

**Photo 3**: 200-series wetland on photo left, 200-series Bank on photo right in background. Proposed wetland replication area located in mid-ground. Facing north.

**Photo 4**: 100-series wetland, facing south.

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Appendix D

Town of Deerfield
Intersection Improvements on Greenfield Road (Routes 5 and 10) at Mill Village Rd and North Main St.
MassDOT Project No. 613708
Notice of Intent

WETLAND DELINEATION REPORT

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# Wetland Delineation Report
# Deerfield - Intersection Improvements on Greenfield Road (Routes 5/10) at Mill Village Road and North Main Street
# MassDOT Project #613708

September 2025

Prepared by:
Robin Hunter, PWS (#3582), District 2 Stormwater and Wetlands Analyst

## Executive Summary

The Deerfield - Intersection Improvements on Greenfield Road (Routes 5/10) at Mill Village Road and North Main Street project (Project) is located in Deerfield, Franklin County, Massachusetts. The Project will The Project will result in improvements to the existing intersection.

A wetland resources delineation was conducted for an approximately 7-acre study area, which includes the proposed work area and adjacent areas that may be temporarily or permanently impacted by the Project. This delineation was conducted in accordance with the U.S. Army Corps of Engineers' (USACE's) 1987 *Wetlands Delineation Manual*, the USACE *Northcentral and Northeast Regional Supplement* (Version 2.0; 2012), and the *Massachusetts Handbook for Delineation of Bordering Vegetated Wetlands* (Jackson et al. 2022).

The study area contains the following regulated Massachusetts Inland Wetland Resource Areas:

☒Bank
☐Land Under Water Bodies and Waterways (LUWW)
☒Riverfront Area
☒Buffer Zone
☐Vernal Pool (Certified and/or Potential)
☒ Bordering Vegetated Wetland (BVW)
☐ Land Subject to Flooding (BLSF/ILSF)
☐ Estimated Habitats of Rare Wildlife
☐ Priority Habitats of Rare Species

# 1 Table of Contents



LIST OF TABLES



LIST OF APPENDICES

# 1 Introduction

This report presents the methods and results of wetland delineation conducted for the Deerfield - Intersection Improvements on Greenfield Road (Routes 5/10) at Mill Village Road and North Main Street project (Project), Franklin County, Massachusetts (Appendix A, Figure 1). The Project will result in improvements to the existing intersection. This report describes jurisdictional resource areas regulated under the Wetlands Protection Act (M.G.L. c. 131 sec. 40) and associated Wetlands Protection Act Regulations (310 CMR 10), as well as areas regulated under the Clean Water Act.

# 2 Location

The study area is located in the vicinity of the Greenfield Road (Routes 5/10) intersection with Mill Village Road and North Main Street (Figure 1, Table 1). The study area is located within State Highway Layout, Town of Deerfield Right of Way, and a MassDOT drainage easement.

**Table 1 – Location Information**

| | |
|---|---|
| Name of Waterbody | Unnamed tributary to Bloody Brook |
| Tributary to and Downstream Waterbody | Bloody Brook, Mill River, Connecticut River |
| Watershed Hydrologic Unit Code and Name | HUC010802010604,<br>West Brook-Mill River |
| Latitude and Longitude (decimal degrees) | 42.498593, -72.609497 |
| USGS Quadrangle(s) | Mount Toby |
| Address | N/A – intersection of Greenfield Road, Mill Village Road, and North Main Street |
| Assessor Parcel Number | N/A |
| Directions to Site | From the Deerfield Town Hall, head northwest on Conway Street, which becomes Railroad Street. Turn right onto Elm Street. Turn right onto Greenfield Road (Route 5/10). Continue on Greenfield Road for approximately 1.5 miles. The study area is at the intersection with Mill Village Road and North Main Street. |
| Study Area | Approximately 7 acres |

# 3 Methods

The wetland resource delineation was conducted in accordance with the Massachusetts Wetlands Protection Act (WPA; M.G.L. c. 131, s.40), its implementing Regulations (310 CMR 10.00), the USACE 1987 *Wetlands Delineation Manual*, the USACE *Northcentral and Northeast Regional Supplement* (Version 2.0; 2012), and the *Massachusetts Handbook for Delineation of Bordering Vegetated Wetlands* (Jackson et al. 2022).

## 3.1 Background Information

The following information was reviewed prior to conducting the delineation:

- The FEMA Flood Insurance Rate Map (FIRM) Panel 2501150006B (effective date July 2, 1980)
- NRCS Soil Survey Data (NRCS 2024a)
- U.S. Fish and Wildlife Service NWI data (USFWS 2024)
- MassDEP Wetlands maps (MassDEP 2005).
- Natural Heritage and Endangered Species Program (NHESP) Priority and Estimated Habitats Mapper
- Recent aerial orthoimagery.

## 3.2 Field Survey

Field surveys were conducted on August 6, 13, and 15 and September 6, 2024, by MassDOT staff, including District Environmental Engineer Billie Li, professional wetland scientist (PWS #3582) Robin Hunter, environmental engineer Max Phaneuf, and environmental analysts Noah Boland, Alex Lamarch, and Mike Dami. Additional site visits were conducted by Robin Hunter on August 1, 7, 8, 11, and 14, 2025 to verify stream flow conditions within Bloody Brook. The study area was evaluated for the presence of regulated wetland resources. The surveyors searched the study area for evidence of wetland indicators such as hydrophytic vegetation, ponding, or saturated conditions.

**Table 2 – Field Survey Dates and Personnel**

| Date | Surveyors |
|---|---|
| August 6, 2024 | Billie Li, Robin Hunter, Noah Boland, Alex Lamarch, and Mike Dami |
| August 13, 2024 | Billie Li, Max Phaneuf, and Robin Hunter, |
| August 15, 2024 | Robin Hunter |
| September 6, 2024 | Robin Hunter |
| August 1, 7, 8, 11, 14, 2025 | Robin Hunter |

Data regarding vegetation, soils, and hydrology were gathered to complete the Bordering Vegetated Wetland (BVW) delineation field forms. Hydrology was evaluated within 12 inches of the surface and soil conditions within 12-24 inches of the surface.

The Wetland Indicator Status for plant species was determined using the 1988 National List of Plants Species that Occur in Wetlands (1988 list), except for those species not included in the 1988 list. Indicator status for those species was determined using the U.S. Army Corps of Engineers Northcentral and Northeast 2022 Regional Wetland Plant List (U.S. Army Corps of Engineers 2022).

Resource boundary flags were placed in the field to mark the limit of BVWs with orange flagging and Bank with blue flagging.

The locations of resource area boundaries were mapped using a Leica GS18 global navigation satellite system (GNSS) real-time kinematic (RTK) receiver with sub-meter accuracy. Spatial data were imported into ESRI ArcGIS Pro 3.0.0 software to develop resource maps.

# 4 Results

Site photographs are provided in Appendix B (photograph locations are shown on Figure 5).

## 4.1 Land Forms and Topography

The study area is generally flat, but slopes downwards to the east. Elevations range from approximately 210 to 225 feet (North American Vertical Datum of 1988 [NAVD 88]). The study area includes Greenfield Road, Mill Village Road, North Main Street, and their associated embankments. An access driveway is also present on the west side of Greenfield Road, north of Mill Village Road.

## 4.2 Hydrology

Bloody Brook is located at the eastern limits of the study area (Figures 1 and 2). Bloody Brook flows into the Mill River, which flows into the Connecticut River, which is defined by USACE as a navigable water (USACE 2019). The most recent USGS National Map shows Bloody Brook in the vicinity of the study area as an intermittent stream, however the 1990 Mount Toby USGS quadrangle map shows it as a perennial stream. During site visits conducted in August 2025, Bloody Brook was observed to not be flowing on four separate days (August 7, 8, 11, and 14, 2025, see photographs 7 through 14 in Appendix B). However, on September 9, 2025, DEP declared that the Connecticut River Valley was in a Level-2 Significant Drought, retroactive to August 1, 2025, therefore the presumption of the stream being perennial is not overcome. Using the StreamStats method outlined 310 CMR 10.58(2)(a)(1)(c)(i), Bloody Brook in the vicinity of the study area has a 0.72 square mile drainage area and a predicted flow rate of 0.07 cubic feet per second at the 99% flow duration (Appendix C). Therefore, for the purposes of this delineation, Bloody Brook in the vicinity of the study area is considered perennial.

Bloody Brook in the immediate vicinity of the study area is not identified as an impaired waterbody (Massachusetts Department of Environmental Protection [MassDEP] 2023). However, downstream of the crossing with the Connecticut River Mainline train tracks, Bloody Brook (MA34-36) is listed as impaired for dissolved oxygen, *Escherichia* Coli (*E. Coli*), total phosphorus, and turbidity (MassDEP 2023).

## 4.3 Wetlands Databases

The eastern edge of the study area overlaps with mapped DEP wetlands associated with Bloody Brook (Figure 2).

## 4.4 Floodplain

According to the most recent approved FEMA FIRM 2501150006B (effective date July 2, 1980), the study area is not a mapped flood zone (Appendix D). However, the preliminary FIRM released May 22, 2024 (Appendix D) indicates that the study area is located within the flood hazard Zone A, as well as the 0.2% Annual Chance Flood Hazard area (Zone X).

## 4.5 Soils

Three soil types are present within the study area and are listed in Table 3. Figure 3 shows soils mapped in the study area (Natural Resources Conservation Service [NRCS 2024a]). All three soils are

included on the NRCS list of hydric soils (NRCS 2024b). Soils in the study area appear to have been altered in the past due to construction of the roadways and the former railroad.

**Table 3.** NRCS Soil Types Mapped in the Study Area

| Map Unit Symbol | Map Unit Name | Map Unit Details | Hydric Soil |
|---|---|---|---|
| 30A | Raynham silt loam | 0 to 3 percent slopes | Yes |
| 223A | Scio silt loam | 0 to 3 percent slopes | Yes |
| 223B | Scio silt loam | 3 to 8 percent slopes | Yes |

## 4.6 Land Use

The study area is within State Highway Layout and Town of Deerfield Right of Way. Adjacent land uses include transportation (Route 5/10), low density residential, and commercial. Historically, a rail line was present in the western portion of the study area, per the 1935 Mount Toby USGS quadrangle. Additionally, the historic alignment of Route 5/10 runs along the eastern edge of the study area.

## 4.7 Wetland Resource Areas

Wetland Resource Areas associated with the study area include Bordering Vegetated Wetland (BVW), Bank, Riverfront Area (RFA), and 100-foot Buffer. Descriptions of the Resource Areas are provided below, and they are mapped in Figure 4. BVW data sheets are provided in Appendix E.

### Bordering Vegetated Wetland (BVW)

BVW is defined in 310 CMR 10.55(2) as *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes. In these areas soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. The boundary of BVW is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.*

#### *Vegetation*

Vegetation is identified as follows: common name (scientific name) wetland indicator status. Four BVWs were mapped on site. The BVW to the northwest of the intersection (flagged with series 1-100 through 1-119) is dominated by sensitive fern (*Onoclea sensibilis*) FACW on its eastern side, transitioning into an area dominated by red osier dogwood (*Cornus sericea*) FACW and red maple (*Acer rubrum*) FAC further west. This wetland drains to a small area of Bank that flows into a catch basin connected to Bloody Brook. The wetland to the northeast of the intersection (flagged with series 1-200 through 1-221) is a wet meadow dominated by soft rush (*Juncus effusus*) OBL in the wettest areas to the east, with species such as northern blackberry (*Rubus flagellaris*) FACU, red osier dogwood, and goldenrod (*Solidago* spp.) present in drier areas closer to the roadway. The BVWs associated with constructed ditches to the south of Mill Village Road (flagged with series WF-300 through WF-313 and WF-350 through WF-354) are joined by a 12-inch culvert, and drain to an inlet connected to Bloody Brook. These wetlands are dominated by jewelweed (*Impatiens capensis*) FACW, interrupted fern (*Osumnda claytoniana*) FAC, and red osier dogwood in the understory. The BVW

associated with Bloody Brook (flagged with series WF-400 through WF-405) is dominated by sensitive fern, poison ivy (*Toxicodendron radicans*) FAC, and red osier dogwood. The canopy, when present, generally includes trees that are rooted outside of the wetland.

In addition to the BVWs described above, two isolated wetlands are mapped on Figure 4. These wetlands did not have any apparent surface water or culverted connection to any other waterbodies.

#### *Hydrology*

Indicators of wetland hydrology within the BVWs included oxidized rhizospheres, geographic position, surface soil cracks, and sparsely vegetated concave surface. No surface water, high water table, or soil saturation were observed at the sampling points, likely due to sample collection during drier portions of the year.

#### *Soils*

Hydric soils indicators Depleted Below Dark Surface (A11) and Depleted Matrix (F3) were identified.

### Inland Bank/Stream

Inland Bank is defined under 310 CMR 10.54(2)(a) as *the portion of the land surface which normally abuts and confines a water body. It occurs between a water body and a vegetated bordering wetland and adjacent flood plain, or, in the absence of these, it occurs between a water body and an upland*.

Bank was delineated for unnamed intermittent streams tributary to Bloody Brook and Bloody Brook. Bank is considered to be coincident with the Ordinary High Water Mark (OHWM) of these streams. Bank marked with flag series B-100 through B-105 appears to have been excavated through the former railroad bed in the west of the study area, collecting water draining from the mowed field to the west of the study area. This stream drains into the BVW flagged as series 1-100. Water then flows through a poorly defined channel into a catch basin. Bank marked with flag series B-200 through B-219 is located underneath the power lines, with water flowing south into an intake that flows to Bloody Brook. Bank associated with Bloody Brook was flagged with series BF-RB-1 through BF-RB-6 (for the right bank) and series BF-LB-1 through BF-LB-7 (for the left bank).

### Riverfront Area

RFA is measured 200-feet horizontally from the MAHWL of Bloody Brook. For the portions of Bloody located within the study area, RFA was delineated within 200 feet of the flagged Bank of Bloody Brook. For those portions of Bloody Brook outside of the study area RFA was delineated based on interpretation of aerial imagery. RFA in the study area is characterized by forested vegetation within a portion of the inner (0-100 feet) riparian zone, and a mix of mowed field, BVW, existing roadway, and road shoulders in the outer (100-200 feet) riparian zone.

### Buffer Zone

A 100-foot Buffer Zone extends outward from the limit of the BVWs and Bank. Within the study area, the buffer zone includes roadways, driveways, mowed fields, and forested areas.

### 4.8 Rare, Threatened and Endangered Species

Per the NHESP MassGIS datalayers (15th edition of the Atlas, August 2021), no mapped estimated or priority habitat is present within the study area (Figure 5).

### 4.9 Other Environmental Resources

According to MassGIS data layers and classifications provided in 314 CMR 4.00, none of the project area occurs within an Outstanding Resource Water (ORW), Surface Water Protection Zone, or Area of Critical Environmental Concern (ACEC).

## 5 References

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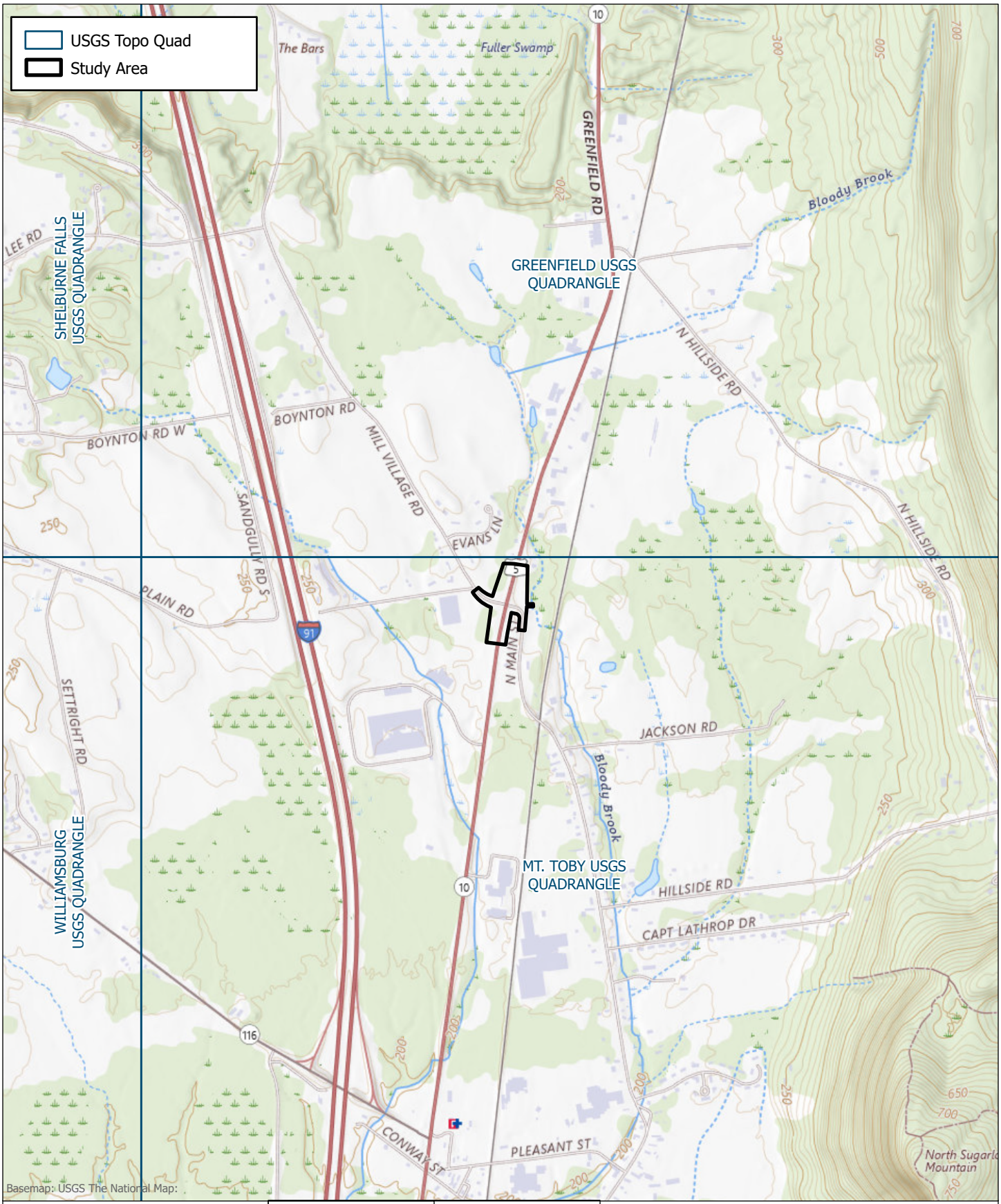
# Appendix A - Figures

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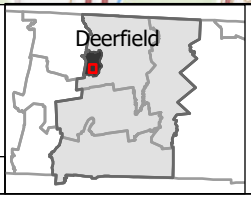


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**Figure 1 - USGS Project Location**
Deerfield
Route 5/10 at Mill Village Road and North Main Street


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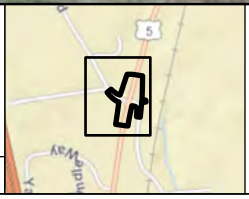

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**Figure 2 - Aerial**
Deerfield
Route 5/10 at Mill Village Road and
North Main Street

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District 2

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Feet

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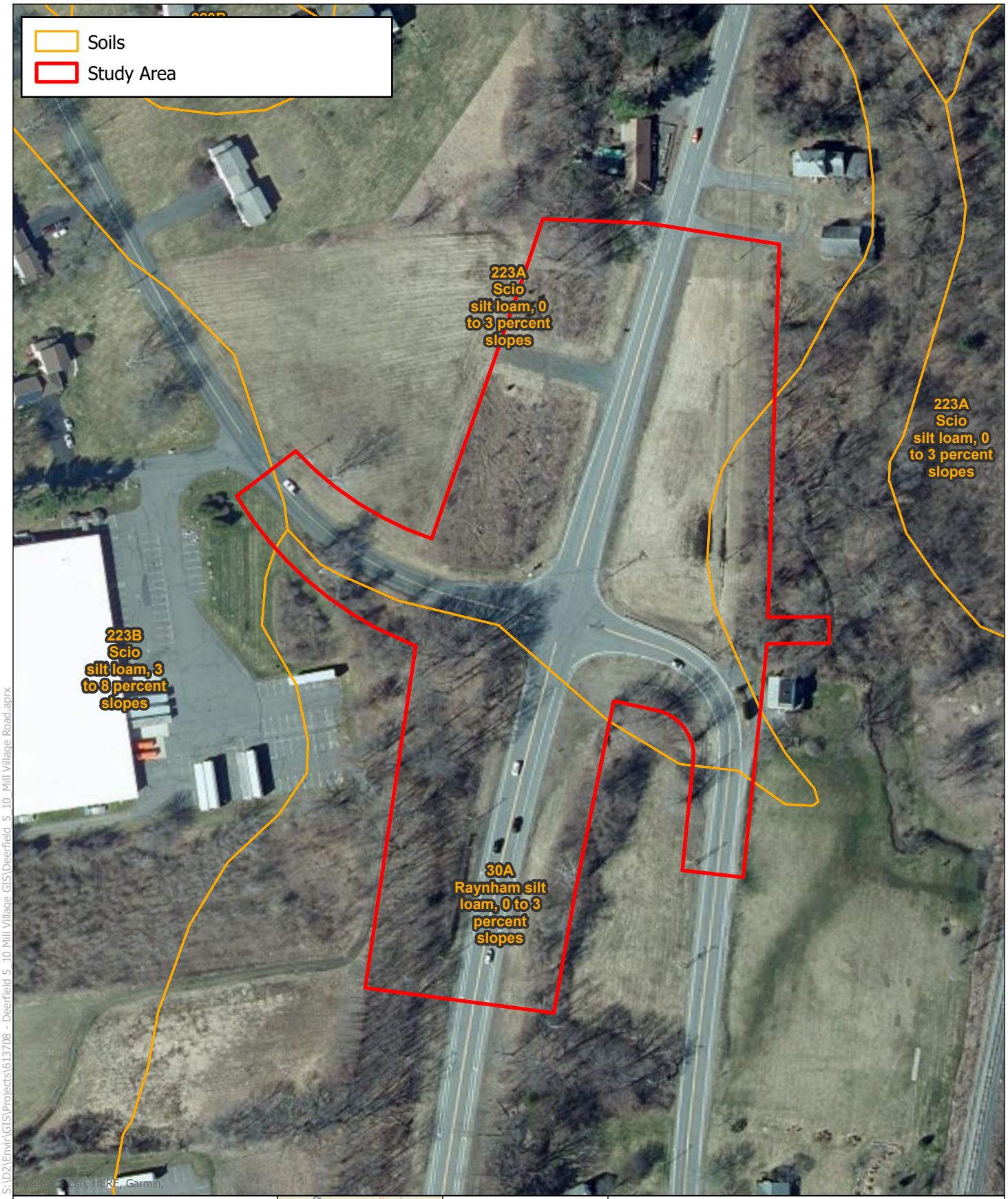
1:1,800

**Figure 2 - MassDEP Wetlands**

Deerfield

Route 5/10 at Mill Village Road and North Main Street

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Feet

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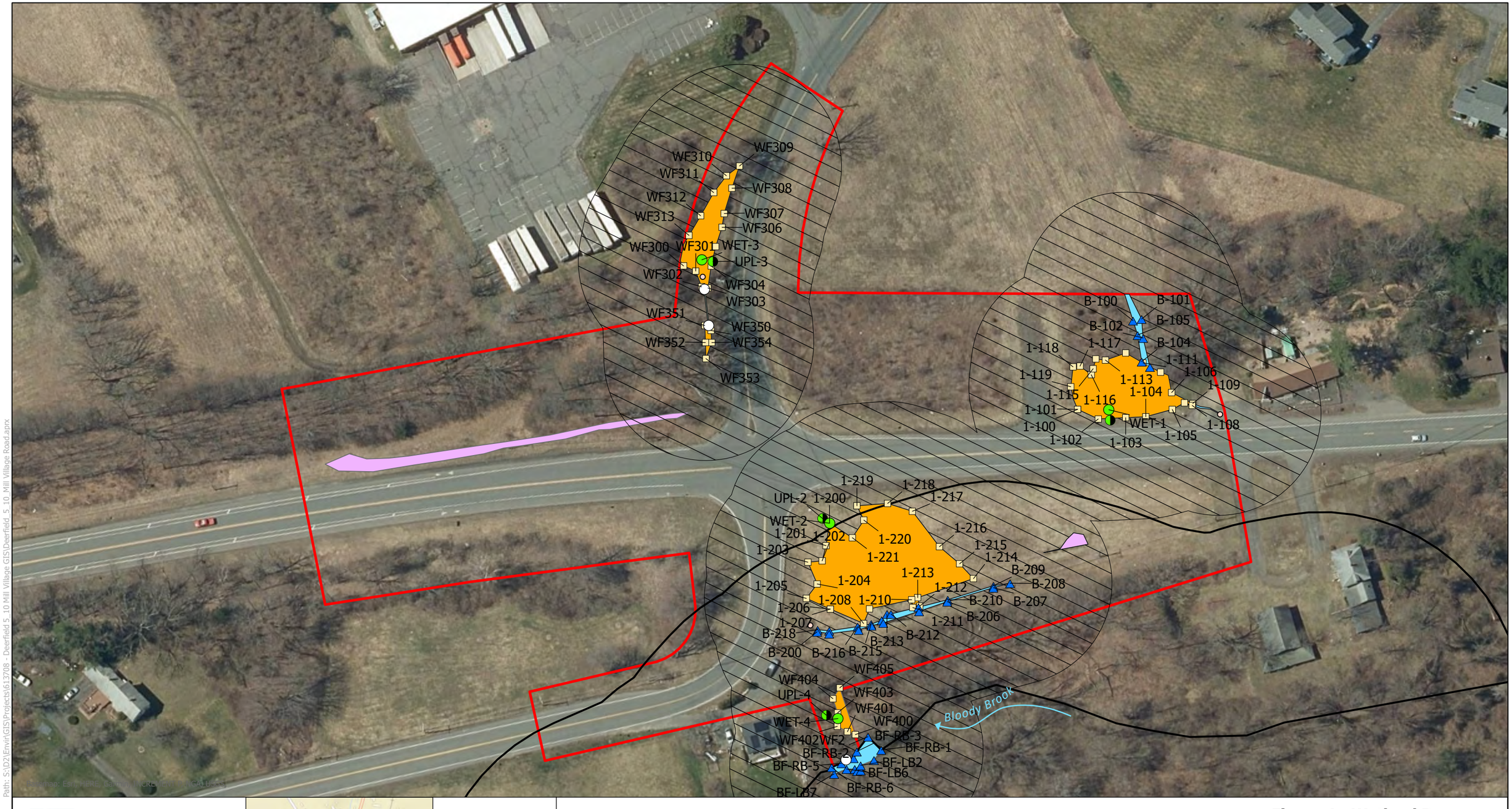
**Figure 3 - Soils**
Deerfield
Route 5/10 at Mill Village Road and
North Main Street

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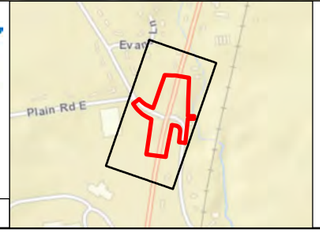


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Feet

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Study Area

Wetland Resources
- BVW
- Bank

100-foot Buffer Zone

200-foot Riverfront Area

Isolated Wetland

Culverted Waters

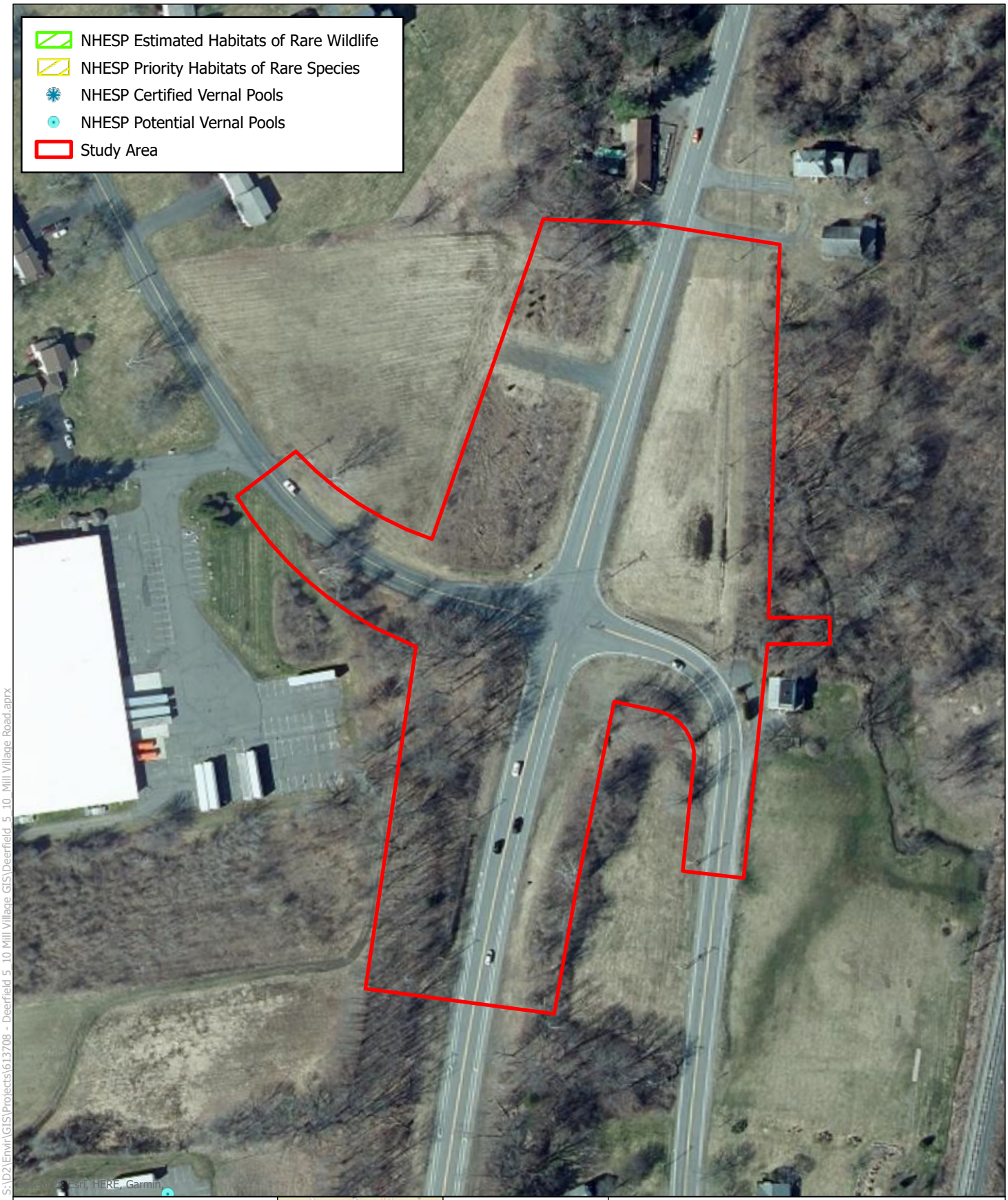
Delineation Points
- Wetland
- Bank
- Catch Basin

Culvert

Upland Sample Point

Wetland Sample Point

**Figure 4 - Wetland Resources**
Deerfield - Rt 5/10 at Mill Village Rd

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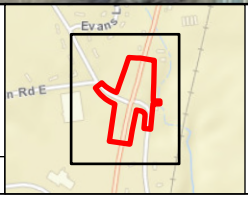


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Feet

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**Figure 5 - NHESP Habitats**
Deerfield
Route 5/10 at Mill Village Road and North Main Street

# Appendix B - Site Photographs

## Appendix B – Site Photographs

**Photo 1**: 200-series wetland sampling points (pink flags). Point UPL-2 in foreground and point WET-2 in background. Facing northeast.

**Photo 2**: 300-series wetland. Sampling points UPL-3 (foreground) and WET-3 (background) circled in yellow. Facing SW.

**Photo 3**: 200-series wetland on photo left, 200-series Bank on photo right in background. Facing north.

**Photo 4**: 100-series wetland, facing south.

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**Photo 5**: 400-series wetland sampling points (pink flags). Sampling points UPL-4 (foreground) and WET-4 (background) circled in yellow. Facing NE.

**Photo 6**: Bloody Brook, facing upstream. Flow present. (8/1/25).

**Photo 7**: Bloody Brook, facing upstream. Flow absent. (8/7/25).

**Photo 8**: Bloody Brook, facing downstream. Ponding present but flow absent. (8/7/25).

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**Photo 9**: Bloody Brook, facing upstream. Flow absent. (8/8/25).

**Photo 10**: Bloody Brook, facing downstream. Flow absent. (8/8/25).

**Photo 11**: Bloody Brook, facing upstream. Flow absent. (8/11/25).

**Photo 12**: Bloody Brook, facing downstream. Flow absent. (8/11/25).

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**Photo 13**: Bloody Brook, facing upstream. Flow absent. (8/14/25).

**Photo 14**: Bloody Brook, facing downstream. Flow absent. (8/14/25).

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# Appendix C – StreamStats Results

# StreamStats Report - Bloody Brook in the vicinity of the Rt 5/10, Mill Village Road, and North Main St Intersection

**Region ID:** MA
**Workspace ID:** MA20240730132006940000
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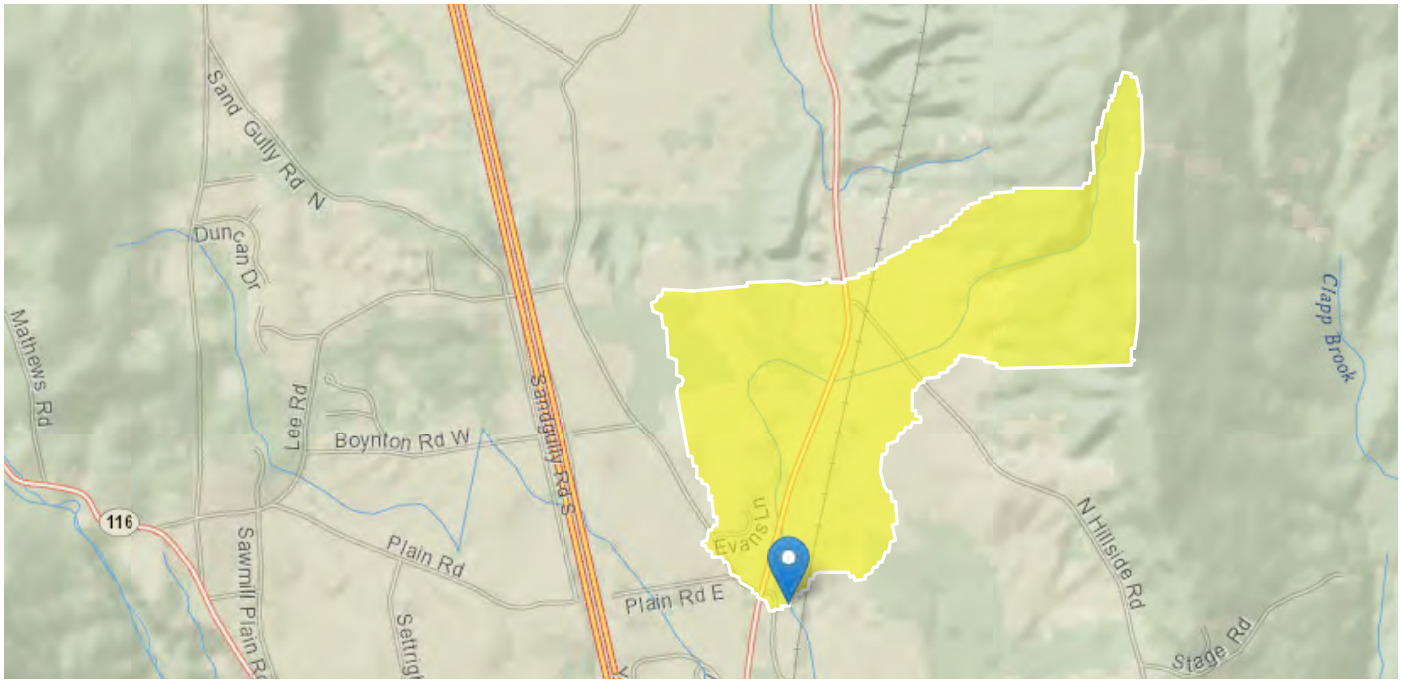



Collapse All

## Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| ACRSDFT | Area underlain by stratified drift | 0.63 | square miles |
| BSLDEM250 | Mean basin slope computed from 1:250K DEM | 5.112 | percent |
| DRFTPERSTR | Area of stratified drift per unit of stream length | 0.25 | square mile per mile |
| DRNAREA | Area that drains to a point on a stream | 0.72 | square miles |
| MAREGION | Region of Massachusetts 0 for Eastern 1 for Western | 1 | dimensionless |

## Flow-Duration Statistics

### Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|---|---|---|---|---|---|
| DRNAREA | Drainage Area | 0.72 | square miles | 1.61 | 149 |
| DRFTPERSTR | Stratified Drift per Stream Length | 0.25 | square mile per mile | 0 | 1.29 |
| MAREGION | Massachusetts Region | 1 | dimensionless | 0 | 1 |
| BSLDEM250 | Mean Basin Slope from 250K DEM | 5.112 | percent | 0.32 | 24.6 |

### Flow-Duration Statistics Disclaimers [Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

### Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

| Statistic | Value | Unit |
|---|---|---|
| 50 Percent Duration | 0.683 | ft^3/s |
| 60 Percent Duration | 0.475 | ft^3/s |
| 70 Percent Duration | 0.388 | ft^3/s |
| 75 Percent Duration | 0.326 | ft^3/s |
| 80 Percent Duration | 0.33 | ft^3/s |
| 85 Percent Duration | 0.256 | ft^3/s |
| 90 Percent Duration | 0.226 | ft^3/s |
| 95 Percent Duration | 0.135 | ft^3/s |
| 98 Percent Duration | 0.0939 | ft^3/s |
| 99 Percent Duration | 0.0672 | ft^3/s |

*Flow-Duration Statistics Citations*

**Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)**

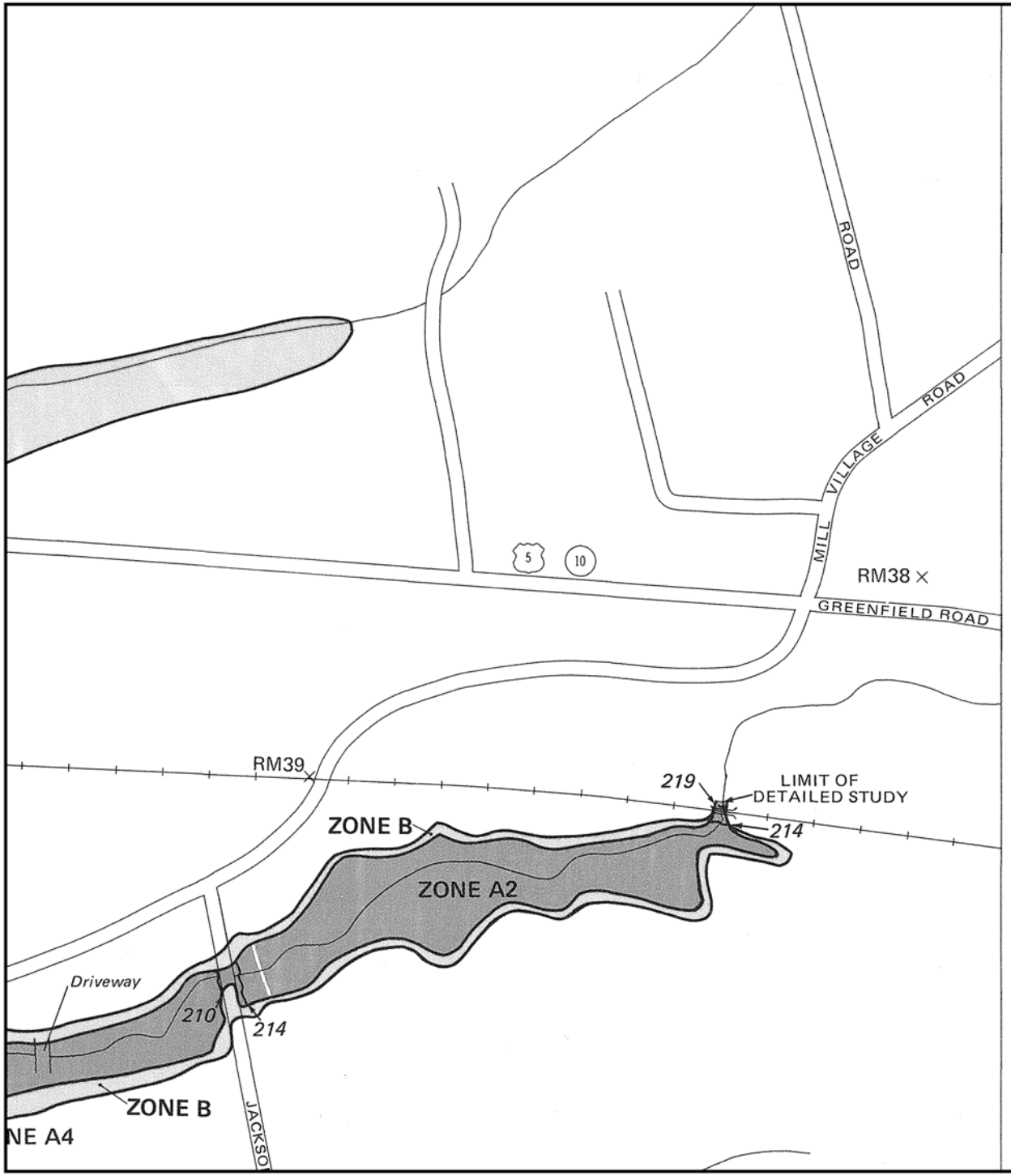
the U.S. Government.

Application Version: 4.21.0

StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

# Appendix D – FEMA FIRMS




APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

# FIRM

## FLOOD INSURANCE RATE MAP

TOWN OF
**DEERFIELD, MASSACHUSETTS**
FRANKLIN COUNTY

PANEL 6 OF 12
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
250115 0006 B

EFFECTIVE DATE:
JULY 2, 1980

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION


## FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV**

**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*
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

## NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available effective flood hazard information for your community, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be downloaded from the website. Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be acquired directly from the Flood Map Service Center at the website listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

Note: Some Special Flood Hazard Areas with elevations may not appear with elevation labels if the Base Flood Elevation or Cross-section line which communicates the elevation for the location appears on the adjacent panel. Please see the Panel Locator Diagram on this map panel to determine the adjacent panel and find the elevation feature there, or alternatively use the Flood Insurance Study report for detailed elevations by flood source.

## SCALE

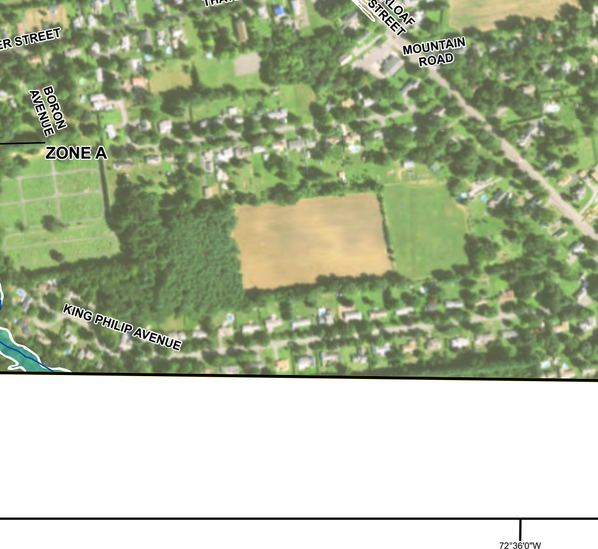
1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 feet

0 50 100 200 300 400 meters

Map Projection:
NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet
Vertical Datum: NAVD88

## PANEL LOCATOR





NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

**FRANKLIN COUNTY MASSACHUSETTS ALL JURISDICTIONS**

Panel Contains:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| TOWN OF WHATELY | 250132 | 0426 | D |
| TOWN OF DEERFIELD | 250115 | 0426 | D |

MAP NUMBER
**25011C0426D**
EFFECTIVE DATE
**Prelim Issue Date: 05/22/2024**

# Appendix E – Bordering Vegetated Wetland Data Sheets

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 603708 - Rt 5/10 At Mill Village and North Main St City/Town: Deerfield Sampling Date: 8/6/24

Applicant/Owner: MassDOT Sampling Point or Zone: WET-1

Investigator(s): Billie Li, Robin Hunter, Alex LaMarche, Noah Boland, Mike Dami Latitude / Longitude: 42.499586/-72.609284

Soil Map Unit Name: 223A Scio silt loam, 0 to 3 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ] , or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ] , or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

| | | |
|---|---|---|
| Wetland vegetation criterion met? | Yes [✓] No [ ] | **Is the Sampled Area within a Wetland?** **Yes [✓] No [ ]** |
| Hydric Soils criterion met? | Yes [✓] No [ ] | |
| Wetlands hydrology present? | Yes [✓] No [ ] | |

Remarks, Photo Details, Flagging, etc.:

Infrequent mowing in this area. Flag series 1-100 through 1-119.

**HYDROLOGY**

| **Field Observations:** | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Water Table Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Saturation Present (including capillary fringe)? | Yes [ ] | No [✓] | Depth (inches)_____ |

**Wetland Hydrology Indicators**

| Reliable Indicators of Wetlands Hydrology | Indicators that can be Reliable with Proper Interpretation | Indicators of the Influence of Water |
|---|---|---|
| [ ] Water-stained leaves | [ ] Hydrological records | [ ] Direct observation of inundation |
| [ ] Evidence of aquatic fauna | [ ] Free water in a soil test hole | [ ] Drainage patterns |
| [ ] Iron deposits | [ ] Saturated soil | [ ] Drift lines |
| [ ] Algal mats or crusts | [ ] Water marks | [ ] Scoured areas |
| [✓] Oxidized rhizospheres/pore linings | [ ] Moss trim lines | [ ] Sediment deposits |
| [ ] Thin muck surfaces | [ ] Presence of reduced iron | [ ] Surface soil cracks |
| [ ] Plants with air-filled tissue (aerenchyma) | [ ] Woody plants with adventitious roots | [ ] Sparsely vegetated concave surface |
| [ ] Plants with polymorphic leaves | [ ] Trees with shallow root systems | [ ] Microtopographic relief |
| [ ] Plants with floating leaves | [ ] Woody plants with enlarged lenticels | [✓] Geographic position (depression, toe of slope, fringing lowland |
| [ ] Hydrogen sulfide odor | | |

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Form Revised July 2023

**VEGETATION –** Use both common and scientific names of plants.

Tree Stratum Plot size 10 x 15 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

0.0 = Total Cover

Shrub/Sapling Stratum Plot size 10 x 15 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. red osier dogwood | Cornus sericea | FACW | 5.0 | Yes | Yes |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

5.0 = Total Cover

Herb Stratum Plot size 10 x 15 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. Sensitive fern | Onoclea sensibilis | FACW | 63.0 | Yes | Yes |
| 2. tall rye grass | Festuca arundinaceae (Schedonorus arundinaceus) | FACU | 10.5 | No | |
| 3. soft rush | Juncus effusus | FACW | 10.5 | No | |
| 4. multiflora rose | Rosa multiflora | FACU | 3.0 | No | |
| 5. Virginia creeper | Parthenocissus quinquefolia | FACU | 3.0 | No | |
| 6. Poison ivy | Toxicodendron radicans | FAC | 3.0 | No | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |

93.0 = Total Cover

**VEGETATION –** continued.

| Woody Vine Stratum | Plot size 10 x 15 feet | | | | |
|---|---|---|---|---|---|
| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| | | | 0.0 = Total Cover | | |

| Rapid Test: Do all dominant species have an indicator status of OBL or FACW? | | | | Yes ☑ No ☐ |
|---|---|---|---|---|
| Dominance Test: | Number of dominant species | Number of dominant species that are wetland indicator plants | | Do wetland indicator plants make up ≥ 50% of dominant plant species? Yes ☑ No ☐ |
| | 2 | 2 | | |
| Prevalence Index: | | Total % Cover (all strata) | Multiply by: | Result |
| | OBL species | | X 1 | = 0.00 |
| | FACW species | 79 | X 2 | = 157.00 |
| | FAC species | 3 | X 3 | = 9.00 |
| | FACU species | 17 | X 4 | = 66.00 |
| | UPL species | | X 5 | = 0.00 |
| | Column Totals | (A) 98 | | (B) 232 |
| Prevalence Index | | B/A = 2.37 | | Is the Prevalence Index ≤ 3.0? Yes ☑ No ☐ |
| **Wetland vegetation criterion met?** | | **Yes** ☑ **No** ☐ | | |

**Definitions of Vegetation Strata**

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

| **Cover Ranges** | |
|---|---|
| Range | Midpoint |
| 1-5 % | 3.0 % |
| 6-15 % | 10.5 % |
| 15-25 % | 20.5 % |
| 26-50 % | 38.0 % |
| 51-75 % | 63.0 % |
| 76-95 % | 85.5 % |
| 96-100 % | 98.0 % |

Sampling Point WET-1

**SOIL**

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators)

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Location[2] | | |
| 0-4 | 10 YR 4/2 | 98.00 | 7.5 YR 3/4 | 2.00 | C | PL | silty loam | many fibrous roots |
| 4-10 | 10 YR 4/3 | 97.00 | 7.5 YR 3/4 | 3.00 | C | PL | loam | |
| 10-14 | 10 YR 5/3 | 95.00 | 7.5 YR 3/4 | 5.00 | C | PL | loam | |
| 14-17 | 10 YR 5/4 | 99.00 | 7.5 YR 3/4 | 1.00 | C | PL | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

| **Hydric Soil Indicators** (Check all that apply) | | **Indicators for Problematic Hydric Soils** |
|---|---|---|
| ☐ Histosol (A1) | ☐ Polyvalue Below Surface (S8) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Thin Dark Surface (S9) | ☐ 5 cm Mucky Peat or Peat (S3) |
| ☐ Black Histic (A3) | ☐ Loamy Gleyed Matrix (F2) | ☐ Iron-Manganese Masses (F12) |
| ☐ Hydrogen Sulfide (A4) | ☑ Depleted Matrix (F3) | ☐ Mesic Spodic (A17) |
| ☐ Stratified Layers (A5) | ☐ Redox Dark Surface (F6) | ☐ Red Parent Material (F21) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Dark Surface (F7) | ☐ Very Shallow Dark Surface (F22) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Depressions (F8) | |
| ☐ Sandy Mucky Mineral (S1) | | |
| ☐ Sandy Gleyed Matrix (S4) | | |
| ☐ Sandy Redox (S5) | | ☐ Other (Include Explanation in Remarks) |
| ☐ Stripped Matrix (S6) | | |
| ☐ Dark Surface (S7) | | |

**Restrictive Layer (if observed)** Type: _____ Depth (inches): _____

Remarks:

**Hydric Soils criterion met?** **Yes** ☑ **No** ☐

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 603708 - Rt 5/10 At Mill Village and North Main St City/Town: Deerfield Sampling Date: 8/6/24

Applicant/Owner: MassDOT Sampling Point or Zone: UPL-1

Investigator(s): Billie Li, Robin Hunter, Alex LaMarche, Noah Boland, Mike Dami Latitude / Longitude: 42.499581/-72.609246

Soil Map Unit Name: 223A Scio silt loam, 0 to 3 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [✓], Soil [✓], or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [✓] naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

| | | | |
|---|---|---|---|
| Wetland vegetation criterion met? | Yes [ ] | No [✓] | **Is the Sampled Area within a Wetland?** Yes [ ] No [✓] |
| Hydric Soils criterion met? | Yes [ ] | No [✓] | |
| Wetlands hydrology present? | Yes [ ] | No [✓] | |

Remarks, Photo Details, Flagging, etc.:

Disturbed - roadway edge/embankment, frequent mowing. Vegetation meets the dominance test for wetland vegetation, but not the prevalence index.

**HYDROLOGY**

| **Field Observations:** | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Water Table Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Saturation Present (including capillary fringe)? | Yes [ ] | No [✓] | Depth (inches)_____ |

**Wetland Hydrology Indicators**

| Reliable Indicators of Wetlands Hydrology | Indicators that can be Reliable with Proper Interpretation | Indicators of the Influence of Water |
|---|---|---|
| [ ] Water-stained leaves | [ ] Hydrological records | [ ] Direct observation of inundation |
| [ ] Evidence of aquatic fauna | [ ] Free water in a soil test hole | [ ] Drainage patterns |
| [ ] Iron deposits | [ ] Saturated soil | [ ] Drift lines |
| [ ] Algal mats or crusts | [ ] Water marks | [ ] Scoured areas |
| [ ] Oxidized rhizospheres/pore linings | [ ] Moss trim lines | [ ] Sediment deposits |
| [ ] Thin muck surfaces | [ ] Presence of reduced iron | [ ] Surface soil cracks |
| [ ] Plants with air-filled tissue (aerenchyma) | [ ] Woody plants with adventitious roots | [ ] Sparsely vegetated concave surface |
| [ ] Plants with polymorphic leaves | [ ] Trees with shallow root systems | [ ] Microtopographic relief |
| [ ] Plants with floating leaves | [ ] Woody plants with enlarged lenticels | [ ] Geographic position (depression, toe of slope, fringing lowland |
| [ ] Hydrogen sulfide odor | | |

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Form Revised July 2023

**VEGETATION –** Use both common and scientific names of plants.

Tree Stratum Plot size 8 x 15 ft

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

0.0 = Total Cover

Shrub/Sapling Stratum Plot size 8 x 15 ft

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

0.0 = Total Cover

Herb Stratum Plot size 8 x 15 ft

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. yellow foxtail | Setaria pumila | FAC | 20.5 | Yes | Yes |
| 2. annual ragweed | Ambrosia artemisifolia | FACU | 20.5 | Yes | No |
| 3. English plantain | Plantago lanceolata | FACU | 10.5 | No | |
| 4. Sensitive fern | Onoclea sensibilis | FACW | 3.0 | No | |
| 5. Virginia creeper | Parthenocissus quinquefolia | FACU | 3.0 | No | |
| 6. Poison ivy | Toxicodendron radicans | FAC | 3.0 | No | |
| 7. tall rye grass | Festuca arundinaceae (Schedonorus arundinaceus) | FACU | 3.0 | No | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |

63.5 = Total Cover

**VEGETATION –** continued.

| Woody Vine Stratum | Plot size 8 x 15 ft | | | | |
|---|---|---|---|---|---|
| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| | | | 0.0 = Total Cover | | |

| Rapid Test: Do all dominant species have an indicator status of OBL or FACW? | | | | Yes ☐ No ☑ |
|---|---|---|---|---|
| Dominance Test: | Number of dominant species | Number of dominant species that are wetland indicator plants | | Do wetland indicator plants make up ≥ 50% of dominant plant species? |
| | 2 | 1 | | Yes ☑ No ☐ |
| Prevalence Index: | | Total % Cover (all strata) | Multiply by: | Result |
| | OBL species | | X 1 | = 0.00 |
| | FACW species | 3 | X 2 | = 6.00 |
| | FAC species | 24 | X 3 | = 70.50 |
| | FACU species | 37 | X 4 | = 148.00 |
| | UPL species | | X 5 | = 0.00 |
| | Column Totals | (A) 63.5 | | (B) 224.5 |
| Prevalence Index | | B/A = 3.54 | | Is the Prevalence Index ≤ 3.0? Yes ☐ No ☑ |
| **Wetland vegetation criterion met?** | | **Yes** ☐ | **No** ☑ | |

**Definitions of Vegetation Strata**

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

| **Cover Ranges** | |
|---|---|
| Range | Midpoint |
| 1-5 % | 3.0 % |
| 6-15 % | 10.5 % |
| 15-25 % | 20.5 % |
| 26-50 % | 38.0 % |
| 51-75 % | 63.0 % |
| 76-95 % | 85.5 % |
| 96-100 % | 98.0 % |

Sampling Point UPL-1

**SOIL**

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators)

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Location[2] | | |
| 0-3 | 10 Y/R 3/1 | 100.00 | | | | | sandy loam | |
| 3-6.5 | 10 Y/R 3/2 | 100.00 | | | | | loamy sand | |
| 6.5-9 | 10 Y/R 6/1 | 90.00 | 7.5 YR 3/4 | 10.00 | C | PL | silty loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

| **Hydric Soil Indicators** (Check all that apply) | | **Indicators for Problematic Hydric Soils** |
|---|---|---|
| ☐ Histosol (A1) | ☐ Polyvalue Below Surface (S8) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Thin Dark Surface (S9) | ☐ 5 cm Mucky Peat or Peat (S3) |
| ☐ Black Histic (A3) | ☐ Loamy Gleyed Matrix (F2) | ☐ Iron-Manganese Masses (F12) |
| ☐ Hydrogen Sulfide (A4) | ☐ Depleted Matrix (F3) | ☐ Mesic Spodic (A17) |
| ☐ Stratified Layers (A5) | ☐ Redox Dark Surface (F6) | ☐ Red Parent Material (F21) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Dark Surface (F7) | ☐ Very Shallow Dark Surface (F22) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Depressions (F8) | |
| ☐ Sandy Mucky Mineral (S1) | | |
| ☐ Sandy Gleyed Matrix (S4) | | |
| ☐ Sandy Redox (S5) | | ☐ Other (Include Explanation in Remarks) |
| ☐ Stripped Matrix (S6) | | |
| ☐ Dark Surface (S7) | | |

**Restrictive Layer (if observed)** Type: rock Depth (inches): 9.00

Remarks: Presence of roadway embankment fill/millings 0-9 inches. Soils meet the color requirements for indicator F3, but does not meet thickness requirements. Due to pit location on roadway embankment, it is possible that the lower soil layer exhibits relic features from prior to roadway construction.

**Hydric Soils criterion met?** **Yes** ☐ **No** ☑

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 603708 - Rt 5/10 At Mill Village and North Main St City/Town: Deerfield Sampling Date: 8/13/24

Applicant/Owner: MassDOT Sampling Point or Zone: WET-2

Investigator(s): Billie Li, Robin Hunter, Max Phaneuf Latitude / Longitude: 42.498778/-72.60921

Soil Map Unit Name: 223A Scio silt loam, 0 to 3 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

| | | |
|---|---|---|
| Wetland vegetation criterion met? | Yes [✓] No [ ] | **Is the Sampled Area within a Wetland?** Yes [✓] No [ ] |
| Hydric Soils criterion met? | Yes [✓] No [ ] | |
| Wetlands hydrology present? | Yes [✓] No [ ] | |

Remarks, Photo Details, Flagging, etc.:

Flag series 1-200 through 1-221. Vegetation sampling plot to east of transect.

**HYDROLOGY**

| **Field Observations:** | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Water Table Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Saturation Present (including capillary fringe)? | Yes [ ] | No [✓] | Depth (inches)_____ |

**Wetland Hydrology Indicators**

| Reliable Indicators of Wetlands Hydrology | Indicators that can be Reliable with Proper Interpretation | Indicators of the Influence of Water |
|---|---|---|
| [ ] Water-stained leaves | [ ] Hydrological records | [ ] Direct observation of inundation |
| [ ] Evidence of aquatic fauna | [ ] Free water in a soil test hole | [ ] Drainage patterns |
| [ ] Iron deposits | [ ] Saturated soil | [ ] Drift lines |
| [ ] Algal mats or crusts | [ ] Water marks | [ ] Scoured areas |
| [✓] Oxidized rhizospheres/pore linings | [ ] Moss trim lines | [ ] Sediment deposits |
| [ ] Thin muck surfaces | [ ] Presence of reduced iron | [ ] Surface soil cracks |
| [ ] Plants with air-filled tissue (aerenchyma) | [ ] Woody plants with adventitious roots | [ ] Sparsely vegetated concave surface |
| [ ] Plants with polymorphic leaves | [ ] Trees with shallow root systems | [ ] Microtopographic relief |
| [ ] Plants with floating leaves | [ ] Woody plants with enlarged lenticels | [ ] Geographic position (depression, toe of slope, fringing lowland |
| [ ] Hydrogen sulfide odor | | |

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Form Revised July 2023

**VEGETATION –** Use both common and scientific names of plants.

Tree Stratum Plot size 10 x 15 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

0.0 = Total Cover

Shrub/Sapling Stratum Plot size 20 x 20 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. red osier dogwood | Cornus sericea | FACW | 10.5 | Yes | Yes |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

10.5 = Total Cover

Herb Stratum Plot size 20 x 20 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. northern blackberry | Rubus flagellaris | FACU | 20.5 | Yes | No |
| 2. Sensitive fern | Onoclea sensibilis | FACW | 10.5 | Yes | Yes |
| 3. red osier dogwood | Cornus sericea | FACW | 10.5 | Yes | Yes |
| 4. wrinkled goldenrod | Solidago rugosa | FAC | 10.5 | Yes | Yes |
| 5. smooth goldenrod | Solidago gigantea | FACW | 10.5 | Yes | Yes |
| 6. Canada goldenrod | Solidago canadensis | FACU | 3.0 | No | |
| 7. redtop bentgrass | Agrostis gigantea | FACW | 3.0 | No | |
| 8. English plantain | Plantago lanceolata | FACU | 3.0 | No | |
| 9. early goldenrod | Solidago junceae | UPL | 3.0 | No | |
| 10. unknown grass | | | 3.0 | No | |
| 11. | | | | | |
| 12. | | | | | |

77.5 = Total Cover

**VEGETATION –** continued.

| Woody Vine Stratum | Plot size 20 x 20 feet | | | | |
|---|---|---|---|---|---|
| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| | | | 0.0 = Total Cover | | |

| Rapid Test: Do all dominant species have an indicator status of OBL or FACW? | | | | Yes ☐ No ☑ |
|---|---|---|---|---|
| Dominance Test: | Number of dominant species | Number of dominant species that are wetland indicator plants | | Do wetland indicator plants make up ≥ 50% of dominant plant species? |
| | 6 | 5 | | Yes ☑ No ☐ |
| Prevalence Index: | | Total % Cover (all strata) | Multiply by: | Result |
| | OBL species | 0 | X 1 | = 0.00 |
| | FACW species | | X 2 | = 0.00 |
| | FAC species | | X 3 | = 0.00 |
| | FACU species | | X 4 | = 0.00 |
| | UPL species | | X 5 | = 0.00 |
| | Column Totals | (A) 0 | | (B) 0 |
| Prevalence Index | | B/A = 0.00 | | Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐ |
| **Wetland vegetation criterion met?** | | **Yes** ☑ | **No** ☐ | |

**Definitions of Vegetation Strata**

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

| **Cover Ranges** | |
|---|---|
| Range | Midpoint |
| 1-5 % | 3.0 % |
| 6-15 % | 10.5 % |
| 15-25 % | 20.5 % |
| 26-50 % | 38.0 % |
| 51-75 % | 63.0 % |
| 76-95 % | 85.5 % |
| 96-100 % | 98.0 % |

Sampling Point WET-2

**SOIL**

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators)

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Location[2] | | |
| 0-7.5 | 10 YR 4/3 | 100.00 | | | | | loam | |
| 7.5-14 | 2.5 Y 5/2 | 89.00 | 7.5 YR 4/6 | 5.00 | C | M | loam | |
| 7.5-14 | | | Gley 5/10Y | 6.00 | D | M | loam | |
| 14-18 | 10 YR 5/2 | 100.00 | | | | | clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

| **Hydric Soil Indicators** (Check all that apply) | | **Indicators for Problematic Hydric Soils** |
|---|---|---|
| ☐ Histosol (A1) | ☐ Polyvalue Below Surface (S8) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Thin Dark Surface (S9) | ☐ 5 cm Mucky Peat or Peat (S3) |
| ☐ Black Histic (A3) | ☐ Loamy Gleyed Matrix (F2) | ☐ Iron-Manganese Masses (F12) |
| ☐ Hydrogen Sulfide (A4) | ☑ Depleted Matrix (F3) | ☐ Mesic Spodic (A17) |
| ☐ Stratified Layers (A5) | ☐ Redox Dark Surface (F6) | ☐ Red Parent Material (F21) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Dark Surface (F7) | ☐ Very Shallow Dark Surface (F22) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Depressions (F8) | |
| ☐ Sandy Mucky Mineral (S1) | | |
| ☐ Sandy Gleyed Matrix (S4) | | |
| ☐ Sandy Redox (S5) | | ☐ Other (Include Explanation in Remarks) |
| ☐ Stripped Matrix (S6) | | |
| ☐ Dark Surface (S7) | | |

**Restrictive Layer (if observed)** Type: _____ Depth (inches): _____

Remarks:

**Hydric Soils criterion met?** **Yes** ☑ **No** ☐

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 603708 - Rt 5/10 At Mill Village and North Main St City/Town: Deerfield Sampling Date: 8/13/24

Applicant/Owner: MassDOT Sampling Point or Zone: UPL-2

Investigator(s): Billie Li, Robin Hunter, Max Phaneuf Latitude / Longitude: 42.498764 / -72.609234

Soil Map Unit Name: 223A Scio silt loam, 0 to 3 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

| | | | |
|---|---|---|---|
| Wetland vegetation criterion met? | Yes [ ] | No [✓] | **Is the Sampled Area within a Wetland?** Yes [ ] No [✓] |
| Hydric Soils criterion met? | Yes [ ] | No [✓] | |
| Wetlands hydrology present? | Yes [✓] | No [ ] | |

Remarks, Photo Details, Flagging, etc.:

**HYDROLOGY**

| **Field Observations:** | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Water Table Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Saturation Present (including capillary fringe)? | Yes [ ] | No [✓] | Depth (inches)_____ |

**Wetland Hydrology Indicators**

| Reliable Indicators of Wetlands Hydrology | Indicators that can be Reliable with Proper Interpretation | Indicators of the Influence of Water |
|---|---|---|
| [ ] Water-stained leaves | [ ] Hydrological records | [ ] Direct observation of inundation |
| [ ] Evidence of aquatic fauna | [ ] Free water in a soil test hole | [ ] Drainage patterns |
| [ ] Iron deposits | [ ] Saturated soil | [ ] Drift lines |
| [ ] Algal mats or crusts | [ ] Water marks | [ ] Scoured areas |
| [✓] Oxidized rhizospheres/pore linings | [ ] Moss trim lines | [ ] Sediment deposits |
| [ ] Thin muck surfaces | [ ] Presence of reduced iron | [ ] Surface soil cracks |
| [ ] Plants with air-filled tissue (aerenchyma) | [ ] Woody plants with adventitious roots | [ ] Sparsely vegetated concave surface |
| [ ] Plants with polymorphic leaves | [ ] Trees with shallow root systems | [ ] Microtopographic relief |
| [ ] Plants with floating leaves | [ ] Woody plants with enlarged lenticels | [ ] Geographic position (depression, toe of slope, fringing lowland |
| [ ] Hydrogen sulfide odor | | |

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Form Revised July 2023

**VEGETATION –** Use both common and scientific names of plants.

Tree Stratum Plot size 20 x 20 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

0.0 = Total Cover

Shrub/Sapling Stratum Plot size 20 x 20 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. red osier dogwood | Cornus sericea | FACW | 3.0 | Yes | Yes |
| 2. smooth sumac | Rhus glabra | UPL | 3.0 | Yes | No |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

6.0 = Total Cover

Herb Stratum Plot size 20 x 20 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. northern blackberry | Rubus flagellaris | FACU | 20.5 | Yes | No |
| 2. Canada goldenrod | Solidago canadensis | FACU | 10.5 | Yes | No |
| 3. redtop bentgrass | Agrostis gigantea | FACW | 10.5 | Yes | Yes |
| 4. Kentucky bluegrass | Poa pratensis | FACU | 10.5 | Yes | No |
| 5. tall goldenrod | Solidago altissima | FACU | 10.5 | Yes | No |
| 6. Virginia creeper | Parthenocissus quinquefolia | FACU | 3.0 | No | |
| 7. early goldenrod | Solidago junceae | UPL | 3.0 | No | |
| 8. English plantain | Plantago lanceolata | FACU | 3.0 | No | |
| 9. purpletop tridens | Tridens flavens | UPL | 3.0 | No | |
| 10. common milkweed | Asclepias syriaca | UPL | 3.0 | No | |
| 11. | | | | | |
| 12. | | | | | |

77.5 = Total Cover

**VEGETATION –** continued.

Woody Vine Stratum  Plot size 20 x 20 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| | | | 0.0 = Total Cover | | |

Rapid Test: Do all dominant species have an indicator status of OBL or FACW? Yes ☐ No ☑

| Dominance Test: | Number of dominant species | Number of dominant species that are wetland indicator plants | Do wetland indicator plants make up ≥ 50% of dominant plant species? |
|---|---|---|---|
| | 7 | 2 | Yes ☐ No ☑ |

| Prevalence Index: | | Total % Cover (all strata) | Multiply by: | Result |
|---|---|---|---|---|
| | OBL species | | X 1 | = 0.00 |
| | FACW species | | X 2 | = 0.00 |
| | FAC species | | X 3 | = 0.00 |
| | FACU species | | X 4 | = 0.00 |
| | UPL species | | X 5 | = 0.00 |
| | Column Totals | (A) 0 | | (B) 0 |
| Prevalence Index | | B/A = 0.00 | | Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐ |

**Wetland vegetation criterion met? Yes ☐ No ☑**

**Definitions of Vegetation Strata**

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

| Cover Ranges | |
|---|---|
| Range | Midpoint |
| 1-5 % | 3.0 % |
| 6-15 % | 10.5 % |
| 15-25 % | 20.5 % |
| 26-50 % | 38.0 % |
| 51-75 % | 63.0 % |
| 76-95 % | 85.5 % |
| 96-100 % | 98.0 % |

**SOIL**

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators)

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Location[2] | | |
| 0-5 | 10 YR 3/2 | 99.50 | 7.5 YR 3/4 | 0.50 | C | PL | loam | |
| 5-11 | 10 YR 3/2 | 99.00 | 7.5 YR 3/4 | 1.00 | C | PL | loam | |
| 11-18 | 2.5Y 5/3 | 100.00 | | | | | silty loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

| **Hydric Soil Indicators** (Check all that apply) | | **Indicators for Problematic Hydric Soils** |
|---|---|---|
| ☐ Histosol (A1) | ☐ Polyvalue Below Surface (S8) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Thin Dark Surface (S9) | ☐ 5 cm Mucky Peat or Peat (S3) |
| ☐ Black Histic (A3) | ☐ Loamy Gleyed Matrix (F2) | ☐ Iron-Manganese Masses (F12) |
| ☐ Hydrogen Sulfide (A4) | ☐ Depleted Matrix (F3) | ☐ Mesic Spodic (A17) |
| ☐ Stratified Layers (A5) | ☐ Redox Dark Surface (F6) | ☐ Red Parent Material (F21) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Dark Surface (F7) | ☐ Very Shallow Dark Surface (F22) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Depressions (F8) | |
| ☐ Sandy Mucky Mineral (S1) | | |
| ☐ Sandy Gleyed Matrix (S4) | | |
| ☐ Sandy Redox (S5) | | ☐ Other (Include Explanation in Remarks) |
| ☐ Stripped Matrix (S6) | | |
| ☐ Dark Surface (S7) | | |

**Restrictive Layer (if observed)** Type: _____ Depth (inches): _____

Remarks:

**Hydric Soils criterion met?** **Yes** ☐ **No** ☑

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 603708 - Rt 5/10 At Mill Village and North Main St City/Town: Deerfield Sampling Date: 9/624

Applicant/Owner: MassDOT Sampling Point or Zone: WET-3

Investigator(s): Robin Hunter Latitude / Longitude: 42.498673/-72.610265

Soil Map Unit Name: 30A Raynham silt loam, 0 to 3 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

| | | | |
|---|---|---|---|
| Wetland vegetation criterion met? | Yes [✓] No [ ] | **Is the Sampled Area within a Wetland?** | **Yes** [✓] **No** [ ] |
| Hydric Soils criterion met? | Yes [✓] No [ ] | | |
| Wetlands hydrology present? | Yes [✓] No [ ] | | |

Remarks, Photo Details, Flagging, etc.:

Depressional area associated with roadway. Drains to intake structure just to the west of the dirt road crossing. Culvert is assumed to drain to Bloody Brook. Main depression flagged with series WF-300 through WF-313 and smaller depression flagged with series WF-350 through WF-354. These features are hydrologically connected by a 12-inch culvert.

**HYDROLOGY**

| **Field Observations:** | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Water Table Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Saturation Present (including capillary fringe)? | Yes [ ] | No [✓] | Depth (inches)_____ |

**Wetland Hydrology Indicators**

| Reliable Indicators of Wetlands Hydrology | Indicators that can be Reliable with Proper Interpretation | Indicators of the Influence of Water |
|---|---|---|
| [ ] Water-stained leaves | [ ] Hydrological records | [ ] Direct observation of inundation |
| [ ] Evidence of aquatic fauna | [ ] Free water in a soil test hole | [ ] Drainage patterns |
| [ ] Iron deposits | [ ] Saturated soil | [ ] Drift lines |
| [ ] Algal mats or crusts | [ ] Water marks | [ ] Scoured areas |
| [✓] Oxidized rhizospheres/pore linings | [ ] Moss trim lines | [ ] Sediment deposits |
| [ ] Thin muck surfaces | [ ] Presence of reduced iron | [✓] Surface soil cracks |
| [ ] Plants with air-filled tissue (aerenchyma) | [ ] Woody plants with adventitious roots | [✓] Sparsely vegetated concave surface |
| [ ] Plants with polymorphic leaves | [ ] Trees with shallow root systems | [ ] Microtopographic relief |
| [ ] Plants with floating leaves | [ ] Woody plants with enlarged lenticels | [✓] Geographic position (depression, toe of slope, fringing lowland |
| [ ] Hydrogen sulfide odor | | |

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

**VEGETATION –** Use both common and scientific names of plants.

Tree Stratum Plot size 15 x 25 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

0.0 = Total Cover

Shrub/Sapling Stratum Plot size 15 x 25 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. red raspberry | Rubus idaeus | FACW | 20.5 | Yes | Yes |
| 2. red osier dogwood | Cornus sericea | FACW | 10.5 | Yes | Yes |
| 3. Morrow's honeysuckle | Lonicera morrowii | FACU | 3.0 | No | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

34.0 = Total Cover

Herb Stratum Plot size 15 x 25 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. jewelweed | Impatiens capensis | FACW | 20.5 | Yes | Yes |
| 2. interrupted fern | Osumunda claytoniana | FAC | 10.5 | Yes | Yes |
| 3. red raspberry | Rubus idaeus | FACW | 3.0 | No | |
| 4. Sensitive fern | Onoclea sensibilis | FACW | 3.0 | No | |
| 5. wrinkled goldenrod | Solidago rugosa | FACW | 3.0 | No | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. u | | | | | |
| 11. | | | | | |
| 12. | | | | | |

40.0 = Total Cover

**VEGETATION –** continued.

Woody Vine Stratum  Plot size 15 x 25 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. bittersweet | Celastrus orbiculatus | UPL | 10.5 | Yes | No |
| 2. riverbank grape | Vitis riparia | FAC | 10.5 | Yes | Yes |
| 3. | | | | | |
| 4. | | | | | |
| | | | 21.0 = Total Cover | | |

Rapid Test: Do all dominant species have an indicator status of OBL or FACW? Yes ☐ No ☑

| Dominance Test: | Number of dominant species | Number of dominant species that are wetland indicator plants | Do wetland indicator plants make up ≥ 50% of dominant plant species? |
|---|---|---|---|
| | 6 | 5 | Yes ☑ No ☐ |

| Prevalence Index: | | Total % Cover (all strata) | Multiply by: | Result |
|---|---|---|---|---|
| | OBL species | 0 | X 1 | = 0.00 |
| | FACW species | | X 2 | = 0.00 |
| | FAC species | | X 3 | = 0.00 |
| | FACU species | | X 4 | = 0.00 |
| | UPL species | | X 5 | = 0.00 |
| | Column Totals | (A) 0 | | (B) 0 |
| | Prevalence Index | B/A = 0.00 | | Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐ |

**Wetland vegetation criterion met? Yes ☑ No ☐**

**Definitions of Vegetation Strata**

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

| Cover Ranges | |
|---|---|
| Range | Midpoint |
| 1-5 % | 3.0 % |
| 6-15 % | 10.5 % |
| 15-25 % | 20.5 % |
| 26-50 % | 38.0 % |
| 51-75 % | 63.0 % |
| 76-95 % | 85.5 % |
| 96-100 % | 98.0 % |

**SOIL**

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators)

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Location[2] | | |
| 0-9 | 10 YR 3/2 | 100.00 | | | | | loam | cobbles |
| 9-18 | 10 YR 4/2 | 93.00 | 5 YR 3/4 | 7.00 | C | PL | sandy loam | |
| 18-22 | 5 Y 5/2 | 75.00 | 5 YR 3/4 | 10.00 | C | PL | silty loam | |
| 18-22 | 10 YR 3/2 | 15.00 | | | | | silty loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

| **Hydric Soil Indicators** (Check all that apply) | | **Indicators for Problematic Hydric Soils** |
|---|---|---|
| ☐ Histosol (A1) | ☐ Polyvalue Below Surface (S8) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Thin Dark Surface (S9) | ☐ 5 cm Mucky Peat or Peat (S3) |
| ☐ Black Histic (A3) | ☐ Loamy Gleyed Matrix (F2) | ☐ Iron-Manganese Masses (F12) |
| ☐ Hydrogen Sulfide (A4) | ☐ Depleted Matrix (F3) | ☐ Mesic Spodic (A17) |
| ☐ Stratified Layers (A5) | ☐ Redox Dark Surface (F6) | ☐ Red Parent Material (F21) |
| ☑ Depleted Below Dark Surface (A11) | ☐ Depleted Dark Surface (F7) | ☐ Very Shallow Dark Surface (F22) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Depressions (F8) | |
| ☐ Sandy Mucky Mineral (S1) | | |
| ☐ Sandy Gleyed Matrix (S4) | | |
| ☐ Sandy Redox (S5) | | ☐ Other (Include Explanation in Remarks) |
| ☐ Stripped Matrix (S6) | | |
| ☐ Dark Surface (S7) | | |

**Restrictive Layer (if observed)** Type: _____ Depth (inches): _____

Remarks:

**Hydric Soils criterion met?** **Yes** ☑ **No** ☐

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 603708 - Rt 5/10 At Mill Village and North Main St City/Town: Deerfield Sampling Date: 9/624

Applicant/Owner: MassDOT Sampling Point or Zone: UPL-3

Investigator(s): Robin Hunter Latitude / Longitude: 42.4987/-72.610247

Soil Map Unit Name: 30A Raynham silt loam, 0 to 3 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [✓], Soil [ ] , or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ] , or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

| | | | |
|---|---|---|---|
| Wetland vegetation criterion met? | Yes [ ] | No [✓] | **Is the Sampled Area within a Wetland?** Yes [ ] No [✓] |
| Hydric Soils criterion met? | Yes [ ] | No [✓] | |
| Wetlands hydrology present? | Yes [ ] | No [✓] | |

Remarks, Photo Details, Flagging, etc.:

Vegetation mowed frequently.

**HYDROLOGY**

| **Field Observations:** | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Water Table Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Saturation Present (including capillary fringe)? | Yes [ ] | No [✓] | Depth (inches)_____ |

**Wetland Hydrology Indicators**

| Reliable Indicators of Wetlands Hydrology | Indicators that can be Reliable with Proper Interpretation | Indicators of the Influence of Water |
|---|---|---|
| [ ] Water-stained leaves | [ ] Hydrological records | [ ] Direct observation of inundation |
| [ ] Evidence of aquatic fauna | [ ] Free water in a soil test hole | [ ] Drainage patterns |
| [ ] Iron deposits | [ ] Saturated soil | [ ] Drift lines |
| [ ] Algal mats or crusts | [ ] Water marks | [ ] Scoured areas |
| [ ] Oxidized rhizospheres/pore linings | [ ] Moss trim lines | [ ] Sediment deposits |
| [ ] Thin muck surfaces | [ ] Presence of reduced iron | [ ] Surface soil cracks |
| [ ] Plants with air-filled tissue (aerenchyma) | [ ] Woody plants with adventitious roots | [ ] Sparsely vegetated concave surface |
| [ ] Plants with polymorphic leaves | [ ] Trees with shallow root systems | [ ] Microtopographic relief |
| [ ] Plants with floating leaves | [ ] Woody plants with enlarged lenticels | [ ] Geographic position (depression, toe of slope, fringing lowland |
| [ ] Hydrogen sulfide odor | | |

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Form Revised July 2023

**VEGETATION –** Use both common and scientific names of plants.

Tree Stratum Plot size 10 x 25 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

0.0 = Total Cover

Shrub/Sapling Stratum Plot size 10 x 25 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. red raspberry | Rubus idaeus | FACW | 3.0 | Yes | Yes |
| 2. multiflora rose | Rosa multiflora | FACU | 3.0 | Yes | No |
| 3. Morrow's honeysuckle | Lonicera morrowii | FACU | 3.0 | Yes | No |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

9.0 = Total Cover

Herb Stratum Plot size 10 x 25 feet

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. bittersweet | Celastrus orbiculatus | UPL | 38.0 | Yes | Yes |
| 2. red raspberry | Rubus idaeus | FACW | 10.5 | No | |
| 3. tall goldenrod | Solidago altissima | FACU | 3.0 | No | |
| 4. Canada goldenrod | Solidago canadensis | FACU | 3.0 | No | |
| 5. wrinkled goldenrod | Solidago rugosa | FACW | 3.0 | No | |
| 6. Virginia creeper | Parthenocissus quinquefolia | FACU | 3.0 | No | |
| 7. sensitive fern | Onoclea sensibilis | FACW | 3.0 | No | |
| 8. multiflora rose | Rosa multiflora | FACU | 3.0 | No | |
| 9. unknown grass | Poa sp. | | 3.0 | No | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |

69.5 = Total Cover

**VEGETATION –** continued.

| Woody Vine Stratum | Plot size 10 x 25 feet | | | | |
|---|---|---|---|---|---|
| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
| 1. bittersweet | Celastrus orbiculatus | UPL | 3.0 | Yes | No |
| 2. riverbank grape | Vitis riparia | FAC | 3.0 | Yes | Yes |
| 3. | | | | | |
| 4. | | | | | |
| | | | 6.0 = Total Cover | | |

| Rapid Test: Do all dominant species have an indicator status of OBL or FACW? | | | | Yes ☐ No ☑ |
|---|---|---|---|---|
| Dominance Test: | Number of dominant species | Number of dominant species that are wetland indicator plants | | Do wetland indicator plants make up ≥ 50% of dominant plant species? Yes ☐ No ☑ |
| | 6 | 2 | | |
| Prevalence Index: | | Total % Cover (all strata) | Multiply by: | Result |
| | OBL species | 0 | X 1 | = 0.00 |
| | FACW species | | X 2 | = 0.00 |
| | FAC species | | X 3 | = 0.00 |
| | FACU species | | X 4 | = 0.00 |
| | UPL species | | X 5 | = 0.00 |
| | Column Totals | (A) 0 | | (B) 0 |
| Prevalence Index | | B/A = 0.00 | | Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐ |
| **Wetland vegetation criterion met?** | | **Yes** ☐ | **No** ☑ | |

**Definitions of Vegetation Strata**

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

| **Cover Ranges** | |
|---|---|
| Range | Midpoint |
| 1-5 % | 3.0 % |
| 6-15 % | 10.5 % |
| 15-25 % | 20.5 % |
| 26-50 % | 38.0 % |
| 51-75 % | 63.0 % |
| 76-95 % | 85.5 % |
| 96-100 % | 98.0 % |

Sampling Point UPL-3

**SOIL**

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators)

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Location[2] | | |
| 0-12 | 10 YR 3/2 | 100.00 | | | | | loam | many fine roots, cobbles |
| 12-16 | 10 YR 4/2 | 100.00 | | | | | loam | cobble |
| 16-18 | 10 YR 4/2 | 95.00 | 10 YR 3/3 | 5.00 | C | PL | silty loam | cobble |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

| **Hydric Soil Indicators** (Check all that apply) | | **Indicators for Problematic Hydric Soils** |
|---|---|---|
| ☐ Histosol (A1) | ☐ Polyvalue Below Surface (S8) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Thin Dark Surface (S9) | ☐ 5 cm Mucky Peat or Peat (S3) |
| ☐ Black Histic (A3) | ☐ Loamy Gleyed Matrix (F2) | ☐ Iron-Manganese Masses (F12) |
| ☐ Hydrogen Sulfide (A4) | ☐ Depleted Matrix (F3) | ☐ Mesic Spodic (A17) |
| ☐ Stratified Layers (A5) | ☐ Redox Dark Surface (F6) | ☐ Red Parent Material (F21) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Dark Surface (F7) | ☐ Very Shallow Dark Surface (F22) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Depressions (F8) | |
| ☐ Sandy Mucky Mineral (S1) | | |
| ☐ Sandy Gleyed Matrix (S4) | | |
| ☐ Sandy Redox (S5) | | ☐ Other (Include Explanation in Remarks) |
| ☐ Stripped Matrix (S6) | | |
| ☐ Dark Surface (S7) | | |

**Restrictive Layer (if observed)** Type: _____ Depth (inches): _____

Remarks: The layer from 12-16 inches meet the color and requirements of indicator F3/A11, but does not have the required redox concentration.

**Hydric Soils criterion met?** **Yes** ☐ **No** ☑

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 603708 - Rt 5/10 At Mill Village and North Main St City/Town: Deerfield Sampling Date: 8/7/2025

Applicant/Owner: MassDOT Sampling Point or Zone: WET-4

Investigator(s): Robin Hunter Latitude / Longitude: 42.498634, -72.60852

Soil Map Unit Name: 30A Raynham silt loam, 0 to 3 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ] , or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ] , or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

| | | |
|---|---|---|
| Wetland vegetation criterion met? | Yes [✓] No [ ] | **Is the Sampled Area within a Wetland?** Yes [✓] No [ ] |
| Hydric Soils criterion met? | Yes [✓] No [ ] | |
| Wetlands hydrology present? | Yes [✓] No [ ] | |

Remarks, Photo Details, Flagging, etc.:

All trees rooted outside of wetland. 400-series wetland flags. Wetland flagged within drainage easement only.

**HYDROLOGY**

| **Field Observations:** | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Water Table Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Saturation Present (including capillary fringe)? | Yes [ ] | No [✓] | Depth (inches)_____ |

**Wetland Hydrology Indicators**

| Reliable Indicators of Wetlands Hydrology | Indicators that can be Reliable with Proper Interpretation | Indicators of the Influence of Water |
|---|---|---|
| [ ] Water-stained leaves | [ ] Hydrological records | [ ] Direct observation of inundation |
| [ ] Evidence of aquatic fauna | [ ] Free water in a soil test hole | [ ] Drainage patterns |
| [ ] Iron deposits | [ ] Saturated soil | [ ] Drift lines |
| [ ] Algal mats or crusts | [ ] Water marks | [ ] Scoured areas |
| [✓] Oxidized rhizospheres/pore linings | [ ] Moss trim lines | [ ] Sediment deposits |
| [ ] Thin muck surfaces | [ ] Presence of reduced iron | [ ] Surface soil cracks |
| [ ] Plants with air-filled tissue (aerenchyma) | [ ] Woody plants with adventitious roots | [ ] Sparsely vegetated concave surface |
| [ ] Plants with polymorphic leaves | [ ] Trees with shallow root systems | [ ] Microtopographic relief |
| [ ] Plants with floating leaves | [ ] Woody plants with enlarged lenticels | [✓] Geographic position (depression, toe of slope, fringing lowland |
| [ ] Hydrogen sulfide odor | | |

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

Form Revised July 2023

**VEGETATION –** Use both common and scientific names of plants.

Tree Stratum Plot size 30 ft radius

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

0.0 = Total Cover

Shrub/Sapling Stratum Plot size 15 ft radius

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. Red Osier Dogwood | Cornus Sericea | FACW | 10.5 | Yes | Yes |
| 2. Norway Maple | Acer Platanoides | UPL | 3.0 | No | No |
| 3. California Privet (Not listed) | Ligustrum Ovalifolium | UPL | 3.0 | No | No |
| 4. American Ash | Fraxinus Americana | FACU | 20.5 | Yes | No |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

37.0 = Total Cover

Herb Stratum Plot size 5 ft radius

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. Sensitive fern | Onoclea Sensibilis | FACW | 38.0 | Yes | Yes |
| 2. River Grape | Vitis Riparia | FAC | 3.0 | No | No |
| 3. Peat Moss | Sphagnum sp. | OBL | 3.0 | No | No |
| 4. Poison Ivy | Toxicodendron Radicans | FAC | 10.5 | Yes | Yes |
| 5. Red Osier Dogwood | Cornus Sericea | FACW | 10.5 | Yes | Yes |
| 6. Norway Maple | Acer Platanoides | UPL | 3.0 | No | No |
| 7. Bittersweet | Celastrus orbiculatus | UPL | 10.5 | Yes | No |
| 8. Virginia Creeper | Parthenocissus Quinquefolia | FACU | 10.5 | Yes | No |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |

89.0 = Total Cover

**VEGETATION –** continued.

| Woody Vine Stratum | Plot size | | | | |
|---|---|---|---|---|---|
| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| | | | 0.0 = Total Cover | | |

| Rapid Test: Do all dominant species have an indicator status of OBL or FACW? | | | | Yes ☐ No ☑ |
|---|---|---|---|---|
| Dominance Test: | Number of dominant species | Number of dominant species that are wetland indicator plants | | Do wetland indicator plants make up ≥ 50% of dominant plant species? |
| | 7 | 4 | | Yes ☑ No ☐ |
| Prevalence Index: | | Total % Cover (all strata) | Multiply by: | Result |
| | OBL species | | X 1 | = 0.00 |
| | FACW species | | X 2 | = 0.00 |
| | FAC species | | X 3 | = 0.00 |
| | FACU species | | X 4 | = 0.00 |
| | UPL species | | X 5 | = 0.00 |
| | Column Totals | (A) 0 | | (B) 0 |
| Prevalence Index | | B/A = 0.00 | | Is the Prevalence Index ≤ 3.0? Yes ☐ No ☐ |
| **Wetland vegetation criterion met?** | | **Yes** ☑ | **No** ☐ | |

**Definitions of Vegetation Strata**

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

| **Cover Ranges** | |
|---|---|
| Range | Midpoint |
| 1-5 % | 3.0 % |
| 6-15 % | 10.5 % |
| 15-25 % | 20.5 % |
| 26-50 % | 38.0 % |
| 51-75 % | 63.0 % |
| 76-95 % | 85.5 % |
| 96-100 % | 98.0 % |

Sampling Point WET-4

**SOIL**

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators)

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Location[2] | | |
| 0-9 | 10YR 4/2 | 97.00 | 7.5YR 3/4 | 3.00 | C | PL | Loam | Oxidized Rhizospheres |
| 9-18 | 10YR 4/2 | 90.00 | 10YR 4/4 | 10.00 | C | M | Silty Clay Loam | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

| **Hydric Soil Indicators** (Check all that apply) | | **Indicators for Problematic Hydric Soils** |
|---|---|---|
| ☐ Histosol (A1) | ☐ Polyvalue Below Surface (S8) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Thin Dark Surface (S9) | ☐ 5 cm Mucky Peat or Peat (S3) |
| ☐ Black Histic (A3) | ☐ Loamy Gleyed Matrix (F2) | ☐ Iron-Manganese Masses (F12) |
| ☐ Hydrogen Sulfide (A4) | ☑ Depleted Matrix (F3) | ☐ Mesic Spodic (A17) |
| ☐ Stratified Layers (A5) | ☐ Redox Dark Surface (F6) | ☐ Red Parent Material (F21) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Dark Surface (F7) | ☐ Very Shallow Dark Surface (F22) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Depressions (F8) | |
| ☐ Sandy Mucky Mineral (S1) | | |
| ☐ Sandy Gleyed Matrix (S4) | | |
| ☐ Sandy Redox (S5) | | ☐ Other (Include Explanation in Remarks) |
| ☐ Stripped Matrix (S6) | | |
| ☐ Dark Surface (S7) | | |

**Restrictive Layer (if observed)** Type: _____ Depth (inches): _____

Remarks:

**Hydric Soils criterion met?** **Yes** ☑ **No** ☐

**BORDERING VEGETATED WETLAND DETERMINATION FORM**

Project/Site: 603708 - Rt 5/10 At Mill Village and North Main St City/Town: Deerfield Sampling Date: 8/7/2025

Applicant/Owner: MassDOT Sampling Point or Zone: UPL-4

Investigator(s): Robin Hunter Latitude / Longitude: 42.498607, -72.60855

Soil Map Unit Name: 30A Raynham silt loam, 0 to 3 percent slopes NWI or DEP Classification: N/A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes [✓] No [ ] (If no, explain in Remarks)

Are Vegetation [ ], Soil [ ] , or Hydrology [ ] significantly disturbed? (If yes, explain in Remarks)

Are Vegetation [ ], Soil [ ] , or Hydrology [ ] naturally problematic? (If yes, explain in Remarks)

**SUMMARY OF FINDINGS – Attach site map and photograph log showing sampling locations, transects, etc.**

| | | | |
|---|---|---|---|
| Wetland vegetation criterion met? | Yes [ ] | No [✓] | **Is the Sampled Area within a Wetland?** Yes [ ] No [✓] |
| Hydric Soils criterion met? | Yes [ ] | No [✓] | |
| Wetlands hydrology present? | Yes [ ] | No [✓] | |

Remarks, Photo Details, Flagging, etc.:

**HYDROLOGY**

| **Field Observations:** | | | |
|---|---|---|---|
| Surface Water Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Water Table Present? | Yes [ ] | No [✓] | Depth (inches)_____ |
| Saturation Present (including capillary fringe)? | Yes [ ] | No [✓] | Depth (inches)_____ |

**Wetland Hydrology Indicators**

| Reliable Indicators of Wetlands Hydrology | Indicators that can be Reliable with Proper Interpretation | Indicators of the Influence of Water |
|---|---|---|
| [ ] Water-stained leaves | [ ] Hydrological records | [ ] Direct observation of inundation |
| [ ] Evidence of aquatic fauna | [ ] Free water in a soil test hole | [ ] Drainage patterns |
| [ ] Iron deposits | [ ] Saturated soil | [ ] Drift lines |
| [ ] Algal mats or crusts | [ ] Water marks | [ ] Scoured areas |
| [ ] Oxidized rhizospheres/pore linings | [ ] Moss trim lines | [ ] Sediment deposits |
| [ ] Thin muck surfaces | [ ] Presence of reduced iron | [ ] Surface soil cracks |
| [ ] Plants with air-filled tissue (aerenchyma) | [ ] Woody plants with adventitious roots | [ ] Sparsely vegetated concave surface |
| [ ] Plants with polymorphic leaves | [ ] Trees with shallow root systems | [ ] Microtopographic relief |
| [ ] Plants with floating leaves | [ ] Woody plants with enlarged lenticels | [ ] Geographic position (depression, toe of slope, fringing lowland |
| [ ] Hydrogen sulfide odor | | |

Remarks (describe recorded data from stream gauge, monitoring well, aerial photos, previous inspections, if available):

This form is only for BVW delineations. Other wetland resource areas may be present and should be delineated according to the applicable regulatory provisions.

**VEGETATION –** Use both common and scientific names of plants.

Tree Stratum Plot size 30-ft radius

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. Norway Maple | Acer Platanoides | UPL | 20.5 | Yes | No |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

20.5 = Total Cover

Shrub/Sapling Stratum Plot size 15 foot radius

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. White Ash | Fraxinus Americana | FACU | 20.5 | Yes | No |
| 2. California Privet | Ligustrum Ovalifolium | UPL | 3.0 | No | No |
| 3. Red Osier Dogwood | Cornus Sericea | FACW | 10.5 | Yes | Yes |
| 4. Morro's Honeysuckle | Lonicera Morrowii | FACU | 3.0 | No | No |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |

37.0 = Total Cover

Herb Stratum Plot size 5 ft radius

| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
|---|---|---|---|---|---|
| 1. Virginia Creeper | Parthenocissus Quinquefolia | FACU | 38.0 | Yes | No |
| 2. Poison Ivy | Toxicodendron Radicans | FAC | 10.5 | No | No |
| 3. Bittersweet | Celastrus orbiculatus | UPL | 10.5 | No | No |
| 4. Sensitive Fern | Onoclea Sensibilis | FACW | 3.0 | No | No |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |

62.0 = Total Cover

**VEGETATION –** continued.

| Woody Vine Stratum | Plot size 30 ft radius | | | | |
|---|---|---|---|---|---|
| Common name | Scientific name | Indicator Status | Absolute % Cover | Dominant? (yes/no) | Wetland Indictor? (yes/no) |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| | | | 0.0 = Total Cover | | |

| Rapid Test: Do all dominant species have an indicator status of OBL or FACW? | | | | Yes ☐ No ☑ |
|---|---|---|---|---|
| Dominance Test: | Number of dominant species | Number of dominant species that are wetland indicator plants | | Do wetland indicator plants make up ≥ 50% of dominant plant species? Yes ☐ No ☑ |
| | 4 | 1 | | |
| Prevalence Index: | | Total % Cover (all strata) | Multiply by: | Result |
| | OBL species | 0 | X 1 | = 0.00 |
| | FACW species | 14 | X 2 | = 27.00 |
| | FAC species | 11 | X 3 | = 31.50 |
| | FACU species | 62 | X 4 | = 246.00 |
| | UPL species | 34 | X 5 | = 170.00 |
| | Column Totals | (A) 119.5 | | (B) 474.5 |
| Prevalence Index | | B/A = 3.97 | | Is the Prevalence Index ≤ 3.0? Yes ☐ No ☑ |
| **Wetland vegetation criterion met?** | | **Yes** ☐ | **No** ☑ | |

**Definitions of Vegetation Strata**

Tree - Woody plants 3 in. (7.62 cm) or more in diameter at breast height (DBH), regardless of height

Shrub / Sapling - Woody plants less than 3 in. (7.62 cm) DBH and greater than or equal to 3.3 ft. (1 m) tall

Herb - All herbaceous (non-woody plants, regardless of size, and woody plants less than 3.3 ft. (1 m) tall

Woody vines - All woody vines greater than 3.3 ft. (1 m) in height

| **Cover Ranges** | |
|---|---|
| Range | Midpoint |
| 1-5 % | 3.0 % |
| 6-15 % | 10.5 % |
| 15-25 % | 20.5 % |
| 26-50 % | 38.0 % |
| 51-75 % | 63.0 % |
| 76-95 % | 85.5 % |
| 96-100 % | 98.0 % |

**SOIL**

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators)

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Location[2] | | |
| 0-8 | 10 YR 3/2 | 100.00 | | | | | Loam | Some gravel & roots |
| 8-12 | 10 YR 4/2 | 99.00 | 10 YR 3/4 | 1.00 | C | PL | Loam | |
| 12-16 | 10 YR 4/2 | 98.00 | 10 YR 4/4 | 2.00 | C | PL | Loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2]Location: PL=Pore Lining, M=Matrix

| **Hydric Soil Indicators** (Check all that apply) | | **Indicators for Problematic Hydric Soils** |
|---|---|---|
| ☐ Histosol (A1) | ☐ Polyvalue Below Surface (S8) | ☐ 2 cm Muck (A10) |
| ☐ Histic Epipedon (A2) | ☐ Thin Dark Surface (S9) | ☐ 5 cm Mucky Peat or Peat (S3) |
| ☐ Black Histic (A3) | ☐ Loamy Gleyed Matrix (F2) | ☐ Iron-Manganese Masses (F12) |
| ☐ Hydrogen Sulfide (A4) | ☐ Depleted Matrix (F3) | ☐ Mesic Spodic (A17) |
| ☐ Stratified Layers (A5) | ☐ Redox Dark Surface (F6) | ☐ Red Parent Material (F21) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Dark Surface (F7) | ☐ Very Shallow Dark Surface (F22) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Depressions (F8) | |
| ☐ Sandy Mucky Mineral (S1) | | |
| ☐ Sandy Gleyed Matrix (S4) | | |
| ☐ Sandy Redox (S5) | | ☐ Other (Include Explanation in Remarks) |
| ☐ Stripped Matrix (S6) | | |
| ☐ Dark Surface (S7) | | |

**Restrictive Layer (if observed)** Type: _____ Depth (inches): _____

Remarks:

**Hydric Soils criterion met?** **Yes** ☐ **No** ☑

Appendix E

Town of Deerfield
Intersection Improvements on Greenfield Road (Routes 5 and 10) at Mill Village Rd and North Main St.
MassDOT Project No. 613708
Notice of Intent

PROJECT PLANS

811 North King Street, Northampton, MA 01060
Tel: (857) 368-2000, Fax: (857) 368-0200
mass.gov/massdot

# MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
# HIGHWAY DIVISION

**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 1 | 60 |
| PROJECT FILE NO. | 613708 | | |

**TITLE SHEET & INDEX**

PLAN AND PROFILE OF

## ROUTES 5 AND 10 AT NORTH MAIN STREET AND MILL VILLIAGE ROAD

IN THE TOWN OF

## DEERFIELD

## FRANKLIN COUNTY

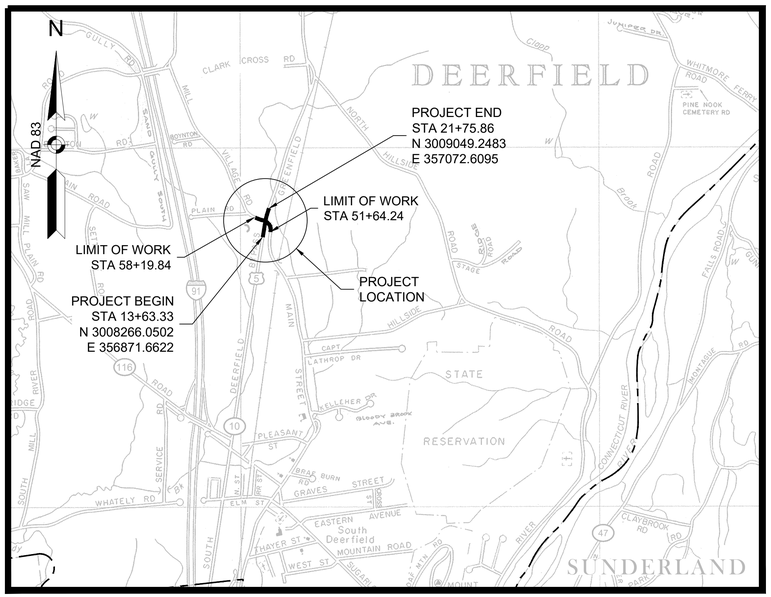
FEDERAL AID PROJECT NO. XXX

# 75% SUBMITTAL - NOI PLANS

THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2025 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, 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.

## INDEX






0 2000 4000 6000 8000

SCALE: 1" = 2000'

LENGTH OF PROJECT = 812.5 FEET = 0.154 MILES

## DESIGN DESIGNATION (ROUTES 5&10)

| DESIGN SPEED | **45 MPH** (25 mph in Roundabout) |
|---|---|
| ADT (2023) | 10,217 |
| ADT (2043) | 10,319 |
| K | 9.7% |
| D | 54% |
| T (PEAK HOUR) | 4% |
| T (AVERAGE DAY) | 8.6% |
| DHV | 991 |
| DDHV | 453 |
| FUNCTIONAL CLASSIFICATION | URBAN MINOR ARTERIAL |

| DATE | DESCRIPTION | REV # |
|---|---|---|
| | | |
| | | |
| | | |

MassDOT
Massachusetts Department of Transportation
Highway Division

**APPROVED**

**CHIEF ENGINEER** **DATE**

613708_HD_TITLE SHEET.DWG Plotted on 17-Feb-2026 11:46 AM

| | |
|---|---|
| AUX | AUXILARY |
| BD | BOUND |
| BIT | BITUMINOUS |
| ℄ | BASELINE |
| BLDG | BUILDING |
| BM | BENCHMARK |
| BR | BRIDGE |
| BRK | BRICK |
| BWL | BROKEN WHITE LINE |
| BYL | BROKEN YELLOW LINE |
| CAB | CABINET |
| CB | CATCH BASIN |
| CC | CEMENT CONCRETE |
| CCB | CAPE COD BERM |
| CEN | CENTER |
| CI | CURB INLET |
| CIP | CAST IRON PIPE |
| ℄ | CENTER LINE |
| CLF | CHAIN LINK FENCE |
| CMH | CABLE MANHOLE |
| CMP | CORRUGATED METAL PIPE |
| CO | COUNTY |
| CO BD | COUNTY BOUND |
| CON | CONIFEROUS |
| CONC | CONCRETE |
| CPP | CORRUGATED PLASTIC PIPE |
| CSP | CORRUGATED STEEL PIPE |
| CULV | CULVERT |
| CW | CROSSWALK |
| DBWL | DOUBLE WHITE LINE |
| DBYL | DOUBLE YELLOW LINE |
| DEC | DECIDUOUS |
| DH | DRILL HOLE |
| DI | DROP INLET |
| DIA | DIAMETER |
| DIP | DUCTILE IRON PIPE |
| DMH | DRAIN MANHOLE |
| DSK | DISK |
| DWL | DOTTED WHITE LINE |
| DYL | DOTTED YELLOW LINE |
| EB | EASTBOUND |
| EL | ELEVATION |
| EMH | ELECTRIC MANHOLE |
| EP | EDGE OF PAVEMENT |
| EPLP | ESCUTCHEON PIN IN LEAD PLUG |
| ETW | EDGE OF TRAVELED WAY |
| EX | EXISTING |
| FF | FINISH FLOOR |
| FGS | FLAGSTONE |
| FL | FLOWLINE |
| FLDSTN | FIELDSTONE |
| GAR | GARAGE |
| GD | GROUND |
| GIP | GALVANIZED IRON PIPE |

## ABBREVIATIONS

| | |
|---|---|
| GMH | GAS MANHOLE |
| GRAN | GRANITE |
| GRAV | GRAVEL |
| GRD | GUARD |
| GRL | GUARDRAIL |
| HDW | HEADWALL |
| HYD | HYDRANT |
| INV | INVERT |
| IP | IRON PIPE |
| JB | JERSEY BARRIER |
| L | LENGTH OF CURVE |
| LB | LEACHING BASIN |
| LC | LAND COURT |
| LCB | LAND COURT BOUND |
| LCD | LAND COURT DISK |
| LO | LAYOUT |
| LP | LIGHT POLE |
| LPD | LIGHT POLE DOUBLE LIGHT |
| LSA | LANDSCAPED AREA |
| MAG | MAG NAIL |
| MBE | MIDDLE BACK EDGE |
| MED | MEDIAN |
| MH | MANHOLE |
| MP | MILE POST |
| MTL | METAL |
| N/F | NOW OR FORMERLY |
| NB | NORTHBOUND |
| OH | OVERHANG |
| OHW | OVERHEAD WIRE |
| PC | POINT OF CURVATURE |
| PCC | POINT OF COMPOUND CURVATURE |
| PED | PEDESTRIAN |
| PI | POINT OF INTERSECTION |
| PK | PK NAIL |
| ℄ | PROPERTY LINE |
| PP | PRICK PUNCH |
| PRC | POINT OF REVERSE CURVATURE |
| PT | POINT OF TANGENCY |
| PVC | POLYVINYL CHLORIDE PIPE |
| PVMT | PAVEMENT |
| PWW | PAVED WATERWAY |
| PZ | PIEZOMETER |
| R | RADIUS OF CURVATURE |
| RB | REBAR |
| RC | REINFORCED CONCRETE |
| RCP | REINFORCED CONCRETE PIPE |
| RET | RETAINING |
| ROW | RIGHT OF WAY |
| RR | RAILROAD |
| RRS | RAILROAD SPIKE |
| S BD | SOUTHBOUND |
| SB | STONE BOUND |
| SD | SUBDRAIN |
| SGE | SLOPED GRANITE EDGING |

| | |
|---|---|
| SHLD | SHOULDER |
| SHLO | STATE HIGHWAY LAYOUT |
| SK | SKEW |
| SL | STOP LINE |
| SMH | SEWER MANHOLE |
| SPK | SPIKE |
| STA | STATION |
| STN | STONE |
| SW | SIDEWALK |
| SWL | SOLID WHITE LINE |
| SYL | SOLID YELLOW LINE |
| T | TANGENT DISTANCE |
| TAN | TANGENT |
| TEMP | TEMPORARY |
| TMH | TELEPHONE MANHOLE |
| TR | TOP OF RAIL |
| TSC | TRAFFIC SIGNAL CONDUIT |
| TYP | TYPICAL |
| VAR | VARIABLE |
| VCP | VITRIFIED CLAY PIPE |
| VGC | VERTICAL GRANITE CURB |
| VLT | VAULT |
| WB | WESTBOUND |
| PCR | PEDESTRIAN CURB RAMP |
| WD | WOOD |
| WIP | WROUGHT IRON PIPE |

## TRAFFIC SYMBOLS

| EXISTING | PROPOSED | DESCRIPTION |
|---|---|---|
| | 1 | CONTROLLER PHASE ACTUATED |
| | | TRAFFIC SIGNAL HEAD (SIZE AS NOTED) |
| | | WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED) |
| | | VIDEO DETECTION CAMERA |
| | | MICROWAVE DETECTOR |
| | | PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE |
| | * | EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT |
| | | VEHICULAR SIGNAL HEAD |
| | | VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED |
| | | FLASHING BEACON |
| | | PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED) |
| RRSG | RRSG | RAILROAD SIGNAL |
| OR | | SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED) |
| | 20' | MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED) |
| | | HIGH MAST POLE OR TOWER |
| | | SIGN AND POST |
| | | SIGN AND POST (2 POSTS) |
| | 20' | MAST ARM WITH LUMINAIRE |
| | | OPTICAL PRE-EMPTION DETECTOR |
| | | CONTROL CABINET, GROUND MOUNTED |
| | | CONTROL CABINET, POLE MOUNTED |
| | | FLASHING BEACON CONTROL AND METER PEDESTAL |
| | | LOAD CENTER ASSEMBLY |
| | | PULL BOX 12"x12" (OR AS NOTED) |
| | | ELECTRIC HANDHOLE 12"x24" (OR AS NOTED) |
| | | TRAFFIC SIGNAL CONDUIT |

| | |
|---|---|
| BF# | BANK FLAG |
| BHL # | BORE HOLE |
| | BUSH |
| BM # | BENCHMARK |
| | BOUND (CONC, STONE, LAND COURT, ETC.) |
| C | CABLE MANHOLE |
| CB | CATCH BASIN - SQUARE |
| CB | CATCH BASIN - D-FRAME |
| CB | CATCH BASIN - ROUND |
| DSK | DISK (CA/T, USC&GS, LAND COURT, ETC.) |
| DH | DRILL HOLE |
| D | DRAIN MANHOLE |
| EHH | ELECTRIC HANDHOLE |
| E | ELECTRIC MANHOLE |
| EM | ELECTRIC METER |
| EPLP | ESCUTCHEON PIN IN LEAD PLUG |
| FB | FLASHING BEACON |
| FES | FLARED END SECTION |
| FP | FLAG POLE |
| GF | GAS FILL |
| GG | GAS GATE |
| GM | GAS METER |
| GP | GAS PUMP |
| G | GAS MANHOLE |
| GPL | GUY POLE |
| | HANDICAP SYMBOL |
| | GUY WIRE ANCHOR |
| HTP | HIGH TENSION POWER POLE |
| | FIRE HYDRANT |
| IP | IRON PIPE |
| | LIGHT POLE |
| | LIGHT POLE DOUBLE LIGHT |

| | |
|---|---|
| TS | TRAFFIC SIGNAL |
| TS | TRAFFIC SIGNAL MAST ARM/SPAN WIRE POLE |
| | SIGN |
| | SIGN - DOUBLE POST |
| UFB# | UTILITY POLE W/ FIRE PULL BOX |
| ULT# | UTILITY POLE W/ LIGHT |
| UPDL# | UTILITY POLE W/ DOUBLE LIGHT |
| UPL# | UTILITY POLE |
| VP | VENT PIPE |
| W | WATER MANHOLE |
| WG | WATER GATE |
| WM | WATER METER |
| WSO | WATER SHUTOFF |
| WELL | WELL (POTABLE) |
| WF# | WETLAND FLAG |
| X-CUT | X-CUT |

**DEERFIELD**
**ROUTE 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ####### | 2 | 59 |
| PROJECT FILE NO. | | 613708 | |

## LEGEND & ABBREVIATIONS

### LEGEND

| | |
|---|---|
| MAG | MAG NAIL |
| MB | MAIL BOX |
| MHB | MASSACHUSETTS HIGHWAY BOUND |
| MW | MONITORING WELL |
| OIL | OIL FILL |
| M | OTHER MANHOLE |
| PB | PULL BOX |
| PED | PEDESTRIAN SIGNAL |
| | PHOTO CONTROL - H & V |
| | PHOTO CONTROL - V ONLY |
| PK | PK NAIL |
| PM | PARKING METER |
| POST | CIRCULAR POST |
| POST | SQUARE POST |
| RB | REBAR/IRON PIN |
| RRS | RAILROAD SPIKE |
| RRSG | RAILROAD SIGNAL |
| RRSW | RAILROAD SWITCH |
| SN | STAKE AND NAIL |
| SP | STAND PIPE |
| S | SEWER MANHOLE |
| ST | STEAM MANHOLE |
| | STUMP |
| TB | TOWN LINE BOUND (CORNER) |
| TCB | TRAFFIC SIGNAL CONTROL CABINET |
| T | TELEPHONE MANHOLE |
| TFMR | TRANSFORMER |
| TLRS | TOWN LINE ROAD STONE |
| TPIT # | TEST PIT |
| TPL | TROLLEY POLE |
| | TRAVERSE POINT |
| 22"M | TREE |

| | |
|---|---|
| P.G.L. | PROFILE GRADE LINE |
| POC | POINT ON CURVE |
| POT | POINT ON TANGENT |
| PROJ | PROJECT |
| PROP | PROPOSED |
| PSB | PLANTABLE SOIL BORROW |

## GENERAL SYMBOLS

| EXISTING | PROPOSED | DESCRIPTION |
|---|---|---|
| JB | JB | JERSEY BARRIER |
| | | 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 |
| | | GUARD RAIL - DOUBLE FACE - STEEL POSTS |
| | | GUARD RAIL - DOUBLE FACE - WOOD POSTS |
| x | x | CHAIN LINK OR METAL FENCE |
| | | WOOD FENCE |
| | | HAY BALES/SILT FENCE |
| | | 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 (cont.)

| GENERAL | |
|---|---|
| PVC | POINT OF VERTICAL CURVATURE |
| PVI | POINT OF VERTICAL INTERSECTION |
| PVT | POINT OF VERTICAL TANGENCY |
| R&D | REMOVE AND DISCARD |
| RD | ROAD |
| RDWY | ROADWAY |
| REM | REMOVE |
| RET WALL | RETAINING WALL |
| RR | RAILROAD |
| R&R | REMOVE AND RESET |
| R&S | REMOVE AND STACK |
| RT | RIGHT |
| SB | STONE BOUND |
| ST | STREET |
| STA | STATION |
| SSD | STOPPING SIGHT DISTANCE |
| T | TANGENT DISTANCE OF CURVE/TRUCK % |
| TC | TOP OF CURB |
| TOS | TOP OF SLOPE |
| UP | UTILITY POLE |
| VAR | VARIES |
| VERT | VERTICAL |
| VC | VERTICAL CURVE |
| WG | WATER GATE |
| WIP | WROUGHT IRON PIPE |
| WM | WATER METER/WATER MAIN |
| X-SECT | CROSS SECTION |

## ABBREVIATIONS

| GENERAL | |
|---|---|
| AADT | ANNUAL AVERAGE DAILY TRAFFIC |
| ABAN | ABANDON |
| ADJ | ADJUST |
| APPROX. | APPROXIMATE |
| A.C. | ASPHALT CONCRETE |
| ACCM PIPE | ASPHALT COATED CORRUGATED METAL PIPE |
| BL | BASELINE |
| BO | BY OTHERS |
| BOS | BOTTOM OF SLOPE |
| CB | CATCH BASIN |
| CBCI | CATCH BASIN WITH CURB INLET |
| CCM | CEMENT CONCRETE MASONRY |
| CEM | CEMENT |
| CONT | CONTINUOUS |
| CONST | CONSTRUCTION |
| CR GR | CROWN GRADE |
| DHV | DESIGN HOURLY VOLUME |
| DIP | DUCTILE IRON PIPE |
| DW | STEADY DON'T WALK - PORTLAND ORANGE |
| DWY | DRIVEWAY |
| EMB | EMBANKMENT |
| EOP | EDGE OF PAVEMENT |
| EXC | EXCAVATION |
| F&C | FRAME AND COVER |
| F&G | FRAME AND GRATE |
| FDN. | FOUNDATION |
| GD | GROUND |
| GG | GAS GATE |
| GI | GUTTER INLET |
| HMA | HOT MIX ASPHALT |
| HOR | HORIZONTAL |
| JCT | JUNCTION |
| LT | LEFT |
| MAX | MAXIMUM |
| MB | MAILBOX |
| MHB | MASSACHUSETTS HIGHWAY BOUND |
| MIN | MINIMUM |
| M&O | MILL & OVERLAY |
| NIC | NOT IN CONTRACT |
| NO. | NUMBER |
| PCR | PEDESTRIAN CURB RAMP |

## TRAFFIC SIGNAL ABBREVIATIONS

| | |
|---|---|
| CAB | CABINET |
| CCVE | CLOSED CIRCUIT VIDEO EQUIPMENT |
| DW | STEADY UPRAISED HAND |
| FDW | FLASHING UPRAISED HAND |
| FR | FLASHING CIRCULAR RED |
| FRL | FLASHING RED LEFT ARROW |
| FRR | FLASHING RED RIGHT ARROW |
| FY | FLASHING CIRCULAR YELLOW |
| FYL | FLASHING YELLOW LEFT ARROW |
| FYR | FLASHING YELLOW RIGHT ARROW |
| G | STEADY CIRCULAR GREEN |
| GL | STEADY GREEN LEFT ARROW |
| GR | STEADY GREEN RIGHT ARROW |
| GSL | STEADY GREEN SLASH LEFT ARROW |
| GSR | STEADY GREEN SLASH RIGHT ARROW |
| GV | STEADY GREEN VERTICAL ARROW |
| OL | OVERLAP |
| PED | PEDESTRIAN |
| PTZ | PAN, TILT, ZOOM |
| R | STEADY CIRCULAR RED |
| RL | STEADY RED LEFT ARROW |
| RR | STEADY RED RIGHT ARROW |
| TR SIG | TRAFFIC SIGNAL |
| TSC | TRAFFIC SIGNAL CONDUIT |
| W | STEADY WALKING PERSON |
| Y | STEADY CIRCULAR YELLOW |
| YL | STEADY YELLOW LEFT ARROW |

## PAVEMENT MARKINGS SYMBOLS

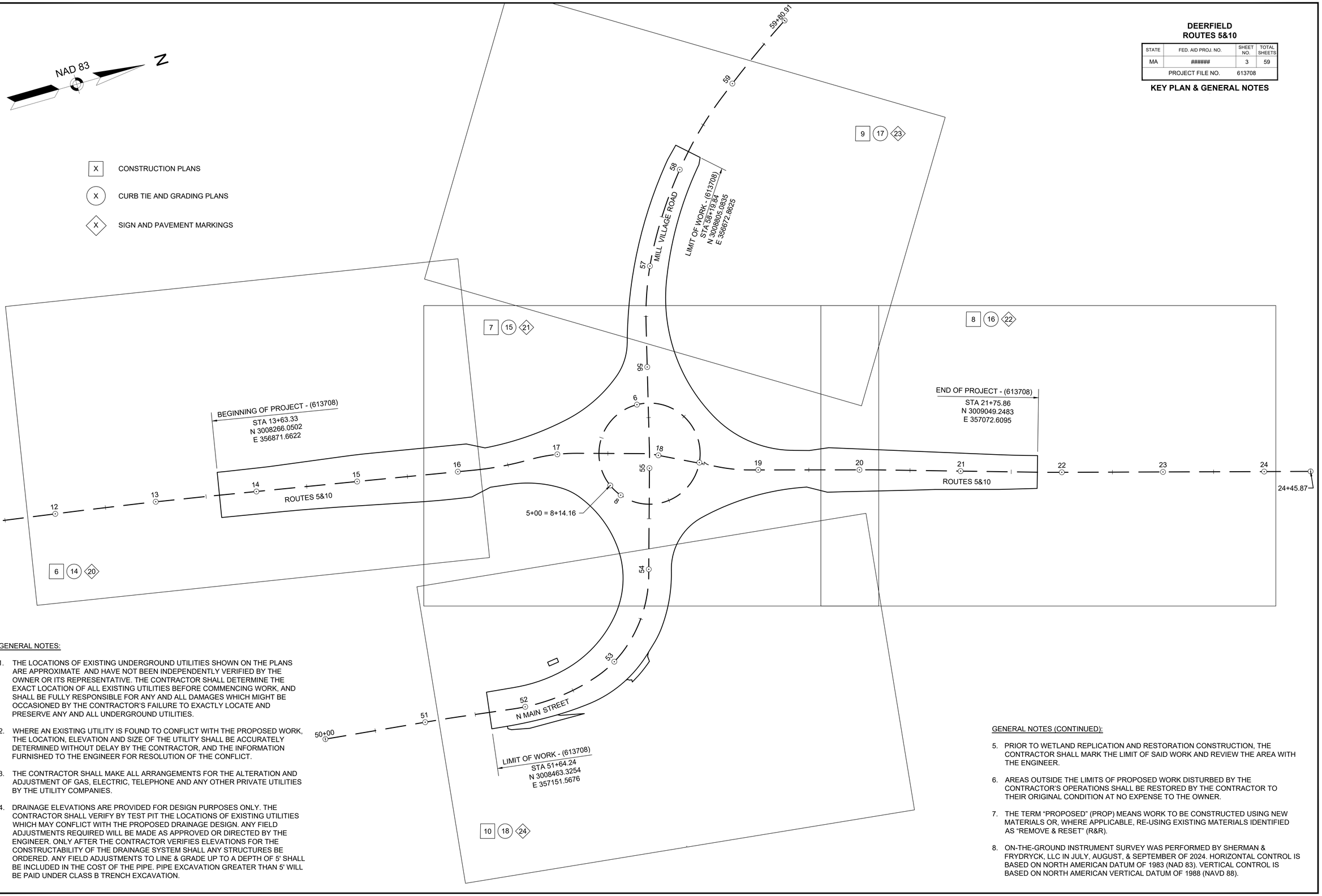
| EXISTING | PROPOSED | DESCRIPTION |
|---|---|---|
| | | PAVEMENT ARROW - WHITE |
| ONLY | ONLY | LEGEND "ONLY" - WHITE |
| | SL | STOP LINE |
| | CW | CROSSWALK |
| | SWL | SOLID WHITE LINE |
| | SYL | SOLID YELLOW LINE |
| | BWL | BROKEN WHITE LINE |
| | BYL | BROKEN YELLOW LINE |
| | DWL | DOTTED WHITE LINE |
| | DYL | DOTTED YELLOW LINE |
| | DWLEx | DOTTED WHITE LINE EXTENSION |
| | DYLEx | DOTTED YELLOW LINE EXTENSION |
| | DBWL | DOUBLE WHITE LINE |
| | DBYL | DOUBLE YELLOW LINE |

613708_HD_TITLE SHEET.DWG Plotted on 27-Feb-2026 9:46 AM

**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 3 | 59 |
| PROJECT FILE NO. | 613708 | | |

**KEY PLAN & GENERAL NOTES**

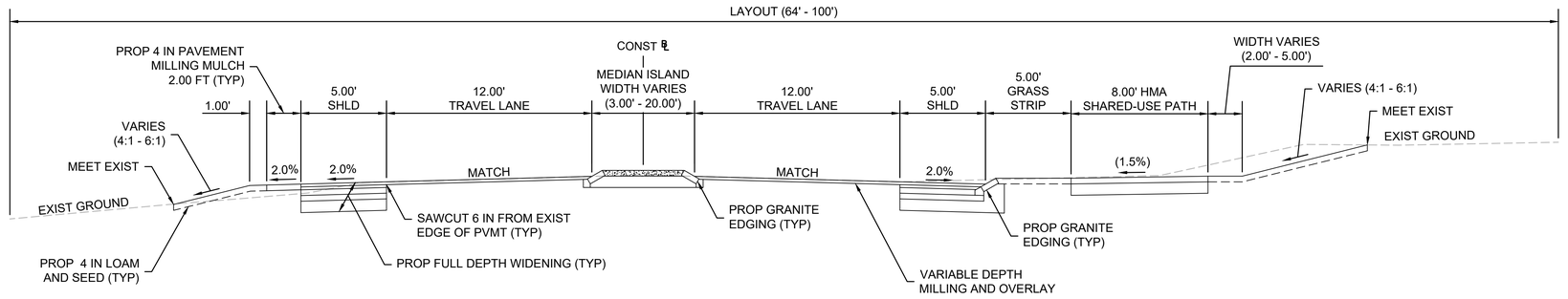



GENERAL NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE 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 SHALL 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.
2. 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.
3. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
4. DRAINAGE ELEVATIONS ARE PROVIDED FOR DESIGN PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY BY TEST PIT THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH THE PROPOSED DRAINAGE DESIGN. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER. ONLY AFTER THE CONTRACTOR VERIFIES ELEVATIONS FOR THE CONSTRUCTABILITY OF THE DRAINAGE SYSTEM SHALL ANY STRUCTURES BE ORDERED. ANY FIELD ADJUSTMENTS TO LINE & GRADE UP TO A DEPTH OF 5' SHALL BE INCLUDED IN THE COST OF THE PIPE. PIPE EXCAVATION GREATER THAN 5' WILL BE PAID UNDER CLASS B TRENCH EXCAVATION.

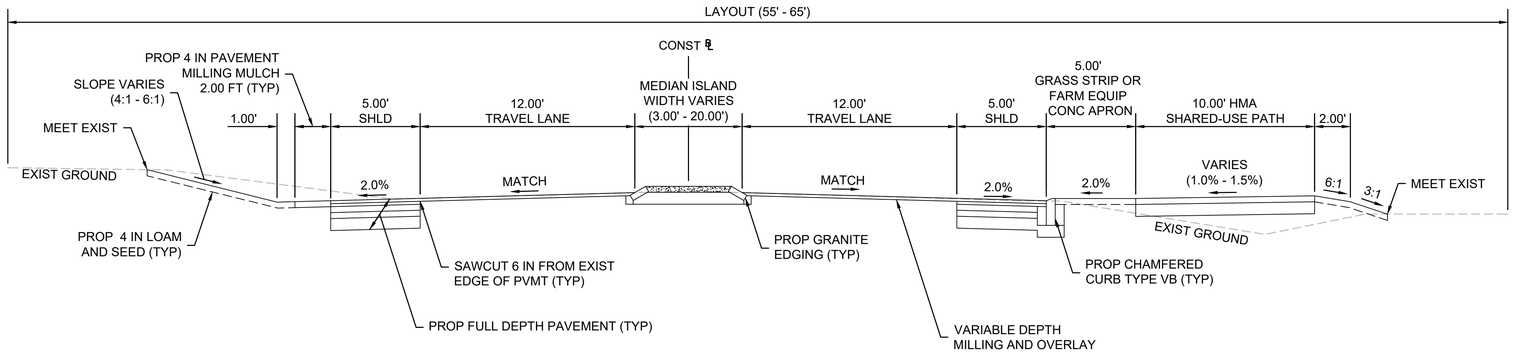
GENERAL NOTES (CONTINUED):

5. PRIOR TO WETLAND REPLICATION AND RESTORATION CONSTRUCTION, THE CONTRACTOR SHALL MARK THE LIMIT OF SAID WORK AND REVIEW THE AREA WITH THE ENGINEER.
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 NO EXPENSE TO THE OWNER.
7. THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE & RESET" (R&R).
8. ON-THE-GROUND INSTRUMENT SURVEY WAS PERFORMED BY SHERMAN & FRYDRYCK, LLC IN JULY, AUGUST, & SEPTEMBER OF 2024. HORIZONTAL CONTROL IS BASED ON NORTH AMERICAN DATUM OF 1983 (NAD 83). VERTICAL CONTROL IS BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).



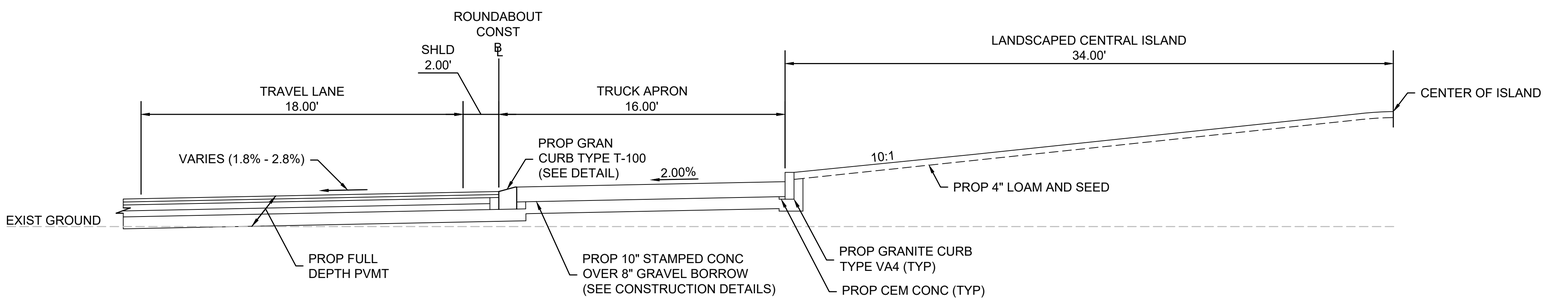

TYPICAL SECTION - NORMAL CROWN FULL DEPTH WIDENING
ROUTE 5 &10
STA 15+14.04 TO STA 16+50 (VARIABLE DEPTH MILLING)
STA 19+50 TO STA 20+15.62 (VARIABLE DEPTH MILLING)

SCALE: 1" = 4'




TYPICAL SECTION - NORMAL CROWN FULL DEPTH WIDENING
MILL VILLAGE ROAD
STA 56+75 TO STA 58+19.84 TO

SCALE: 1" = 4'




TYPICAL SECTION - ROUNDABOUT
SCALE: 1" = 4'

HOR. SCALE IN FEET
4 0 4 8
4 0 4 8
VER. SCALE IN FEET

PAVEMENT NOTES: (ROUTES 5&10, MILL VILLAGE ROAD, NORTH MAIN STREET)

PROPOSED FINE MILLING AND PAVEMENT OVERLAY:

SURFACE: 2 INCH SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) OVER ASPHALT EMULSION FOR TACK COAT AT 0.07 TO 0.09 GALS/SY OVER FINE MILLED SURFACE

FINE MILLING: 2 INCH DEPTH

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 2 INCH SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) OVER ASPHALT EMULSION FOR TACK COAT AT 0.06 TO 0.08 GALS/SY OVER 2 INCH SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC - 12.5) OVER ASPHALT EMULSION FOR TACK COAT AT 0.06 TO 0.08 GALS/SY OVER

BASE: 4 INCH SUPERPAVE BASE COURSE - 37.5 (SBC - 37.5) OVER

SUBBASE: 4 INCH DENSE GRADED CRUSHED STONE FOR SUBBASE OVER 8 INCH GRAVEL BORROW (TYPE b)

PROPOSED FULL DEPTH PAVEMENT - WIDENING (LESS THAN 4 FEET WIDE)

SURFACE: 2 INCH SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) OVER ASPHALT EMULSION FOR TACK COAT AT 0.06 TO 0.08 GALS/SY OVER 2 INCH SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC - 12.5) OVER ASPHALT EMULSION FOR TACK COAT AT 0.07 TO 0.09 GALS/SY OVER

BASE: 6 INCH CEMENT CONCRETE BASE COURSE OVER

SUBBASE: 8 INCH GRAVEL BORROW (TYPE b)

PROPOSED STAMPED AND COLORED CONCRETE TRUCK APRON

SURFACE: 10 INCH REINFORCED CEM CONC (4000 PSI, $\frac{3}{4}$", 610 LB) OVER

SUBBASE: 8 INCH GRAVEL BORROW (TYPE b)

PROPOSED STAMPED AND COLORED CONCRETE FARM EQUIPMENT APRON

SURFACE: 8 INCH REINFORCED CEM CONC (4000 PSI, $\frac{3}{4}$", 610 LB) OVER

SUBBASE: 8 INCH GRAVEL BORROW (TYPE b)

PROPOSED CONCRETE MEDIAN ISLAND

SURFACE: 4 INCH CEM CONC (4000 PSI, $\frac{3}{4}$", 610 LB) OVER

SUBBASE: 8 INCH GRAVEL BORROW (TYPE b)

PROPOSED HOT MIX ASPHALT DRIVEWAY AND APRON

SURFACE: 2 INCH SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER ASPHALT EMULSION FOR TACK COAT AT 0.06 TO 0.08 GALS/SY OVER 2 INCH SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC - 12.5)

BASE: EXISTING GRAVEL MATERIAL SUITABLE FOR REUSE SHALL BE RETAINED ON SITE WHERE POSSIBLE. GRAVEL BORROW SUITABLE FOR REUSE MUST MEET MASSDOT MATERIAL SPECIFICATION M.1.03.0 (TYPE b OR TYPE c), OTHERWISE REPLACE WITH 8 INCH GRAVEL BORROW (TYPE b).

PROPOSED SHARED USE PATH

SURFACE: 1.25 INCH SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5) OVER 1.75 INCH SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC - 12.5) OVER

SUBBASE: 8 INCH GRAVEL BORROW (TYPE b)

PROPOSED PEDESTRIAN CURB RAMP

SURFACE: 4 INCH CEM CONC (4000 PSI, $\frac{3}{4}$", 610 LB) OVER

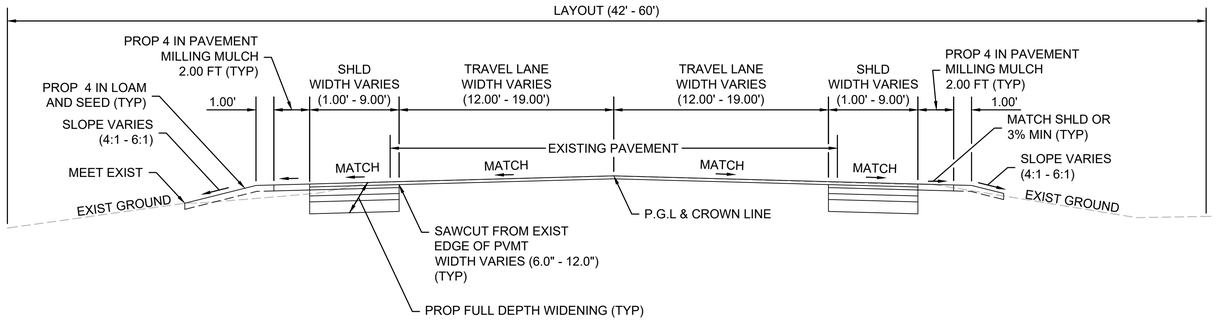
SUBBASE: 8 INCH GRAVEL BORROW (TYPE b)

**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 5 | 59 |
| PROJECT FILE NO. | 613708 | | |

**TYPICAL SECTIONS**



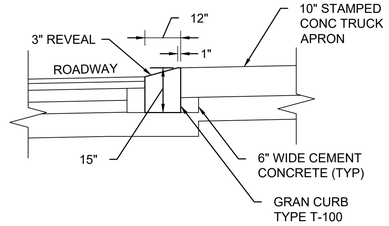



TYPICAL SECTION - NORMAL CROWN FULL DEPTH WIDENING
ROUTE 5&10
STA 13+63.33 TO STA 15+14.04
STA 20+15.62 TO STA 21+75.86

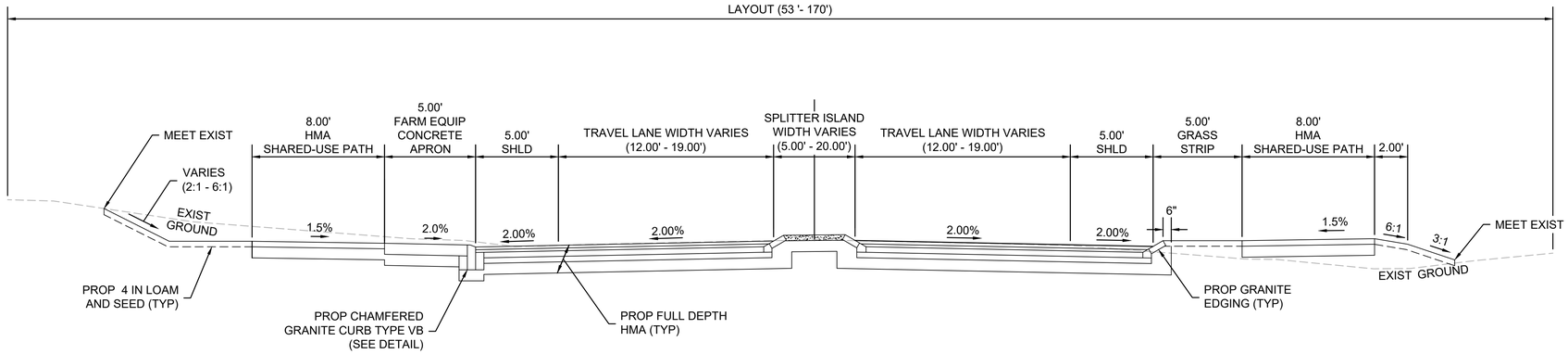
NORTH MAIN STREET
STA 51+64.24 TO STA 52+25

MILL VILLAGE ROAD
STA 56+75 TO STA 58+19.84

SCALE: 1" = 4'




GRANITE CURB TYPE T-100
SCALE: 1" = 2'

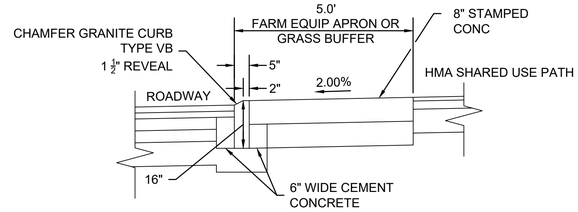



TYPICAL SECTION - NORMAL CROWN FULL DEPTH CONSTRUCTION
ROUTE 5 & 10
STA. 18+61.15 TO STA 19+50
STA 16+50 TO STA 17+19.84

NORTH MAIN ST
STA 52+75 TO STA 54+43

MILL VILLAGE ROAD
STA 55+86 TO STA 56+75

SCALE: 1" = 4'



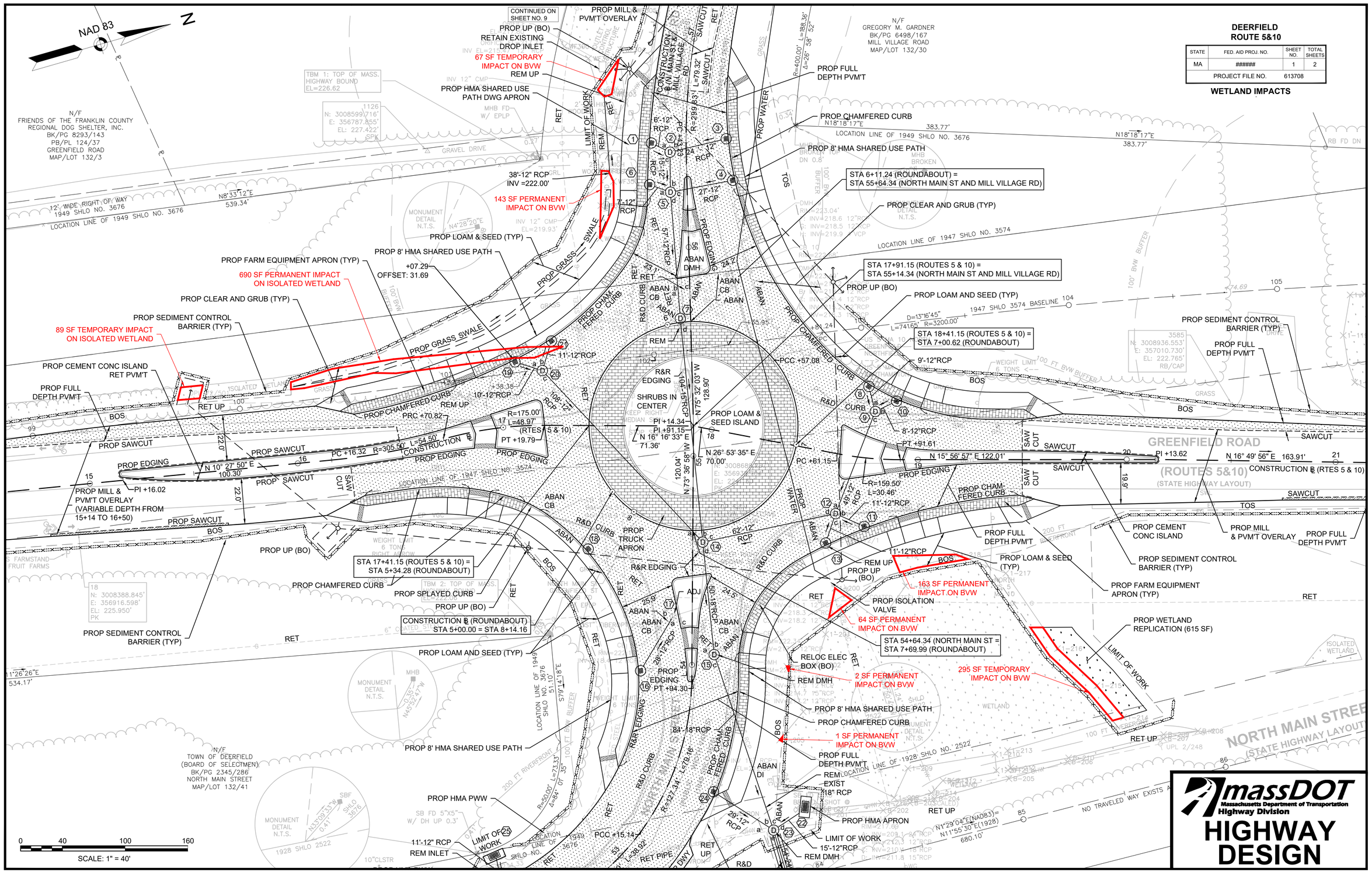

CHAMFERED GRANITE CURB TYPE VB
SCALE: 1" = 2'

HOR. SCALE IN FEET
4 0 4 8
4 0 4 8
VER. SCALE IN FEET

# DEERFIELD
# ROUTE 5&10

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 1 | 2 |
| PROJECT FILE NO. | 613708 | | |

## WETLAND IMPACTS




MassDOT
Massachusetts Department of Transportation
Highway Division

# HIGHWAY DESIGN

**DEERFIELD**
**ROUTE 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 2 | 2 |
| PROJECT FILE NO. | | 613708 | |

**WETLAND IMPACTS**

64 SF PERMANENT IMPACT ON BVW
2 SF PERMANENT IMPACT ON BVW
1 SF PERMANENT IMPACT ON BVW
295 SF TEMPORARY IMPACT ON BVW
380 SF TEMPORARY IMPACT ON BVW

**DRAINAGE STRUCTURE DATA**

| NO. | TYPE | STATION | RIM ELEV. | INV. ELEV. IN | INV. ELEV. OUT | REMARKS |
|---|---|---|---|---|---|---|
| 1 | CBCI | 56+50.00, 17.62' LT | 223.74 | - | 219.24 | |
| 2 | DMH | 56+45.62, 7.74' LT | 223.94 | a = 219.14<br>b = 218.94 | c = 218.84 | |
| 3 | CBCI | 56+52.03, 20.22' RT | 223.68 | - | 219.17 | |
| 4 | CBCI | 56+31.62, 22.94' RT | 223.79 | - | 219.29 | |
| 5 | DMH | 56+26.54, 8.03' LT | 224.11 | a = 219.23<br>b = 218.69<br>c = 218.78 | d = 218.59 | |
| 6 | CBCI | 56+30.45, 18.90' LT | 223.84 | - | 219.34 | |
| 7 | EXIST DMH | 55+65.96, 4.95' LT | 224.97 | a = EXIST<br>b = 218.02<br>c = EXIST | b = 215.2 | |
| 8 | CBCI | 18+73.03, 35.04' LT | 223.50 | - | 219.00 | |

**DRAINAGE STRUCTURE DATA**

| NO. | TYPE | STATION | RIM ELEV. | INV. ELEV. IN | INV. ELEV. OUT | REMARKS |
|---|---|---|---|---|---|---|
| 9 | DMH | 18+77.63, 22.55' LT | 223.75 | a = 218.89<br>b = 218.95 | c = 218.79 | |
| 10 | CBCI | 18+89.94, 28.90' LT | 223.58 | - | 219.08 | |
| 11 | CBCI | 18+77.58, 33.63' RT | 223.35 | - | 218.85 | |
| 12 | DMH | 18+65.15, 28.40' RT | 223.68 | a = 218.08<br>b = 218.65<br>c = 218.77 | d = 215.93 | |
| 13 | CBCI | 18+63.75, 43.87' RT | 223.47 | - | 218.97 | |
| 14 | DMH | 54+58.82, 4.84' RT | 224.22 | a = 217.63<br>b = 214.18<br>c = 215.03 | d = 214.08 | |
| 15 | DMH | 54+04.99, 10.63' RT | 222.83 | a = EXIST<br>b = 213.57 | c = 213.47 | |
| 16 | CB | 53+96.96, 25.57' LT | 222.36 | - | 218.46 | |
| 17 | EXIST DMH | 54+23.31, 9.08' LT | 223.39 | a = 218.20<br>b = EXIST | c = EXIST | ADJ |
| 18 | CB | 54+54.47, 50.76 LT | 223.95 | - | EXIST | CONSTR OVER EXIST PIPE |
| 19 | CBCI | 17+22.37, 41.20' LT | 224.17 | - | 219.67 | |

**DRAINAGE STRUCTURE DATA**

| NO. | TYPE | STATION | RIM ELEV. | INV. ELEV. IN | INV. ELEV. OUT | REMARKS |
|---|---|---|---|---|---|---|
| 20 | DMH | 17+18.80, 26.21' LT | 224.48 | a = 219.52<br>b = 219.74 | c = 219.42 | |
| 21 | CBCI | 17+22.37, 41.20' LT | 224.40 | - | 219.90 | |
| 22 | DI | 53+52.55, 64.94' RT | 216.00 | - | 212.75 | |
| 23 | DMH | 53+41.73, 54.95' RT | 217.94 | a = EXIST<br>b = 215.82<br>c = 212.55<br>d = 212.55 | e = 212.30 | |
| 24 | CBCI | 53+46.02, 22.31' RT | 220.72 | - | 216.22 | |
| 25 | DI | 52+43.74, 34.07' LT | 216.00 | - | 214.53 | |
| 26 | DMH | 52+41.42, 21.09 LT | | a = 214.43<br>b = EXIST<br>c = 214.43 | d = EXIST | |
| 27 | CB | 52+31.93, 16.66' RT | 218.47 | - | 214.77 | |
| 28 | FES | 53+15.09, 100.41 RT | - | - | 211.78 | 24" FES |

0 40 100 160
SCALE: 1" = 40'

MassDOT Massachusetts Department of Transportation Highway Division
**HIGHWAY DESIGN**

## HIGHWAY GUARD DETAILS
NONE

## TRAFFIC SIGNAL CONDUIT
NONE

## WATER SUPPLY ALTERATIONS
NONE

## DRAINAGE DETAILS
NONE

**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 6 | 59 |
| PROJECT FILE NO. | | 613708 | |

**CONSTRUCTION PLAN**

613708_HD_CONSTRUCTION PLAN.DWG Plotted on 13-Mar-2026 1:38 PM

NAD 83

31
N: 3008003.598'
E: 356660.115'
EL: 221.580'
SPK

SHLO NO. 3574

50°40'06"W 293.07'

VERSE

N/F
CYNTHIA MORAWSKI,
PATRICIA DAGROSA,
LEONARD T. GRYBKO, JR.
& DONNA GRYBKO
BK/PG 5811/283
GREENFIELD ROAD
MAP/LOT 132/1

DETAIL
N.T.S.
N51°58'02"E
0.42'
MHB

N/F
CYNTHIA MORAWSKI,
PATRICIA A. DAGROSA,
LEONARD T. GRYBKO, JR.
& DONNA GRYBKO
BK/PG 5811/283
GREENFIELD ROAD
MAP/LOT 132/2

N/F
FRIENDS OF THE FRANKLIN COUNTY
REGIONAL DOG SHELTER, INC.
BK/PG 8293/143
PB/PL 124/37
GREENFIELD ROAD
MAP/LOT 132/3

ACCESS AND EGRESS
HEREBY ALLOWED
1999 SHLO NO. 7524 &
2001 SHLO NO. 7647

N08°07'44"E 1.44'
LOCATION LINE OF 1949 SHLO NO. 3676

LOCATION LINE OF 1947 SHLO NO. 3574

N8°33'12"E 539.34'

LOCATION LINE OF 1949 SHLO NO. 3676

MHB FD W/ EPLP

RB FD
BENT, DN 0.3'

12' WIDE RIGHT OF WAY
1949 SHLO NO. 3676

LOCATION LINE OF 1949 SHLO NO. 3676

N8°33'12"E
539.34'

1276
N: 3008339.393'
E: 356746.950'
EL: 224.103'
SPK

N6°26'45"W 192.11'
SURVEY TRAVERSE

TBM 6: SPIKE
IN UP 503
EL=226.89

CONTINUED ON
SHEET NO. 7

PROP SEDIMENT CONTROL
BARRIER (TYP)

LOCATION LINE OF 1947 SHLO NO. 3574

LOCATION LINE OF 1947 SHLO NO. 3574

ADS FES
21"

UPL 72/904

OHW

RET UP

GRASS

GRASS

SPEED LIMIT 50

BEGINNING OF PROJECT
AND LIMIT OF WORK
STATION 13+63.33
N 3008266.0502
E 356871.6622

GRASS

OHW

UPL 502

RET UP

RET OHW

PROP FULL
DEPTH PVM'T

PROP UP &
GUY WIRE
(BO) (TYP)

REM UP

N8°33'12"E(NAD8
N18°59'05"E(19
10313

2.30 ISOLATED WETLAND

BOS

1.00

N8°33'12"E(NAD83)=
N18°59'05"E(1947)
10313.03'

94 95 96 97 98 99

+50.11 +13.00 +51.56 +26.00 +52.00 +15.69

1947 SHLO 3574 BASELINE

EP SWL

PROP SAWCUT

PROP CEMENT
CONC ISLAND

PROP EDGING

22.0'

PROP SAWCUT

10+00 11 12 13 14 15 16

N 8° 45' 12" E 223.00' N 8° 45' 12" E 223.00'

PC +23.00

R=4460.00' L=122.22'

CONSTRUCTION ℄
(RTES 5 & 10)

PT +45.23

SAWCUT

44.9'

N 10° 19' 24" E 170.80'

PROP MILLING &
PVM'T OVERLAY

48.14'

PI +16.02

N 10° 27' 50" E 100.30'

PROP SAWCUT

32.0'

GREENFIELD ROAD (ROUTES 5 & 10)
(STATE HIGHWAY LAYOUT)

38.21'

38.6'

DBYL

SWL

SURVEY TRAVERSE

302.84'
S10°20'55"W

LOCATION LINE OF 1947 SHLO NO. 3574

PROP SAWCUT

GRASS

GRASS

EP

INTERSECTION AHEAD

SPEED LIMIT 45

THE BARS FARMSTAND
CLARKDALE FRUIT FARMS

RET

PROP LP (TYP)

PROP FULL
DEPTH PVM'T

BOS

WALL

INV 12" RCP
EL=221.16'

23
N: 3007929.912'
E: 356837.533'
EL: 226.690'
PK

21
N: 3008090.933'
E: 356862.197'
EL: 227.200'
PK

18
N: 3008388.845'
E: 356916.598'
EL: 225.950'
PK

PROP SEDIMENT CONTROL
BARRIER (TYP)

GAS PYLON

RET

6" COATED STEEL

RET

RET

TBM 3: TOP OF MASS.
HIGHWAY BOUND
EL=224.27
BMK 3

MHB FD
BACK CENTER

LOCATION LINE OF 1949 SHLO NO. 3676

N11°26'26"E
534.17'

LOCATION LINE OF 1949 SHLO NO. 3676

N11°26'26"E
534.17'

MONUMENT
DETAIL
N.T.S.
0.47'
N43°59'00"E
MHB

N/F
DENIS P. BOUDAH
& SANDRA M. BOUDAH
BK/PG 2844/302
223 NORTH MAIN STREET
MAP/LOT 132/40

N/F
TOWN OF DEERFIELD
(BOARD OF SELECTMEN)
BK/PG 2345/286
NORTH MAIN STREET
MAP/LOT 132/41

MONUMENT
DETAIL
N.T.S.
N33°09'33"W
0.41'
SBF
SHLO
3676
1928 SHLO 2522

10"C

N4°47'21"E
481.78'
LOCATION LINE OF 1928 SHLO NO. 2522

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 11

## HIGHWAY GUARD DETAILS
SEE BELOW

## TRAFFIC SIGNAL CONDUIT
NONE

## WATER SUPPLY ALTERATIONS
SEE BELOW

## DRAINAGE DETAILS
SEE BELOW

**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ####### | 7 | 59 |
| | PROJECT FILE NO. 613708 | | |

**CONSTRUCTION PLAN**

613708_HD_CONSTRUCTION PLAN.DWG Plotted on 13-Mar-2026 1:38 PM

NAD 83 N

N/F
FRIENDS OF THE FRANKLIN COUNTY
REGIONAL DOG SHELTER, INC.
BK/PG 8293/143
PB/PL 124/37
GREENFIELD ROAD
MAP/LOT 132/3

N/F
GREGORY M. GARDNER
BK/PG 6498/167
MILL VILLAGE ROAD
MAP/LOT 132/30

N/F
CARYN E. GARDNER
BK/PG 6539/330
MILL VILLAGE ROAD
MAP/LOT 132/29

N/F
TOWN OF DEERFIELD
(BOARD OF SELECTMEN)
BK/PG 2345/286
NORTH MAIN STREET
MAP/LOT 132/41

CONTINUED ON SHEET NO. 9

CONTINUED ON SHEET NO. 6

CONTINUED ON SHEET NO. 8

CONTINUED ON SHEET NO. 10

TBM 1: TOP OF MASS. HIGHWAY BOUND EL=226.62

1126
N: 3008599.716'
E: 356787.855'
EL: 227.422'
SPK

3585
N: 3008936.553'
E: 357010.730'
EL: 222.765'
RB/CAP

18
N: 3008388.845'
E: 356916.598'
EL: 225.950'
PK

TBM 2: TOP OF MASS. HIGHWAY BOUND EL=222.08

PROP MILL & PVM'T OVERLAY
PROP UP (BO)
RETAIN EXISTING DROP INLET
REM UP
PROP CHAMFERED CURB
PROP HMA SHARED USE PATH DWG APRON
PROP FULL DEPTH PVM'T
PROP CHAMFERED CURB
PROP 8' HMA SHARED USE PATH
PROP CLEAR AND GRUB (TYP)
PROP LOAM & SEED (TYP)
PROP 8' HMA SHARED USE PATH
PROP FARM EQUIPMENT APRON (TYP)
PROP CLEAR AND GRUB (TYP)
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP CEMENT CONC ISLAND
RET PVM'T
PROP FULL DEPTH PVM'T
PROP UP (BO)
REM UP
PROP SAWCUT
PROP EDGING
PROP MILL & PVM'T OVERLAY (VARIABLE DEPTH FROM 15+14 TO 16+50)
PROP FULL DEPTH PVM'T
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP UP (BO)
PROP SPLAYED CURB
PROP CHAMFERED CURB
PROP LOAM AND SEED (TYP)
FIELD CUT EDGING TRANSITION TO PCB
PROP 8' HMA SHARED USE PATH
PROP HH (TYP)
PROP LP (TYP)
11'-12" RCP
REM INLET
PROP DWY
PROP TRUCK APRON
R&R EDGING
SHRUBS IN CENTER
PROP LOAM & SEED ISLAND
PROP LOAM AND SEED (TYP)
PROP UP (BO)
PROP ISOLATION VALVE
RELOC ELEC BOX (BO)
REM DMH
PROP 8' HMA SHARED USE PATH
PROP FULL DEPTH PVM'T
30'-12" RCP
REM EXIST 18" RCP
PROP HMA APRON
PROP UP (BO) (TYP)
PROP GUY WIRE (TYP)
15' 12"RCP
REM DMH
PROP LOAM & SEED
11'-12"RCP
PROP WETLAND REPLICATION (615 SF)
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP FULL DEPTH PVM'T
PROP LP (TYP)
PROP CEMENT CONC ISLAND
PROP MILL & PVM'T OVERLAY
PROP FARM EQUIPMENT APRON (TYP)
RET UP
PROP EDGING
CONSTRUCTION ℄ (RTES 5 & 10)
SAWCUT
TOS
R&R
R&D GUARD RAIL
RET PIPE
PROP LOAD BOX
PROP CHAMFERED CURB
PROP WATER
PROP GRASS SWALE
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP CEMENT CONC ISLAND
RET PVM'T
PROP FULL DEPTH PVM'T
PROP UP (BO)
REM UP
PROP SAWCUT
PROP EDGING
PROP MILL & PVM'T OVERLAY (VARIABLE DEPTH FROM 15+14 TO 16+50)
PROP FULL DEPTH PVM'T
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP UP (BO)
PROP SPLAYED CURB
PROP CHAMFERED CURB
PROP LOAM AND SEED (TYP)
FIELD CUT EDGING TRANSITION TO PCB
PROP 8' HMA SHARED USE PATH
PROP HH (TYP)
PROP LP (TYP)
11'-12" RCP
REM INLET
PROP DWY
PROP TRUCK APRON
R&R EDGING
SHRUBS IN CENTER
PROP LOAM & SEED ISLAND
PROP LOAM AND SEED (TYP)
PROP UP (BO)
PROP ISOLATION VALVE
RELOC ELEC BOX (BO)
REM DMH
PROP 8' HMA SHARED USE PATH
PROP FULL DEPTH PVM'T
30'-12" RCP
REM EXIST 18" RCP
PROP HMA APRON
PROP UP (BO) (TYP)
PROP GUY WIRE (TYP)
15' 12"RCP
REM DMH
PROP LOAM & SEED
11'-12"RCP
PROP WETLAND REPLICATION (615 SF)
PROP SEDIMENT CONTROL BARRIER (TYP)
PROP FULL DEPTH PVM'T
PROP LP (TYP)
PROP CEMENT CONC ISLAND
PROP MILL & PVM'T OVERLAY
PROP FARM EQUIPMENT APRON (TYP)
RET UP
PROP EDGING
CONSTRUCTION ℄ (RTES 5 & 10)
SAWCUT
TOS
R&R
R&D GUARD RAIL
RET PIPE
PROP LOAD BOX
PROP CHAMFERED CURB
PROP WATER

38'-12" RCP
INV =222.00'
7'-12" RCP
6'-12" RCP
27'-12" RCP
24'-12" RCP
62'-12" RCP
48'-12" RCP
11'-12" RCP
10'-12"RCP
8'-12"RCP
9'-12"RCP
6'-12" RCP
11'-12"RCP
18'-12"RCP
85'-18"RCP
5'-24" RCP
15" 12"RCP

STA 6+11.24 (ROUNDABOUT) = STA 55+64.34 (NORTH MAIN ST AND MILL VILLAGE RD)
STA 17+91.15 (ROUTES 5 & 10) = STA 55+14.34 (NORTH MAIN ST AND MILL VILLAGE RD)
STA 18+41.15 (ROUTES 5 & 10) = STA 7+00.62 (ROUNDABOUT)
STA 17+41.15 (ROUTES 5 & 10) = STA 5+34.28 (ROUNDABOUT)
CONSTRUCTION ℄ (ROUNDABOUT) STA 5+00.00 = STA 8+14.16
STA 54+64.34 (NORTH MAIN ST = STA 7+69.99 (ROUNDABOUT)

LOCATION LINE OF 1949 SHLO NO. 3676
LOCATION LINE OF 1947 SHLO NO. 3574
LOCATION LINE OF 1928' SHLO NO. 2522
1947 SHLO 3574 BASELINE
CONSTRUCTION ℄ STA 5+00.00 = STA 8+14.16
CONSTRUCTION ℄ STA 5+00.00 = STA 8+14.16

GREENFIELD ROAD
(ROUTES 5&10)
(STATE HIGHWAY LAYOUT)

NORTH MAIN STREET
(STATE HIGHWAY LAYOUT)

NOTES:
1. EXCAVATE TEST PITS TO LOCATE UNDERGROUND UTILITIES PRIOR TO INSTALLING PROPOSED DRAINAGE. SEE GENERAL NOTES.
2. ALL ABANDONED PIPES SHALL BE PLUGGED WITH MASONRY.

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 11, 12, 13

## HIGHWAY GUARD DETAILS
NONE

## TRAFFIC SIGNAL CONDUIT
NONE

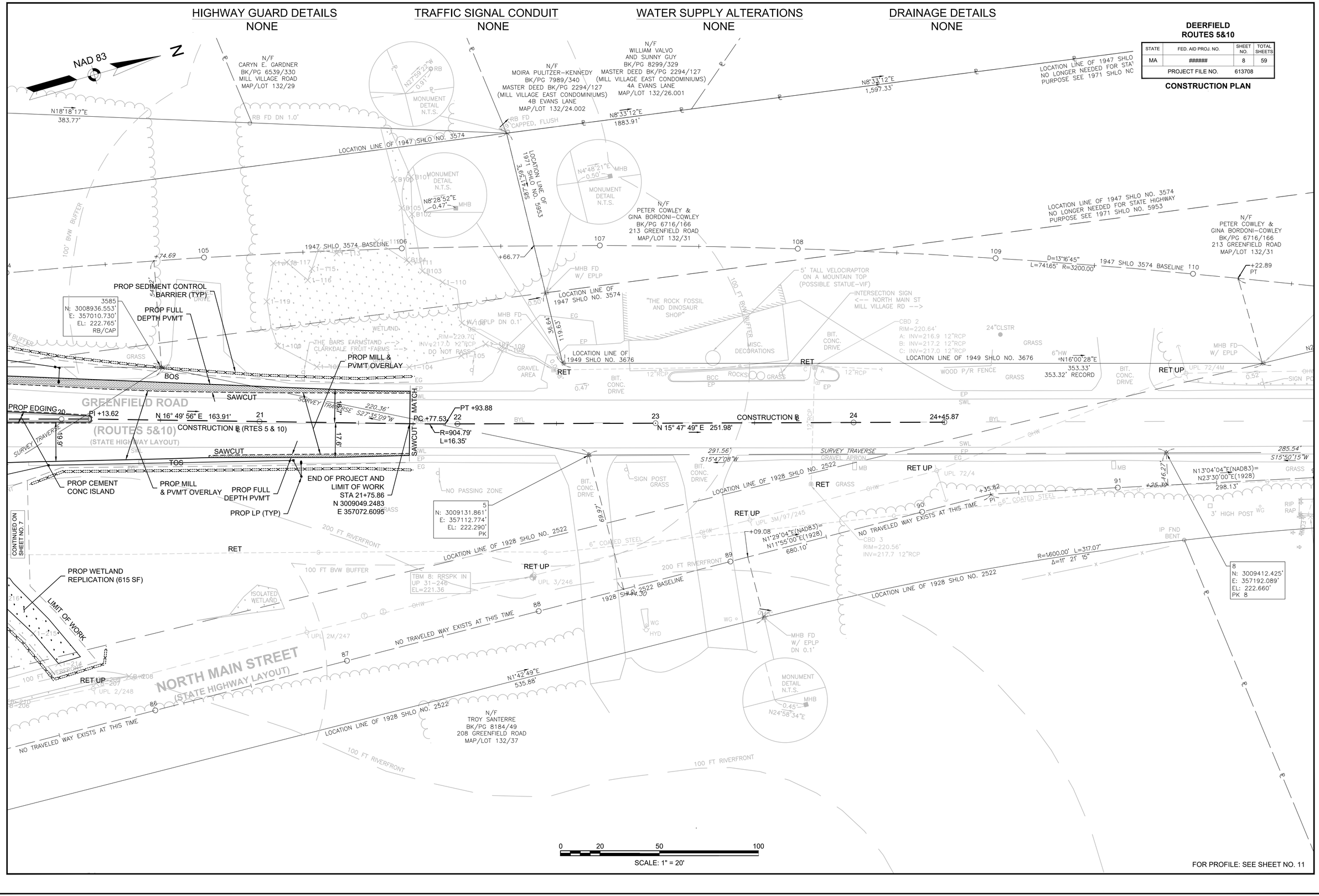
## WATER SUPPLY ALTERATIONS
NONE

## DRAINAGE DETAILS
NONE

**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 8 | 59 |
| PROJECT FILE NO. | | 613708 | |

**CONSTRUCTION PLAN**



HIGHWAY GUARD DETAILS
SEE BELOW

TRAFFIC SIGNAL CONDUIT
NONE

WATER SUPPLY ALTERATIONS
SEE BELOW

DRAINAGE DETAILS
SEE BELOW

**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 9 | 59 |
| PROJECT FILE NO. | 613708 | | |

**CONSTRUCTION PLAN**

613708_HD_CONSTRUCTION PLAN.DWG Plotted on 13-Mar-2026 1:38 PM

NAD 83

N8°33'12"E 539.34'

1126
N: 3008599.716'
E: 356787.855'
EL: 227.422'
SPK

TBM 1: TOP OF MASS. HIGHWAY BOUND EL=226.62

TBM 1: TOP OF MASS. HIGHWAY BOUND EL=226.62

100 FT BVW BUFFER

PROP 8' HMA SHARED USE PATH

PROP CLEAR AND GRUB (TYP)

40'-12" RCP
INV AT SWALE=222.00'

PROP MILLING MULCH

PROP CHAMFERED CURB

PROP TERMINAL END

REM GUARDRAIL

LOCATE FIBER LINE BEFORE INSTALLING GUARDRAIL POST

PROP TL-3 GUARDRAIL

PROP TL-2 TANGENT END

PROP SEDIMENT CONTROL BARRIER (TYP)

LIMIT OF WORK

PROP GRASS SWALE

REM UP

CONSTRUCTION @ (N. MAIN ST & MILL VILLAGE RD)

SAWCUT

PCC +22.55

6'-12"RCP

7'-12"RCP

R=299.83'

L=79.32'

PROP CHAM. FERED CURB

R&R CURB

ABAN CB

51'-12" RCP

56'

ABAN

PROP EDGING

PROP UP (BO)

PROP WATER

TOS

PROP MILL & PVM'T OVERLAY

VARIABLE DEPTH MILLING

PROP ISOLATION VALVE

PROP LOAM AND SEED (TYP)

PROP LP (TYP)

PROP FULL DEPTH PVM'T

PCC +57.08

PT +91.67

N 15°56'51" E
122.01'

PROP CHAMFERED CURB

SAW CUT

BOS

SURVEY TRAVERSE

WEIGHT LIMIT 6 TONS <---

CONTINUED ON SHEET NO. 7

CONTINUED ON SHEET NO. 8

N/F
THE YANKEE CANDLE COMPANY, INC.
BK/PG 2895/241
PB/PL 69/74
1 PLAIN ROAD EAST
MAP/LOT 132/4

16
N: 3008744.228'
E: 356730.134'
EL: 224.480'
PK

MONUMENT DETAIL N.T.S.
N4°28'12"E 0.27'
MHB

MONUMENT DETAIL N.T.S.
N24°51'15"E 0.77'
MHB

MONUMENT DETAIL N.T.S.
N0°35'40"W 0.34'
MHB BROKEN

MONUMENT DETAIL N.T.S.
N1°40'E 0.05
N.57.91
MHB

MHB FD W/ EPLP

MHB FD W/ EPLP DN 0.4'

MHB FD BROKEN TOP 0.8'

TBM 5: TOP OF MASS. HIGHWAY BOUND EL=227.90

R=400.00' L=270.80'
Δ=38° 47' 23"

LOCATION LINE OF 1949 SHLO NO. 3676

LIMIT OF WORK
STA 58+19.84
N 3008805.0835
E 356672.8625

PCC +27.75

SAWCUT ADJ MILL VILLAGE RD CONSTRUCTION @

R=425.00' L=405.20'

30.1'

58

404.7'

R=342.22' L=51.65'

PCC +79.4069

R=1104.01' L=101.51'

59+80.91

RET CB

LOCATION LINE OF 1949 SHLO NO. 3676

N51°08'57"E 84.22'

R=400.00' L=188.36'
Δ=26° 58' 52"

LOCATION LINE OF 1949 SHLO NO. 3676

N16°18'17"W 383.77'

LOCATION LINE OF 1947 SHLO NO. 3574

N16°18'17"W 383.77'

R=3200.00'
D=13°16'45"

1947 SHLO 3574 BASELINE 104

PLAIN ROAD (EAST)
(PUBLIC, 49.5' WIDE)

1953 TOWN LAYOUT

1954 COUNTY LAYOUT

MILL VILLAGE ROAD
(PUBLIC, WIDTH VARIES)

EAST PLAIN ST

UPL 40T/54

SIGN
NO BICYCLES
NO SKATEBOARDS
NO ROLLERBLADES

STOP

EXPOSED RCP PIPE

DMH (FND 3-25-25)
RIM=224.64'
A INV=219.72'
B INV=219.89'

INV 12" RCP EL=223.14'

CB
RIM=226.15'
A: INV=223.7 12"RCP
B: INV=223.5 12"RCP

CB
RIM=227.10'
INV=224.3 12"RCP

UG CABLE RISER

N/F
DEBRA A. KMETZ
MASTER DEED BK/PG
2046/104
2164/90
BK/PG 8099/284
4B PLAIN ROAD EAST
MAP/LOT 132/12.002

N/F
DAMIEN K. MORVIDELLI
& NICOLE J. FAHEY
MASTER DEED BK/PG 2046/104
2164/90
BK/PG 7280/104
4A PLAIN ROAD EAST
MAP/LOT 132/12.001

N/F
GREGORY M. GARDNER
BK/PG 6498/167
MILL VILLAGE ROAD
MAP/LOT 132/30

N/F
CARYN E. GARDNER
BK/PG 6539/330
MILL VILLAGE ROAD
MAP/LOT 132/29

34
N: 3009066.008'
E: 356484.653'
EL: 229.740'
PK

45.89'
N67°12'15"E

RD FD CAP

UBD 3

NOTES:
1. EXCAVATE TEST PITS TO LOCATE UNDERGROUND UTILITIES PRIOR TO INSTALLING PROPOSED DRAINAGE. SEE GENERAL NOTES.
2. ALL ABANDONED PIPES SHALL BE PLUGGED WITH MASONRY.

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NO. 13

## HIGHWAY GUARD DETAILS
NONE

## TRAFFIC SIGNAL CONDUIT
NONE

## WATER SUPPLY ALTERATIONS
SEE BELOW

## DRAINAGE DETAILS
SEE BELOW

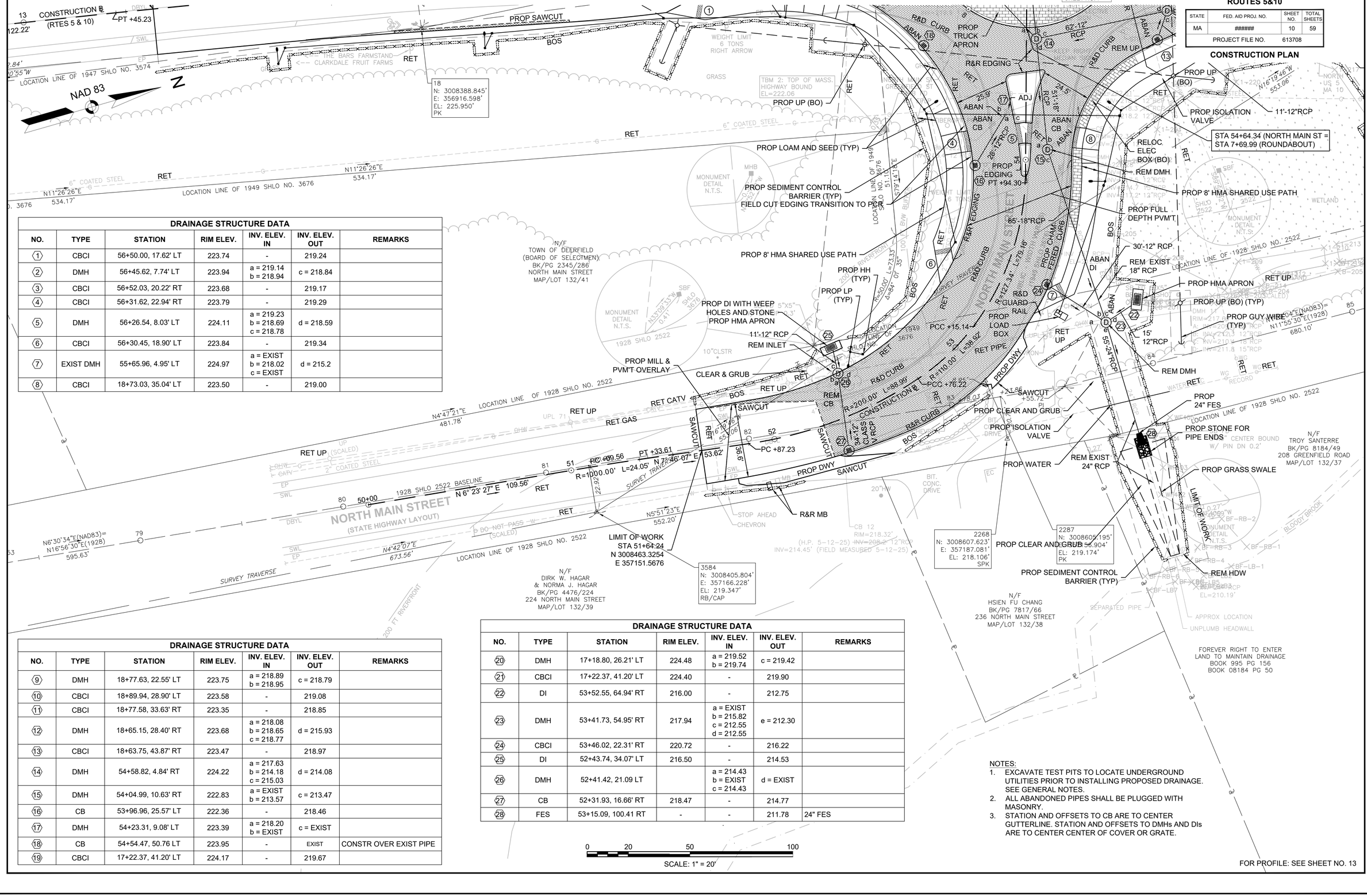
CONTINUED ON SHEET NO. 7

**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ####### | 10 | 59 |
| PROJECT FILE NO. | | 613708 | |

**CONSTRUCTION PLAN**

613708_HD_CONSTRUCTION PLAN.DWG Plotted on 13-Mar-2026 1:38 PM




**DRAINAGE STRUCTURE DATA**

| NO. | TYPE | STATION | RIM ELEV. | INV. ELEV. IN | INV. ELEV. OUT | REMARKS |
|---|---|---|---|---|---|---|
| ① | CBCI | 56+50.00, 17.62' LT | 223.74 | - | 219.24 | |
| ② | DMH | 56+45.62, 7.74' LT | 223.94 | a = 219.14<br>b = 218.94 | c = 218.84 | |
| ③ | CBCI | 56+52.03, 20.22' RT | 223.68 | - | 219.17 | |
| ④ | CBCI | 56+31.62, 22.94' RT | 223.79 | - | 219.29 | |
| ⑤ | DMH | 56+26.54, 8.03' LT | 224.11 | a = 219.23<br>b = 218.69<br>c = 218.78 | d = 218.59 | |
| ⑥ | CBCI | 56+30.45, 18.90' LT | 223.84 | - | 219.34 | |
| ⑦ | EXIST DMH | 55+65.96, 4.95' LT | 224.97 | a = EXIST<br>b = 218.02<br>c = EXIST | d = 215.2 | |
| ⑧ | CBCI | 18+73.03, 35.04' LT | 223.50 | - | 219.00 | |

**DRAINAGE STRUCTURE DATA**

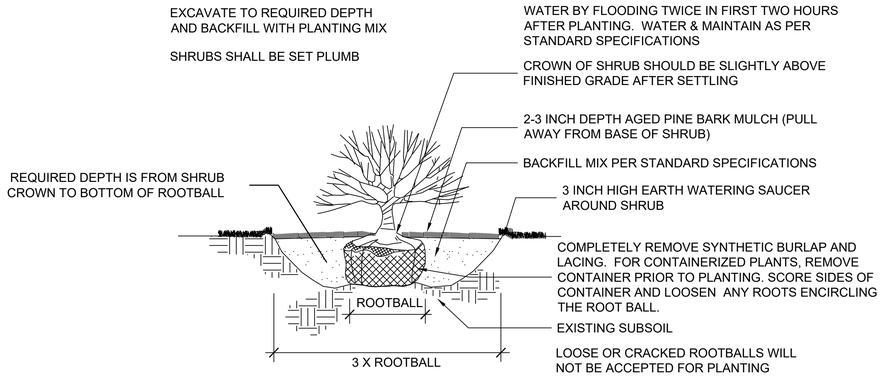
| NO. | TYPE | STATION | RIM ELEV. | INV. ELEV. IN | INV. ELEV. OUT | REMARKS |
|---|---|---|---|---|---|---|
| ⑨ | DMH | 18+77.63, 22.55' LT | 223.75 | a = 218.89<br>b = 218.95 | c = 218.79 | |
| ⑩ | CBCI | 18+89.94, 28.90' LT | 223.58 | - | 219.08 | |
| ⑪ | CBCI | 18+77.58, 33.63' RT | 223.35 | - | 218.85 | |
| ⑫ | DMH | 18+65.15, 28.40' RT | 223.68 | a = 218.08<br>b = 218.65<br>c = 218.77 | d = 215.93 | |
| ⑬ | CBCI | 18+63.75, 43.87' RT | 223.47 | - | 218.97 | |
| ⑭ | DMH | 54+58.82, 4.84' RT | 224.22 | a = 217.63<br>b = 214.18<br>c = 215.03 | d = 214.08 | |
| ⑮ | DMH | 54+04.99, 10.63' RT | 222.83 | a = EXIST<br>b = 213.57 | c = 213.47 | |
| ⑯ | CB | 53+96.96, 25.57' LT | 222.36 | - | 218.46 | |
| ⑰ | DMH | 54+23.31, 9.08' LT | 223.39 | a = 218.20<br>b = EXIST | c = EXIST | |
| ⑱ | CB | 54+54.47, 50.76 LT | 223.95 | - | EXIST | CONSTR OVER EXIST PIPE |
| ⑲ | CBCI | 17+22.37, 41.20' LT | 224.17 | - | 219.67 | |

**DRAINAGE STRUCTURE DATA**

| NO. | TYPE | STATION | RIM ELEV. | INV. ELEV. IN | INV. ELEV. OUT | REMARKS |
|---|---|---|---|---|---|---|
| ⑳ | DMH | 17+18.80, 26.21' LT | 224.48 | a = 219.52<br>b = 219.74 | c = 219.42 | |
| ㉑ | CBCI | 17+22.37, 41.20' LT | 224.40 | - | 219.90 | |
| ㉒ | DI | 53+52.55, 64.94' RT | 216.00 | - | 212.75 | |
| ㉓ | DMH | 53+41.73, 54.95' RT | 217.94 | a = EXIST<br>b = 215.82<br>c = 212.55<br>d = 212.55 | e = 212.30 | |
| ㉔ | CBCI | 53+46.02, 22.31' RT | 220.72 | - | 216.22 | |
| ㉕ | DI | 52+43.74, 34.07' LT | 216.50 | - | 214.53 | |
| ㉖ | DMH | 52+41.42, 21.09 LT | | a = 214.43<br>b = EXIST<br>c = 214.43 | d = EXIST | |
| ㉗ | CB | 52+31.93, 16.66' RT | 218.47 | - | 214.77 | |
| ㉘ | FES | 53+15.09, 100.41 RT | - | - | 211.78 | 24" FES |

NOTES:
1. EXCAVATE TEST PITS TO LOCATE UNDERGROUND UTILITIES PRIOR TO INSTALLING PROPOSED DRAINAGE. SEE GENERAL NOTES.
2. ALL ABANDONED PIPES SHALL BE PLUGGED WITH MASONRY.
3. STATION AND OFFSETS TO CB ARE TO CENTER GUTTERLINE. STATION AND OFFSETS TO DMHs AND DIs ARE TO CENTER CENTER OF COVER OR GRATE.

FOR PROFILE: SEE SHEET NO. 13



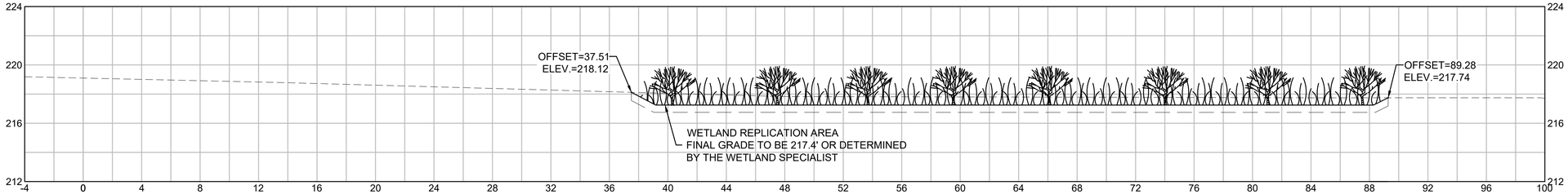

## SHRUB PLANTING

NOT TO SCALE

WETLAND REPLICATION NOTES

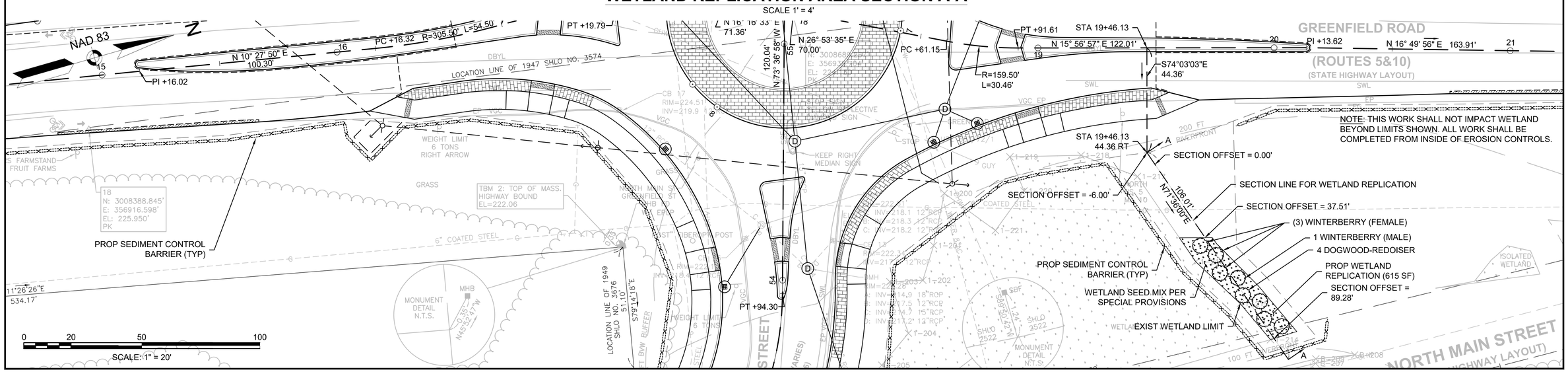
1. WETLAND REPLICATION AREA SHALL BE CONSTRUCTED IN ACCORDANCE WITH ITEM 755.35 OF THE SPECIAL PROVISIONS.
2. EXCAVATE EXISTING SOIL TO TARGET ELEVATIONS. IF EXISTING SUBSOIL IS DETERMINED TO BE UNSUITABLE FOR PLANTING, EXCAVATE TO DEPTH NECESSARY FOR PLANTING AND BACKFILL WITH APPROPRIATE MANUFACTURED SOIL. BACKFILL SHALL BE INSTALLED AS PER MASSDOT STANDARD SPECIFICATIONS.
3. SALVAGED TOPSOIL MATERIAL AND B-HORIZON SUBSOIL MATERIAL EXCAVATED FROM THE WETLAND IMPACT AREAS SHALL BE PLACED IN SEPARATE STOCKPILES TO BE REUSED IN THE PROPOSED REPLICATION AREA IF SUITABLE.
4. FINAL GRADES TO BE APPROXIMATELY AT 217.4. MINOR ADJUSTMENTS TO FINAL GRADES SHALL BE MADE IN THE FIELD AS REQUIRED BY THE WETLAND SPECIALIST.
5. THE PROPOSED FINISHED SURFACE ELEVATIONS FOR THE WETLAND REPLICATION AREA HAVE BEEN DESIGNED TO BE SIMILAR IN ELEVATION TO THOSE OF THE ADJACENT WETLANDS.
6. WETLAND SPECIALIST SHALL INSPECT THE SUB-GRADE OF THE REPLICATION AREA TO ENSURE THAT THE PROPER HYDROLOGICAL SOIL CONNECTION HAS BEEN ESTABLISHED. MINOR MODIFICATIONS TO THIS PLAN MAY BE MADE IN THE FIELD BY THE WETLAND SPECIALIST AS REQUIRED TO ACHIEVE SUBSURFACE HYDROLOGICAL SOIL CONNECTION.
7. PLANTING PLAN IS SCHEMATIC ONLY. SHRUBS IN THE REPLICATION AREA SHALL BE FIELD LOCATED BY THE WETLAND SPECIALIST AS APPROPRIATE TO HYDROLOGY.
8. REPLICATION AREA WILL HAVE TWO STAKED 2-FOOT BY 2-FOOT SIGNS THAT STATES, "PROTECTED REPLICATION AREA". ONE SIGN WILL BE PLACED AT EACH END OF THE REPLICATION/UPLAND BOUNDARY.
9. WETLAND MIX SHALL BE THOSE SPECIFIED IN THE WETLAND SPECIAL PROVISIONS.
10. ADJACENT UPLANDS SHALL BE SEEDED WITH THE SPECIFIED NATIVE UPLAND MIX.
11. STOCKPILE SHALL BE COVERED AND PROTECTED BY APPLICABLE EROSION CONTROLS.

| WETLAND REPLICATION PLANTING LIST | | | | | |
|---|---|---|---|---|---|
| SYMBOL | QUANTITY | WETLAND STATUS | SCIENTIFIC NAME | COMMON NAME | SIZE |
| CS | 4 | FACW | CORNUS SERICEA | RED-OSIER DOGWOOD | 18-24" |
| IV | 3 | FACW | ILEX VERTICILLATA | WINTERBERRY (FEMALE) | 18"-24" |
| IVM | 1 | FACW | ILEX VERTICILLATA | WINTERBERRY (MALE) | 18"-24" |




## WETLAND REPLICATION AREA SECTION A-A

SCALE 1' = 4'




**DEERFIELD**
**ROUTES 5&10**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | ###### | 39 | 59 |
| PROJECT FILE NO. | | 613708 | |

**WETLAND REPLICATION PLAN**

613708_HD_WETLAND REPLICATION PLAN.DWG Plotted on 12-Mar-2026 1:31 PM

Appendix F

Town of Deerfield
Intersection Improvements on Greenfield Road (Routes 5 and 10) at Mill Village Rd and North Main St.
MassDOT Project No. 613708
Notice of Intent

STORMWATER REPORT

811 North King Street, Northampton, MA 01060
Tel: (857) 368-2000, Fax: (857) 368-0200
mass.gov/massdot

# Deerfield Roundabout

## Intersection of Greenfield Road (Route 5/10), Mill Village Road and North Main Street

## Deerfield, MA

## (MassDOT #613708)

PREPARED FOR

10 Park Plaza
Boston, MA 02116

PREPARED BY

McFarland Johnson
125 Nagog Park, Suite 220
Acton, MA 01720

01/29/2026

# Table of Contents



# List of Figures



# List of Tables

# Attachments

# 1

# Introduction

This Stormwater Management Report has been prepared to demonstrate compliance with the Massachusetts Stormwater Management Standards (the Standards) in accordance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) and Water Quality Certification Regulations (314 CMR 9.00). Appendix A includes a completed Massachusetts Department of Environmental Protection (MassDEP) Checklist for Stormwater Report, stamped by a Massachusetts registered professional engineer.

The Project follows the guidance presented in the MassDOT Stormwater Design Guide (SDG), and stormwater management systems are designed in accordance with the Standards.

The following MassDOT standard methodologies are being employed in this project: Standards 1–4, and 6–10.

The Project is a redevelopment project, and only meets standards 2, 3, and 4 to the maximum extent practical (MEP).

# 2

# Project Summary

The Applicant, Massachusetts Department of Transportation, Highway Division (MassDOT), is proposing Project 613708 to construct an intersection improvements project located in Deerfield, MA. The proposed project consists of the construction of a roundabout at the intersection of Greenfield Road (Route 5/10), Mill Village Road, and North Main Street, which will provide traffic improvements to the intersection and surrounding area.

The purpose of this project is to improve the approaching roadway geometry and sight distance. The project includes a proposed roundabout and other safety improvements including curbing, bike and pedestrian accommodations, new line striping, and signage throughout.

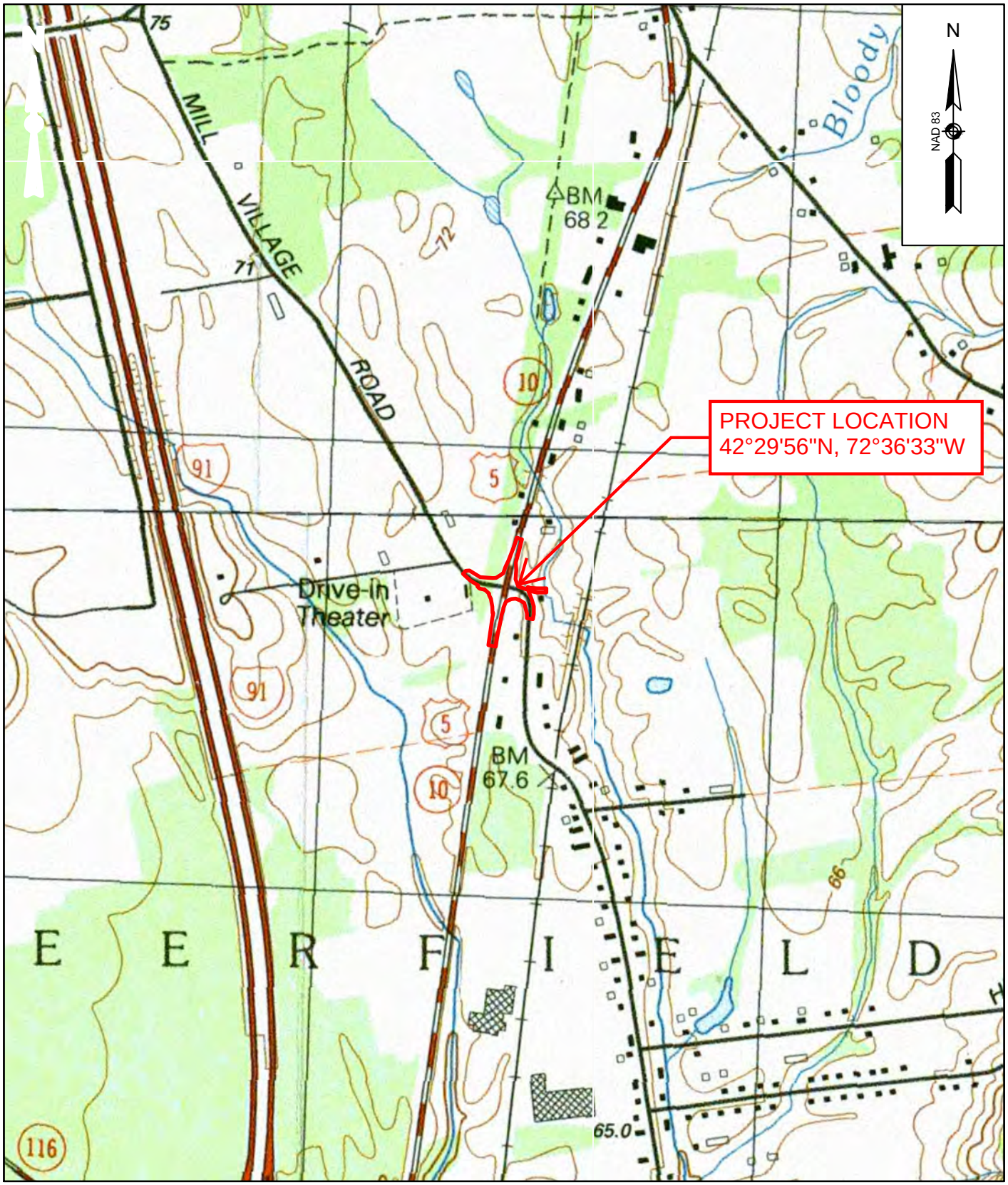
This project consists of maintenance and improvement of an existing roadway (including improvements to existing drainage systems and repaving). Therefore, the proposed project is categorized as a "Redevelopment Project" under the Massachusetts Stormwater Management Standards. The project is required to meet only Standards 2 & 3 and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5 & 6 to the maximum extent practicable. The project will result in an increase of approximately 22,400 square feet of impervious area.

Greenfield Road (Route 5/10) is classified by MassDOT as urban minor arterial with an average daily traffic (ADT) of 6989 vehicles per day, with 11% truck traffic (2023). The design speed is 45 mph.

The project also includes a proposed drainage network that connects to an existing closed system that outlets into a wetland resource area. The wetland resource area is Bloody Brook and associated bordering vegetated wetlands. This waterbody is not impaired at the existing outlet to Bloody Brook based on the MassDEP Water Quality Viewer and Massachusetts Integrated List of Waters for the Clean Water Act 2022 Reporting Cycle.

The following report was created in accordance with the "Massachusetts Stormwater Handbook" last revised in January 2008. The report is organized into sections that correspond to the categories listed in the "Massachusetts Stormwater Report Checklist". The checklist is included in Appendix A of this report along with a "Redevelopment Checklist". The following is a more detailed description of the existing and proposed drainage areas and the design methodology for this project.

See Figure 1 for the Project Locus Map.




LEGEND:

Limit of Work

0 1,000 2,000

Feet

# MASSDOT DEERFIELD 613708

INTERSECTION OF GREENFIELD ROAD (ROUTE 5/10 ), NORTH MAIN STREET, AND MILL VILLAGE ROAD

## LOCUS MAP

| SCALE : | DATE : | FIGURE : |
|---|---|---|
| 1" = 1,000' | JANUARY 2026 | 1 |

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# 3

# Existing Conditions

The project is currently a four-way intersection of Greenfield Road (Route 5/10), Mill Village Road, and North Main Street in Deerfield, Massachusetts. Within the project limits there is 57,500 square feet of existing impervious area. The existing site can be analyzed as 7 watershed areas that contribute runoff to 3 discharge points. The existing drainage areas are delineated in Figure 2 – Existing Watershed Plan. For the purpose of this hydrologic analysis, the following assumptions were made:

- When the watershed boundary fell outside of the limit of work an arbitrary line was delineated as the watershed boundary
- The total watershed area for the existing conditions is used as the comparison base for the watershed area in the proposed conditions.

There are four separate watershed areas that collect runoff via a combination of overland flow and multiple closed drainage systems that eventually discharge to the 24" outfall to Bloody Brook (DP-1).

There is a portion of the project that discharges to the north via overland flow and eventually to an existing 3' box culvert (DP-2) that goes under Greenfield Road and discharges to Bloody Brook.

The third discharge point (DP-3) collects runoff from the west to an existing drainage swale located on the southwest quadrant of the intersection. Runoff from this area discharges to an existing drop inlet structure based on 1940's and 1950's record plans; however, recent photos of this structure indicate it is an old, deteriorated structure acting as an orifice not a drop inlet. This inlet (DP-3) captures the existing swale before entering the existing closed drainage system and will remain in place. Figure 3 shows the existing structure inlet. The existing closed drainage system eventually connects to the 24" outfall to Blood Brook (DP-1); however, since the structure and closed drainage system will remain, this was analyzed as a separate DP to confirm net reduction in peak rates. Brief descriptions of each contributing area are below.

Drainage Area EX-1A

- This area consists mostly of pavement with a small grass area in the northwest quadrant that collects runoff via a closed system that discharges to directed gutter flow/closed drainage system prior to discharging to the 24" outfall to Bloody Brook (DP-1).

Drainage Area EX-1B

- This area consists mostly of grassed area with pavement associated with the northbound side of Greenfield road in the northeast quadrant of the intersection.

Runoff is conveyed via overland flow to an existing catch basin located at station 53+50, 50' right of North Main Street that ties into the existing closed drainage system that eventually discharges to the 24" outfall to Bloody Brook (DP-1).

Drainage Area EX-1C

- This area consists mostly of grassed and wooded areas and portions of pavement within the southeast quadrant of the intersection. Runoff from the northbound side of Greenfield Road and the southbound side of North Main Street sheet flow to an area east of Greenfield Road and discharges via overland flow to an existing catch basin located at station 52+30, 25' left of North Main Street. This catch basin ties into the existing closed drainage system that eventually discharges to the 24" outfall to Bloody Brook (DP-1).

Drainage Area EX-1D

- This area consists mostly of grass and pavement areas and is located along Mill Village Road. Runoff from Mill Village Road and the surrounding grass area discharges via overland flow to an existing catch basin located at station 58+15, 15' right of Mill Village Road. This catch basin ties into the existing closed drainage system that eventually discharges via the 24" outfall to Bloody Brook (DP-1).

Drainage Area EX-2

- This area consists mostly of pavement areas with a small grass area and is located in the northwest quadrant of the intersection. The southbound side of Greenfield Road sheet flows to a roadside ditch that connects to an off-road catch basin and into a closed drainage system that eventually discharges via open channel flow to a 3' box culvert (DP-2) that crosses under Route 5/10 approximately 800' north of the project limits. This culvert eventually discharges directly into Bloody Brook, but to be conservative the inlet of the culvert was use as a discharge point to analyze peak flow attenuation.

Drainage Area EX-3

- This area consists mostly of a wooded area with some grass area and pavement located in the southwest quadrant of the intersection. The southbound side of Greenfield Road and Mill Village Road sheet flow to the southwest where runoff discharges via an existing drainage swale located on the southwest quadrant of the intersection to an existing drainage structure located at station 56+90, 40' left of Mill Village Road (DP-3). This drainage structure (DP-3) eventually discharges directly into the existing closed drainage system that discharges via the 24" outfall to Bloody Brook (DP-1), but to be conservative the inlet of the structure was use as a discharge point to analyze peak flow attenuation.

Drainage Area EX-4

- This area consists of a small paved area along North Main Street that sheets flows to the east towards Bloody Brook (DP-1) via overland flow.

Table 1 presents the existing drainage areas and their characteristics.

**Table 1 Existing Drainage Areas**

| Drainage Area | Design Point | Area (acres) | Curve Number |
|---|---|---|---|
| EX-1A | DP-1 | 0.614 | 96 |
| EX-1B | DP-1 | 1.672 | 82 |
| EX-1C | DP-1 | 1.451 | 81 |
| EX-1D | DP-1 | 3.371 | 84 |
| EX-2 | DP-2 | 0.230 | 91 |
| EX-3 | DP-3 | 1.340 | 82 |
| EX-4 | DP-1 | 0.027 | 98 |
| TOTAL | | 8.705 | 84 |

There are no existing Stormwater Control Measures (SCMs). Key features in and around the project area include the Bloody Brook and adjacent Bordering Vegetated wetlands, which is shown on Figure 2.

**Table 2 Existing SCMs – Not Applicable**

Review of the NRCS Soil Survey map of the project area identified "Birdsall mucky silt loam" with an HSG type of B/D, "Raynham silt loam" with an HSG type of C/D, "Scio silt loam" with an HSG type of B/D, and "Amostown fine sandy loam" with an HSG type of C/D and are shown on Figure 4 and in Appendix B. Review of the soil information indicates poor soil conditions with little to no potential for infiltration. See Figure 4 for the NRCS Soils map and Appendix B provides detailed soil information, including the NRCS soil survey data for the project area and the results of on-site subsurface investigations.

The Project is not located within the 100-year floodplain as shown on Figure 5 – FEMA Map and the FIRM community panels 25011500068 and 2501150007B, dated 07/02/1980 included in Appendix B.

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**DEERFIELD**
**INTERSECTION IMPROVEMENTS**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | - | 1 | 1 |
| PROJECT FILE NO. | 613708 | | |

**FIGURE 2: EXISTING WATERSHED PLAN**



DP-2

GREENFIELD ROAD (ROUTE 5/10)

BVW (GIS)

EX-1B

BVW (FLAGGED)

BVW (FLAGGED)

EX-2

EX-1D

MILL VILLAGE ROAD

EX-1A

DP-1

BLOODY BROOK

EX-4

EX-1C

BVW (FLAGGED)

DP-3

EX-3

NORTH MAIN STREET

IVW (FLAGGED)

N

MAGNETIC

LEGEND:

| | |
|---|---|
| DP-X | DISCHARGE POINT |
| Ex-X | EXISTING DRAINAGE AREA |
| | WETLAND |
| | EXISTING DRAINAGE AREA BOUNDARY |
| | TIME OF CONCENTRATION LINE |
| | IMPERVIOUS SURFACE |
| | GRASS SURFACE |
| | WOODS SURFACE |

0 60 100 200 300

SCALE: 1" = 60'

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NOTE: THE EXISTING INLET STRUCTURE IS LOCATED IN THE SW QUADRANT AT STATION 56+90, 40' SOUTH OF MILL VILLAGE ROAD (DP-3).

MASSDOT DEERFIELD 613708

INTERSECTION OF GREENFIELD ROAD (ROUTE 5/10 ), NORTH MAIN STREET, AND MILL VILLAGE ROAD

# EXISTING DRAINAGE STRUCTURE

| SCALE : | DATE : | FIGURE : |
|---|---|---|
| NOT TO SCALE | JANUARY 2026 | 3 |

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## LEGEND:

LIMIT OF WORK

0 200 400

Feet

NOTE: DATA TAKEN FROM MASSGIS

# MASSDOT DEERFIELD 613708

INTERSECTION OF GREENFIELD ROAD (ROUTE 5/10 ), NORTH MAIN STREET, AND MILL VILLAGE ROAD

## SOILS MAP

| SCALE : | DATE : | FIGURE : |
|---|---|---|
| 1" = 200' | JANUARY 2026 | 4 |

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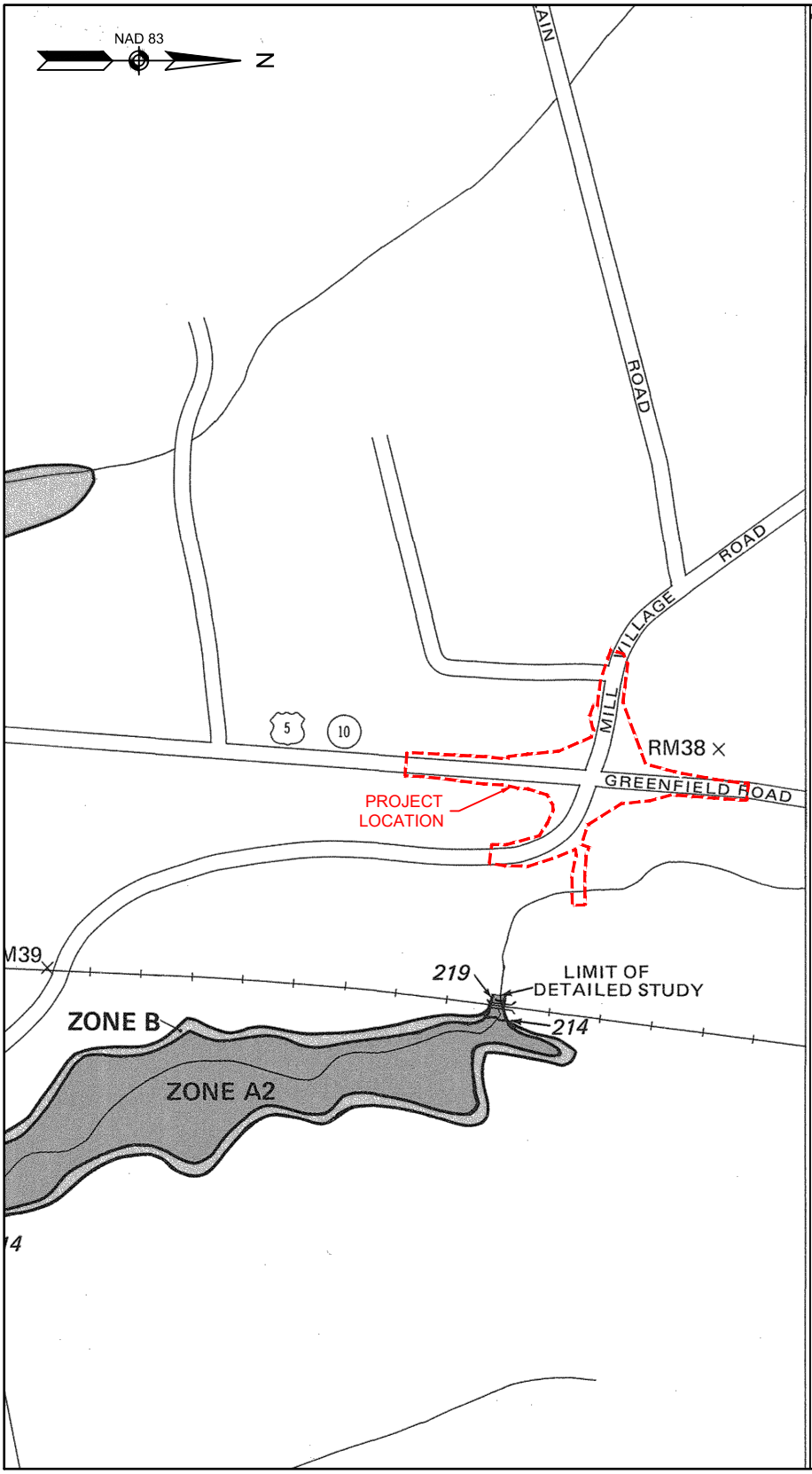


## KEY TO MAP

| | |
|---|---|
| 500-Year Flood Boundary | ZONE B |
| 100-Year Flood Boundary | ZONE A1 DATE / ZONE A5 DATE |
| Zone Designations* With Date of Identification e.g., 12/2/74 | |
| 100-Year Flood Boundary | ZONE B |
| 500-Year Flood Boundary | |
| Base Flood Elevation Line With Elevation In Feet** | 513 |
| Base Flood Elevation in Feet Where Uniform Within Zone** | (EL 987) |
| Elevation Reference Mark | RM7 × |
| River Mile | • M1.5 |

**Referenced to the National Geodetic Vertical Datum of 1929

## *EXPLANATION OF ZONE DESIGNATIONS

| ZONE | EXPLANATION |
|---|---|
| A | Areas of 100-year flood; base flood elevations and flood hazard factors not determined. |
| A0 | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined. |
| AH | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined. |
| A1-A30 | Areas of 100-year flood; base flood elevations and flood hazard factors determined. |
| A99 | Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined. |
| B | Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading) |
| C | Areas of minimal flooding. (No shading) |
| D | Areas of undetermined, but possible, flood hazards. |
| V | Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined. |
| V1-V30 | Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined. |

### NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
SEPTEMBER 13, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
JULY 30, 1976

FLOOD INSURANCE RATE MAP EFFECTIVE:
JULY 2, 1980

FLOOD INSURANCE RATE MAP REVISIONS:

Note: The flood zone data shown is taken from the Federal Insurance Rate Maps (FIRM) for Franklin County (see FIRM Community Panel Maps 2501150006B, dated 7/2/1980).

## LEGEND:

LIMIT OF WORK

0 400 800
Feet

# MASSDOT DEERFIELD 613708

INTERSECTION OF GREENFIELD ROAD (ROUTE 5/10 ), NORTH MAIN STREET, AND MILL VILLAGE ROAD

# FEMA MAP

| SCALE : | DATE : | FIGURE : |
|---|---|---|
| 1" = 400' | JANUARY 2026 | 5 |

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# 4

# Proposed Conditions

The Project will include construction of a roundabout at the intersection of Greenfield Road (Route 5/10), Mill Village Road, and North Main Street. The proposed project area will have a proposed impervious area of approximately 79,900 square feet, which is an increase of 22,400 square feet compared to the existing condition, which has an impervious area of 57,500 square feet. Proposed stormwater management analysis can be summarized as 6 watershed areas that contribute runoff to 3 discharge points. Runoff from the Existing Watershed Area EX-4 that discharged via overland flow to Bloody Brook with no treatment, will now be captured within PR-1A closed drainage system; thereby eliminating a subcatchment area under proposed conditions. The overall watershed areas and discharge points of analysis are the same in the proposed conditions as in the existing conditions. The proposed drainage areas are delineated in Figure 6 – Proposed Watershed Plan.

Table 3 provides a breakdown of the impervious area within the Project limits.

**Table 3 Impervious Area**

| Condition | Impervious Area (sq. ft) |
|---|---|
| **Existing** | *57,500* |
| **Proposed** | *79,900* |
| **Net** | *+22,400* |

The proposed drainage design will add new catch basins for the proposed roundabout geometry and at new low points where roadway drainage will be optimized for more efficient flows. All new catch basins will utilize deep sumps where proposed to provide additional stormwater treatment. The proposed outfalls are located at or near existing outfalls where there is an existing point source discharge. There are no new untreated point source discharges as a result of this project. The proposed drainage system will improve the quality of stormwater runoff, pull the 24" outfall to Bloody Brook further upland and will overall maintain the historic drainage patterns, distributing runoff to the existing discharge points.

Drainage Area PR-1A

- This area is primarily composed of pavement associated with the proposed roundabout, with a small landscaped center island. Runoff is conveyed via gutter flow to a proposed closed drainage system, which discharges to a new 24-inch

outfall located approximately 60 feet upland of the existing outfall to Bloody Brook (DP-1).

Drainage Area PR-1B

- This area consists mostly of grassed areas with pavement associated with the northbound side of Greenfield road in the northeast quadrant of the intersection. Runoff is conveyed via overland flow to an existing catch basin located at station 53+50, 50' right of North Main Street that ties into the closed drainage system that eventually discharges to the 24" outfall to Bloody Brook (DP-1).

Drainage Area PR-1C

- This area consists mostly of grass and wooded areas along with pavement associated with the northbound side of Greenfield Road and the southbound side of North Main Street in the southwest quadrant. Runoff is collected via overland flow to a proposed catch basin located at station 52+30, 35' left of North Main Street. This catch basin ties into the closed drainage system that eventually discharges to the 24" outfall to Bloody Brook (DP-1).

Drainage Area PR-1D

- This area consists mostly of grass and pavement areas and is located along Mill Village Road. Runoff from Mill Village Road and the surrounding grass area discharges via overland flow to an existing catch basin located at station 58+15, 15' right of Mill Village Road. This catch basin ties into the existing closed drainage system that eventually discharges via the 24" outfall to Bloody Brook (DP-1).

Drainage Area PR-2

- This area consists mostly of pavement areas with a small grass area and is located in the northwest quadrant of the intersection. The southbound side of Greenfield Road sheet flows to a roadside ditch that connects to an off-road catch basin and into a closed drainage system that eventually discharges via open channel flow to a 3' box culvert (DP-2) that crosses under Route 5/10 approximately 800' north of the project limits. This culvert eventually discharges directly into Bloody Brook, but to be conservative the inlet of the culvert was use as a discharge point to analyze peak flow attenuation.

Drainage Area PR-3

- This area consists mostly of a wooded area with some grass area and pavement located in the southwest quadrant of the intersection. The southbound side of Greenfield Road and Mill Village Road sheet flow to the southwest where runoff discharges via an existing drainage swale located on the southwest quadrant of the intersection to an existing drainage structure located at station 56+90, 40' left of Mill Village Road (DP-3). This drainage structure (DP-3) eventually discharges directly into the existing closed drainage system that discharges via the 24" outfall to Bloody Brook (DP-1), but to be conservative the inlet of the structure was use as a discharge point to analyze peak flow attenuation.

Table 4 presents the proposed drainage areas and their characteristics under proposed conditions. Figure 6 shows proposed drainage patterns and drainage area delineations by design point.

**Table 4 Proposed Drainage Areas**

| Drainage Area | Design Point | Area (acres) | Curve Numbers |
|---|---|---|---|
| PR-1A | DP-1 | 1.114 | 97 |
| PR-1B | DP-1 | 1.546 | 82 |
| PR-1C | DP-1 | 1.420 | 83 |
| PR-1D | DP-1 | 3.371 | 84 |
| PR-2 | DP-2 | 0.159 | 98 |
| PR-3 | DP-3 | 1.095 | 82 |
| TOTAL | | 8.705 | 85 |

**Table 5 Proposed SCMs – Not Applicable**

The project considered implementation of SCMs that would provide water quality treatment and recharge throughout the project limits; however, no feasible locations were identified. The project consists of an intersection improvement with a proposed roundabout that requires a large geometric footprint. Available space within the roadway right-of-way is limited, the site contains numerous underground utilities, and is in close proximity to bordering vegetated wetlands. In addition, soils are classified as Hydrological Soil Group "D", which is not conductive to infiltration. Therefore, implementation of SCMs is not feasible.

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**DEERFIELD**
**INTERSECTION IMPROVEMENTS**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| MA | - | 1 | 1 |
| PROJECT FILE NO. | 613708 | | |

**PROPOSED WATERSHED PLAN**

613708_HD_PR_WATERSHED PLANS.DWG Plotted on 29-Jan-2026 9:59 AM

DP-2

GREENFIELD ROAD (ROUTE 5/10)

BVW (GIS)

PR-1B

WETLAND REPLICATION AREA

BVW (FLAGGED)

PR-1D

MILL VILLAGE ROAD

PR-2

NORTH MAIN STREET

BVW (FLAGGED)

DP-1

PR-1A

BLOODY BROOK

BVW (FLAGGED)

DP-3

PR-1C

PR-3

NORTH MAIN STREET

IVW (FLAGGED)

N

MAGNETIC

0 60 100 200 300

SCALE: 1" = 60'

LEGEND:

| | |
|---|---|
| DP-X | DISCHARGE POINT |
| Pr-X | PROPOSED DRAINAGE AREA |
| | WETLAND |
| | PROPOSED DRAINAGE AREA BOUNDARY |
| | TIME OF CONCENTRATION LINE |
| | IMPERVIOUS SURFACE |
| | GRASS SURFACE |
| | WOODS SURFACE |

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# 5

# Impaired Waters and TMDLs

The proposed project discharges to Bloody Brook. This waterbody is not impaired at the existing outlets from the project limits to Bloody Brook based on the MassDEP Water Quality Viewer and Massachusetts Integrated List of Waters for the Clean Water Act 2022 Reporting Cycle.

Table 6 lists the receiving water bodies that are affected by this project, and outlines if they are impaired or have a TMDL.

**Table 6 Impaired Waters and TMDL Information**

| Water Body | 303(d) Category | 303(d) Impairments | TMDL | TMDL Pollutant | TMDL Report Name |
|---|---|---|---|---|---|
| *Bloody Brook* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* |
| | | | | | |

Bloody Brook is not an impaired waterbody within the project outfalls and does not have a TMDL; therefore specific nutrient removal for additional pollutants beyond TSS is not required. Catch Basins with deep sumps are proposed; however, no additional SCMs are proposed for the project. Table 7 describes that there are no proposed SCMs within the proposed project.

**Table 7 Nutrient Removal for Project – Not Applicable**

# 6

# Stormwater Management Standards

As demonstrated below, the proposed Project complies with the MassDEP Stormwater Management Standards (the Standards). The Project is a redevelopment project, and only meets standards 2, 3, and 4 to the maximum extent practical (MEP).

## Standard 1: No New Untreated Discharges

*No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

The Massachusetts Stormwater Handbook, Standard 1, requires that the project demonstrates that there are no new untreated discharges and that new discharges will not cause erosion or scour to downstream wetlands. The Project has been designed to comply with Standard 1.

There are two discharge points that discharge to the Bloody Brook and those are represented as DP-1 and DP-2. DP-3 discharges to an existing inlet structure that eventually discharges directly into the closed drainage system that discharges via the 24" outfall to Bloody Brook (DP-1); therefore, it is not applicable to this standard.

DP-1 represents the existing 24" RCP outfall that will be pulled further upland approximately 60' away from Bloody Brook. This outlet discharges the multiple closed drainage systems that are located within the project area into the Bloody Brook. The new outfall is designed with a flared end section and rip rap protection to prevent erosion to the Bloody Brook and moved further upland to provide additional overland flow prior to discharging to adjacent wetlands and Bloody Brook.

DP-2 represents the inlet to the existing 3' box culvert located approximately 800 feet north of the project limits. The existing culvert is located outside of the project limits and will be retained as is.

The proposed catch basins will have deep sumps providing 25% TSS removal. This is an improvement over existing conditions where there is little to no treatment. See Standard 4 for the water quality treatment provided by the Project.  The project will utilize existing discharge points. There are no new untreated point source discharges created as a result of this project. This standard is fully met.

## Standard 2: Peak Rate Attenuation

*Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.*

Standard 2 requires that the rates of flow be attenuated for the proposed development condition. This project is a redevelopment project and is required to meet Standard 2 to the maximum extent practicable.

The peak flow rates were calculated for the 2-, 10-, and 100-year storm events under proposed conditions and compared to the existing peak flow rates. The proposed improvements will result in a net increase in impervious area equal to 22,400 SF.

DP-1 represents the 24" outfall that discharges the closed drainage systems within the project area into Bloody Brook. The increase in impervious area results in a minor increase in peak flow rates at DP-1 for the 2-, 10- and 100-year storm events. The increase in peak rates for the 2-, 10- and 100- year storm events are 0.32, 0.33 and 0.23 cfs respectively. These resulting increases are minor and considered negligible. In addition, runoff from DP-1 will discharge to the bordering vegetated wetland system to Bloody Brook (shown as GIS wetland on Watershed Plans) that is approximately 2.4 acres in size. The increase in peak volume to this wetland system for the 100-year storm event is equal to an approximate 0.62 inch rise, which is considered negligible over this large wetlands system and does not take into account the entire tributary area of Bloody Brook. Therefore, there will be no disproportionate adverse impacts on the receiving waters due to the minor increase of peak flows.

DP-2 represents runoff to the inlet of the existing 3-foot box culvert located approximately 800 feet north of the project. Although the proposed condition increases impervious area to this design point, a large portion of the existing catchment area is reduced due to the expanded pavement and sidewalk area at the intersection in the proposed condition that now discharges to DP-1. As a result, peak flow rates at DP-2 for the 2-, 10-, and 100-year storm events in the proposed condition are reduced.

DP-3 represents runoff to the existing drainage structure on the southwest corner of the intersection. This system was separated into a fourth design point so that it could be analyzed separately as this structure and closed drainage system it discharges into will remain. Runoff from DP-3 will be reduced under proposed conditions and peak rates at DP-3 for the 2-, 10-, and 100-year storm events are reduced.

Table 8 shows the precipitation depths for storm events with average recurrence intervals of 2-, 10-, and 100-years and a duration of 24-hours. Precipitation data was downloaded directly within HydroCAD using NOAA Atlas14, Type III Rainfall data for Franklin County for the hydrological analysis.

**Table 8 Rainfall Depths (in)**

| Design Storm Event | Rainfall Depth (in) |
|---|---|
| 2-year | *3.02* |
| 10-year | *4.33* |
| 100-year | *7.29* |

Table 9 provides a summary of peak rates for each design point under existing and proposed conditions. Appendix D provides the HydroCAD reports which show the computations and supporting information regarding the hydraulic and hydrologic modeling.

**Table 9 Peak Discharge Rates (cfs)**

| | Existing | | | Proposed | | |
|---|---|---|---|---|---|---|
| Design Point | 2-year | 10-year | 100-year | 2-year | 10-year | 100-year |
| *DP-1* | *8.02* | *14.09* | *28.47* | *8.34* | *14.42* | *28.70* |
| *DP-2* | *0.48* | *0.75* | *1.36* | *0.40* | *0.58* | *0.98* |
| *DP-3* | *1.15* | *2.07* | *4.27* | *0.94* | *1.69* | *3.49* |

## Standard 3: Recharge

*Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures, including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.*

This project is a redevelopment project and is required to meet Standard 3 to the maximum extent practicable.

Figure 4 and Appendix B, illustrate the NRCS Soils Information and note that the proposed project area is being built entirely within a Hydrological Soil Group of D. The project has 79,900 square feet of total impervious area within the limit of work and results in an increase in impervious area by approximately 22,400 square feet due to the roundabout geometry. The required recharge volume for the total impervious area within the limit of work is 666 cubic feet. The required recharge volume for the net increase in impervious area within the limit of work is 187 cubic feet.

As noted above in Section 4 the project considered implementation of SCMs; however, it was deemed not feasible. Standard 3 is met to the maximum extent practicable.

Table 10 provides the required recharge volume for the Project, and Table 11 is for recharge volumes provided; however, since SCMs are not proposed, this is Not Applicable. See Appendix 3 for the Recharge Volumes Calculations Sheet.

**Table 10 Required Recharge Volume for Project**

| | HSG A | HSG B | HSG C | HSG D | Total |
|---|---|---|---|---|---|
| **Existing Impervious (sq. ft.)** | *0* | *0* | *0* | *57,500* | *57,500* |
| **Proposed Impervious (sq. ft.)** | *0* | *0* | *0* | *79,900* | *79,900* |
| **Net Impervious Area (sq. ft.)** | *0* | *0* | *0* | *22,400* | *22,400* |
| **Target depth, F (in)** | **0.60** | **0.35** | **0.25** | **0.10** | **-** |
| **Required Recharge Volume (Total), ReV (cf)** | *0* | *0* | *0* | *666* | *666* |
| **Required Recharge Volume (Net), ReV (cf)** | *0* | *0* | *0* | *187* | *187* |

**Table 11 Provided Recharge Volumes at Each Design Point – Not Applicable**

## Standard 4: Water Quality Treatment

*Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:*

- *Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained.*
- *Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook.*
- *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

This project is a redevelopment project and is required to meet Standard 3 to the maximum extent practicable. As noted above, there is an increase in impervious area; however, proposed SCMs are not feasible for this project. In order to improve the existing drainage system, the following treatment practices are proposed:

- Deep Sump Catch Basins
- Removing catch basin to catch basin connections and installing proposed catch basins offline

Table 12 shows the WQV to be treated for both new and existing impervious areas within each drainage area, organized by design point. This project is not located within a critical area; therefore, a runoff treatment depth of 0.5 inches was used to calculate the WQV. Since DP-3 discharges into DP-1, only DP-1 and DP-2 were analyzed. See Appendix 3 for the Water Quality Calculations Sheet.

**Table 12 WQV at Each Design Point**

| Design Point | Proposed/Net WQV (cf) | Existing WQV (cf) | Total WQV (cf) |
|---|---|---|---|
| DP-1 (includes DP-3) | *995* | *3,165* | *4,160* |
| DP-2 | *44* | *245* | *289* |
| Project Total | 1,039 | 3,410 | 4,449 |

Table 13 is for water quality volumes provided; however, since SCMs are not proposed; therefore, this table is Not Applicable. The projects water quality treatment provides up to 25% TSS removal where closed drainage is proposed. Standard 4 is met to the maximum extent practicable.

**Table 13 WQV Provided by the SCMs at Each Design Point – Not Applicable**

## Standard 5: Land Uses with Higher Potential Pollutant Loads

Standard 5 does not apply to the Project. There are no Land Uses with Higher Potential Pollutant Loads within the project area.

## Standard 6: Critical Areas

*Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "stormwater discharge" as defined in 314 CMR 3.04(2)(a)1 or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.*

Standard 6 does not apply to the Project. There are no Stormwater Critical Areas within or near the project area.

## Standard 7: Redevelopment

*A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

The proposed intersection improvements are considered Redevelopment; therefore, Standard 7 is applicable.

This project provides an opportunity to improve the quality of stormwater runoff discharged to adjacent wetlands and waterbodies. The proposed stormwater enhancements are summarized below:

- Deep sump catch basins are utilized at all locations that the project proposed closed drainage systems. This will provide an improvement over the existing drainage system.
- The reconstructed drainage system will utilize the existing 24" outfall location; however, it will pull it further upland approximately 60' away from Blood Brook.

A Redevelopment Stormwater Checklist is provided in Appendix A of this report which illustrates which standards have been met to the maximum extent practicable.

## Standard 8: Erosion and Sediment Control

*A plan to control construction related impacts, including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.*

The implementation of erosion and sediment (E&S) controls during construction is considered a standard practice for all MassDOT projects. E&S controls will be installed before any land disturbance begins for the Project and will remain in place for the duration of the Project. The E&S controls for the Project are shown on the project plans and include silt fences, sediment filters at drain inlets, sedimentation basins, temporary earth berms, and temporary ditches with check dams. Wetlands are located on the northeast and southwest quadrants of the intersection which will be protected along with Bloody Brook. It is estimated that the construction will last more than one season, so multiple replacements of the E&S control will be required.

The Project disturbs one or more acres of land; therefore, the project contractor will request coverage under the NPDES Construction General Permit (CGP) and develop a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP follows the requirements of this standard and complies with the NPDES CGP.

## Standard 9: Operation and Maintenance Plan

*A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

MassDOT O&M plans are implemented on a programmatic level by each MassDOT district. Each MassDOT district office is responsible for providing operation and maintenance for the MassDOT stormwater management systems within their respective jurisdictions. Appendix E includes the O&M Plan for this project.

## Standard 10: Prohibition of Illicit Discharges

*All illicit discharges to the stormwater management system are prohibited.*

The project's stormwater management system, as shown on the plans submitted with this report, have been designed in full compliance with Standard 10. The project area does not have any known illicit connections. Any illicit connections to the stormwater management system found in the project limit of work during construction will be removed and/or resolved through MassDOT's Illicit Discharge Detention and Elimination (IDDE) Program. The Long-Term Pollution Prevention Plan, provided in Appendix E, includes measures to prevent illicit discharges.

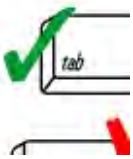
# Appendix A: MassDEP Checklist for Stormwater Report

**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.

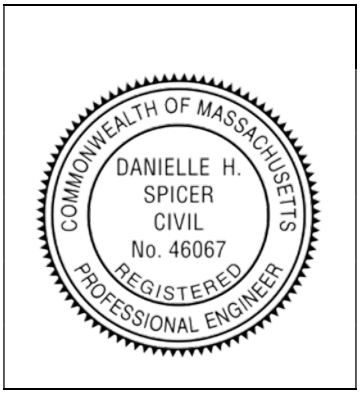
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that 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




1/29/2026

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**

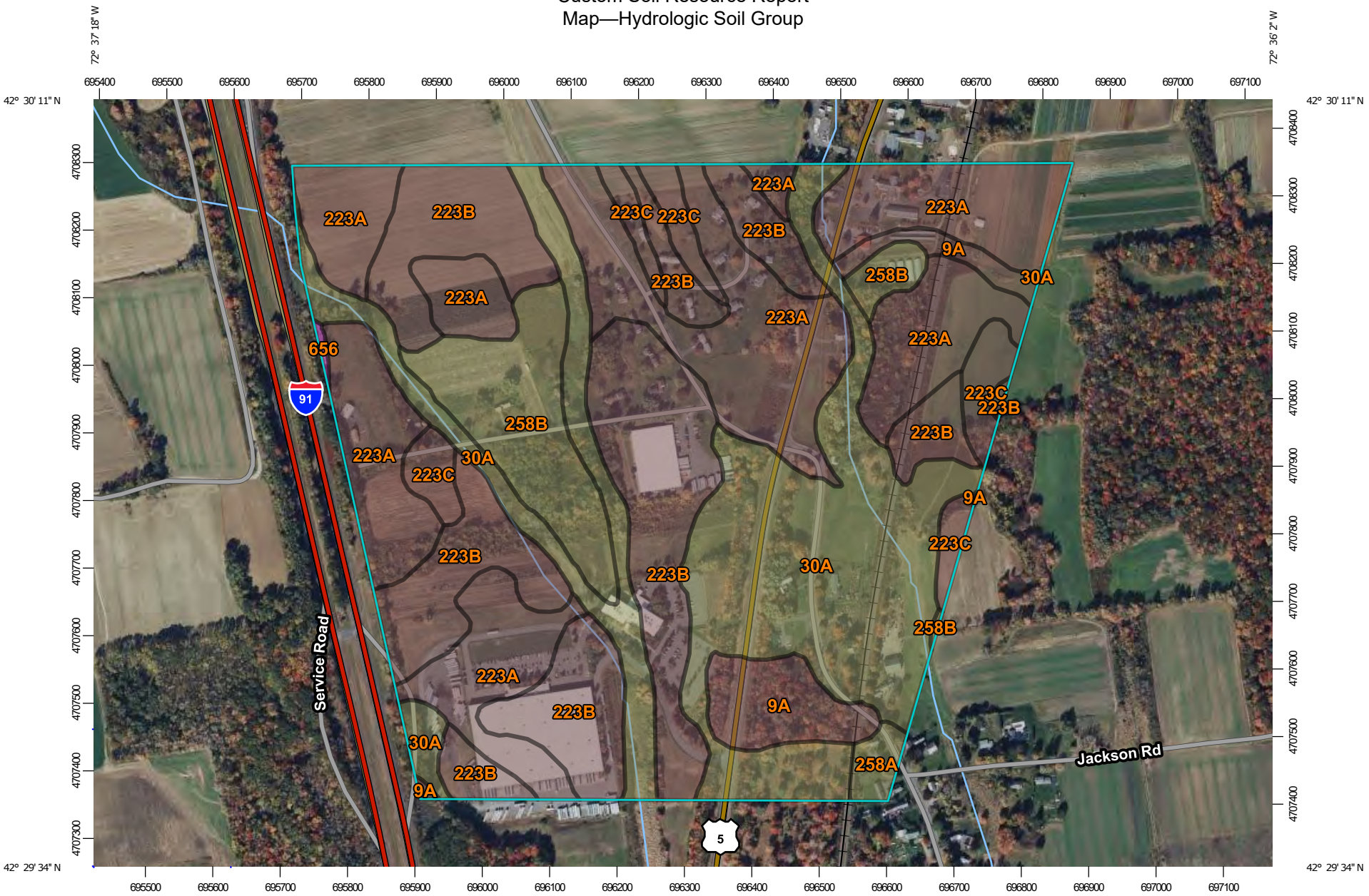
☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ 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.

# Appendix B: Soils and FEMA Information

- NRCS Soil Survey Information
- FEMA Flood Insurance Rate Map (FIRM)




Map Scale: 1:8,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

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

**Soil Rating Lines**

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

**Soil Rating Points**

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

**Water Features**

- Streams and Canals

**Transportation**

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

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

Soil Survey Area: Franklin County, Massachusetts
Survey Area Data: Version 20, Sep 5, 2025

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

Date(s) aerial images were photographed: Oct 15, 2020—Oct 31, 2020

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.

## Table—Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| 9A | Birdsall mucky silt loam, 0 to 2 percent slopes | B/D | 9.0 | 4.1% |
| 30A | Raynham silt loam, 0 to 3 percent slopes | C/D | 56.5 | 25.9% |
| 223A | Scio silt loam, 0 to 3 percent slopes | B/D | 68.3 | 31.3% |
| 223B | Scio silt loam, 3 to 8 percent slopes | B/D | 56.7 | 26.0% |
| 223C | Scio silt loam, 8 to 15 percent slopes | B/D | 9.4 | 4.3% |
| 258A | Amostown fine sandy loam, 0 to 3 percent slopes | C/D | 1.7 | 0.8% |
| 258B | Amostown fine sandy loam, 3 to 8 percent slopes | C/D | 16.3 | 7.5% |
| 656 | Udorthents-Urban land complex | A | 0.2 | 0.1% |
| **Totals for Area of Interest** | | | **218.2** | **100.0%** |

## Rating Options—Hydrologic Soil Group

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher


## ELEVATION REFERENCE MARKS

| REFERENCE MARK | ELEVATION (FT. NGVD) | DESCRIPTION OF LOCATION |
|---|---|---|
| RM1 | 198.08 | Top of northwesterly corner of bottom step to front door of house no. 786 on the southerly side of Whately Road, 3200 feet easterly of intersection with South Mill River Road, near poles no. 29/44 and 28/45. Established by Moore Survey and Mapping Company. |
| RM13 | 211.79 | Top of more westerly hold down nut on hydrant on easterly side of North Main Street in front of house no. 350, 50 feet easterly of pole no. 33/97/290 (nut between "1902" and "A.R. Smith"). Established by Moore Survey and Mapping Company. |
| RM14 | 210.84 | Top of "1891" on hydrant on northerly side of Graves Street between house no. 148 and house no. 154, 50 feet northwesterly of pole no. 16/16 opposite house no. 147. Established by Moore Survey and Mapping Company. |
| RM37 | 204.525 | U.S. Coast & Geodetic Survey traverse disk stamped 9Ga-204.525, and set in top of a concrete monument 4 inches below surface, located in the center of Deerfield in the west corner of the Common near the junction of Main Street, Sugarloaf Street, and Elm Street; 4.1 feet south of 22 inch elm tree, 86.9 feet southwest of southwest corner of World War I Granite Monument, 52.1 feet west of 30 inch elm, 0.7 foot north from concrete state route sign, 32.8 feet southeast of the center of Main Street, 29.3 feet northeast of the center of Sugarloaf Street, and 6.5 feet northwest of the flagpole. |
| RM38 | 224.115 | Mass. Dept. of Public Works traverse disk stamped "9G," set in a concrete monument 6 inches above the ground, located approximately one and one-half miles north of Deerfield on the abandoned Conrail tracks; 66.8 feet west of west edge of U.S. Highway 5 and State Route 10, 265.7 feet north of the centerline of Mill Village Road, 5.5 feet east of the east rail of Conrail station. |
| RM39 | 221.830 | A U.S. Geological Survey standard disk, approximately 1 mile north of South Deerfield, Franklin County. At Boston & Maine overhead highway bridge no. 29.51 on the south end of the wingwall of the west abutment, 10.9 feet west of the west rail and 3 feet above the ditch. |

## KEY TO MAP

- 500-Year Flood Boundary
- 100-Year Flood Boundary
- Zone Designations* With Date of Identification e.g., 12/2/74
- 100-Year Flood Boundary
- 500-Year Flood Boundary

ZONE B | ZONE A1 DATE | ZONE A5 DATE | ZONE B

Base Flood Elevation Line With Elevation In Feet** 513

Base Flood Elevation in Feet Where Uniform Within Zone** (EL 987)

Elevation Reference Mark RM7 ×

River Mile • M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

## *EXPLANATION OF ZONE DESIGNATIONS

| ZONE | EXPLANATION |
|---|---|
| A | Areas of 100-year flood; base flood elevations and flood hazard factors not determined. |
| A0 | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined. |
| AH | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined. |
| A1-A30 | Areas of 100-year flood; base flood elevations and flood hazard factors determined. |
| A99 | Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined. |
| B | Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading) |
| C | Areas of minimal flooding. (No shading) |
| D | Areas of undetermined, but possible, flood hazards. |
| V | Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined. |
| V1-V30 | Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined. |

## NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
SEPTEMBER 13, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
JULY 30, 1976

FLOOD INSURANCE RATE MAP EFFECTIVE:
JULY 2, 1980

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE
400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

# FIRM
## FLOOD INSURANCE RATE MAP

TOWN OF
**DEERFIELD, MASSACHUSETTS**
FRANKLIN COUNTY

PANEL 6 OF 12
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
250115 0006 B

EFFECTIVE DATE:
JULY 2, 1980

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

# Appendix C: Supporting Calculations

- Groundwater recharge calculations
- Water quality calculations
- MassDEP TSS Removal Calculation Worksheets for SCM treatment trains

McFARLAND JOHNSON

**RECHARGE VOLUME CALCULATIONS**

**Date:** January 9, 2026
**Revised:**
**Project:** Deerfield Intersection Improvements
**Project No:** 613708
**Location:** Deerfield, MA

**Prepared By:** RFC
**Checked By:** DHS

## Recharge Volume Design

***Objective:*** Size infiltration BMPs that will approximate the annual recharge from the existing conditions.

***Methodology:*** MA Department of Environmental Protection (DEP) Massachusetts Stormwater Handbook (Vol.3, Ch.1)

***Design Criteria:*** Required recharge volume equals a depth of runoff corresponding to the soil type times the increase in impervious areas covering that soil type at the post-development site.

Based on the Site Hydrologic Soil Group:

| Hydrologic Soil Grou | Soil Texture | Target Depth Factor (F) |
|---|---|---|
| A | Sand | 0.60 inches |
| B | Loam | 0.35 inches |
| C | Silty Loam | 0.25 inches |
| D | Clay | 0.10 inches |

The soils are defined by the Soil Conservation Services (SCS) Soil Survey of Franklin County of Massachusetts. The site is comprised of 'D' soils.

***Required Drawdown Time:*** Maximum of 72 Hours using the following equation:

$$\text{Drawdown Time} = \frac{R_v}{(K x A_{Bot})}$$

$R_v$ = Required Recharge Volume
$K$ = Permeability
$A_{Bot}$ = Bottom area of trench

***Calculation Results:***

| Designation | Total Volume Required (cf) | Net Increase Volume Required (cf) | Volume Provided (cf) |
|---|---|---|---|
| N/A | 666 | 187 | 0 |

***Recharge Volume Required:***

**Total Impervious Area Recharge Required for Entire Projecct**

| Hydrologic Soil Group | Impervious Area (Acres) | Target Depth | Volume Required (cf) |
|---|---|---|---|
| A | 0.000 | 0.60 | 0 |
| B | 0.000 | 0.35 | 0 |
| C | 0.000 | 0.25 | 0 |
| D | 1.834 | 0.10 | 666 |
| Total | 1.834 | | **666** |

**Net Impervious Area Recharge for Entire Project**

| Hydrologic Soil Group | Impervious Area (Acres) | Target Depth | Volume Required (cf) |
|---|---|---|---|
| A | 0.000 | 0.60 | 0 |
| B | 0.000 | 0.35 | 0 |
| C | 0.000 | 0.25 | 0 |
| D | 0.514 | 0.10 | 187 |
| Total | 0.514 | | **187** |

***Recharge Volume Provided:*** N/A - are there are no proposed SCMs

McFARLAND JOHNSON

**WATER QUALITY CALCULATIONS**

| | |
|---|---|
| **Date:** | January 9, 2026 |
| **Revised:** | |
| **Project:** | Deerfield Intersection Improvements |
| **Project No:** | 613708 |
| **Location:** | Deerfield, MA |
| **Prepared By:** | RFC |
| **Checked By:** | DHS |

***Objective:*** To determine the required Water Quality Volume (WQV) for adequate stormwater treatment

***Methodology:*** MA Department of Environmental Protection (DEP) Stormwater Management (Vol. 3, Ch. 1)

***Design Criteria:*** Volume to be treated =0.5" x Post Development Impervious Area

Critical Areas (include ORW, ACEC, recharge areas for public water supplies (Zone Is, Zone IIs and Interim Wellhead Protection Areas for ground water sources and Zone As for surface water sources), bathing beaches, cold water fisheries, shellfish growing areas and LUHPPL's

This project is not located within a stormwater Critical Area therefore,

**All WQ calculations use 0.5"**

***Calculation results:***

Note: impervious areas noted below are based on Watershed Analysis and go beyond project limits

***Volume to be Treated:***

**Net WQV to Design Point 1**

| | | |
|---|---|---|
| Total Proposed Impervious Area: | **23,871** | sf |
| Total Volume to be treated: | **995** | **cf** |

**Existing Design Point 1**

| | | |
|---|---|---|
| Total Impervious Area: | **75,969** | sf |
| Total Volume to be treated: | **3,165** | **cf** |

**Total for Design Point 1 (DP-1)**

| | | |
|---|---|---|
| Total Proposed Impervious Area: | **99,840** | sf |
| Total Volume to be treated: | **4,160** | **cf** |

**Net WQV to Design Point 2**

| | |
|---|---|
| Net Increase Impervious Area: | **1,045** sf |
| Total Volume to be treated: | **44 cf** |

**Existing Design Point 2**

| | |
|---|---|
| Net Increase Impervious Area: | **5,881** sf |
| Total Volume to be treated: | **245 cf** |

**Total for Design Point 2 (DP-2)**

| | |
|---|---|
| Total Proposed Impervious Area: | **6,926** sf |
| Total Volume to be treated: | **289 cf** |

***WQ Volume Provided:*** N/A - are there are no proposed SCMs

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

*Version 1, Automated: Mar. 4, 2008*

Location: DP-1, 2 and 3

## TSS Removal Calculation Worksheet

| B<br>BMP[1] | C<br>TSS Removal Rate[1] | D<br>Starting TSS Load* | E<br>Amount Removed (C*D) | F<br>Remaining Load (D-E) |
|---|---|---|---|---|
| **Deep Sump and Hooded Catch Basin** | **0.25** | **1.00** | **0.25** | **0.75** |
| | **0.00** | **0.75** | **0.00** | **0.75** |
| | **0.00** | **0.75** | **0.00** | **0.75** |
| | **0.00** | **0.75** | **0.00** | **0.75** |
| | **0.00** | **0.75** | **0.00** | **0.75** |

**Total TSS Removal =** **25%**

**Separate Form Needs to be Completed for Each Outlet or BMP Train**

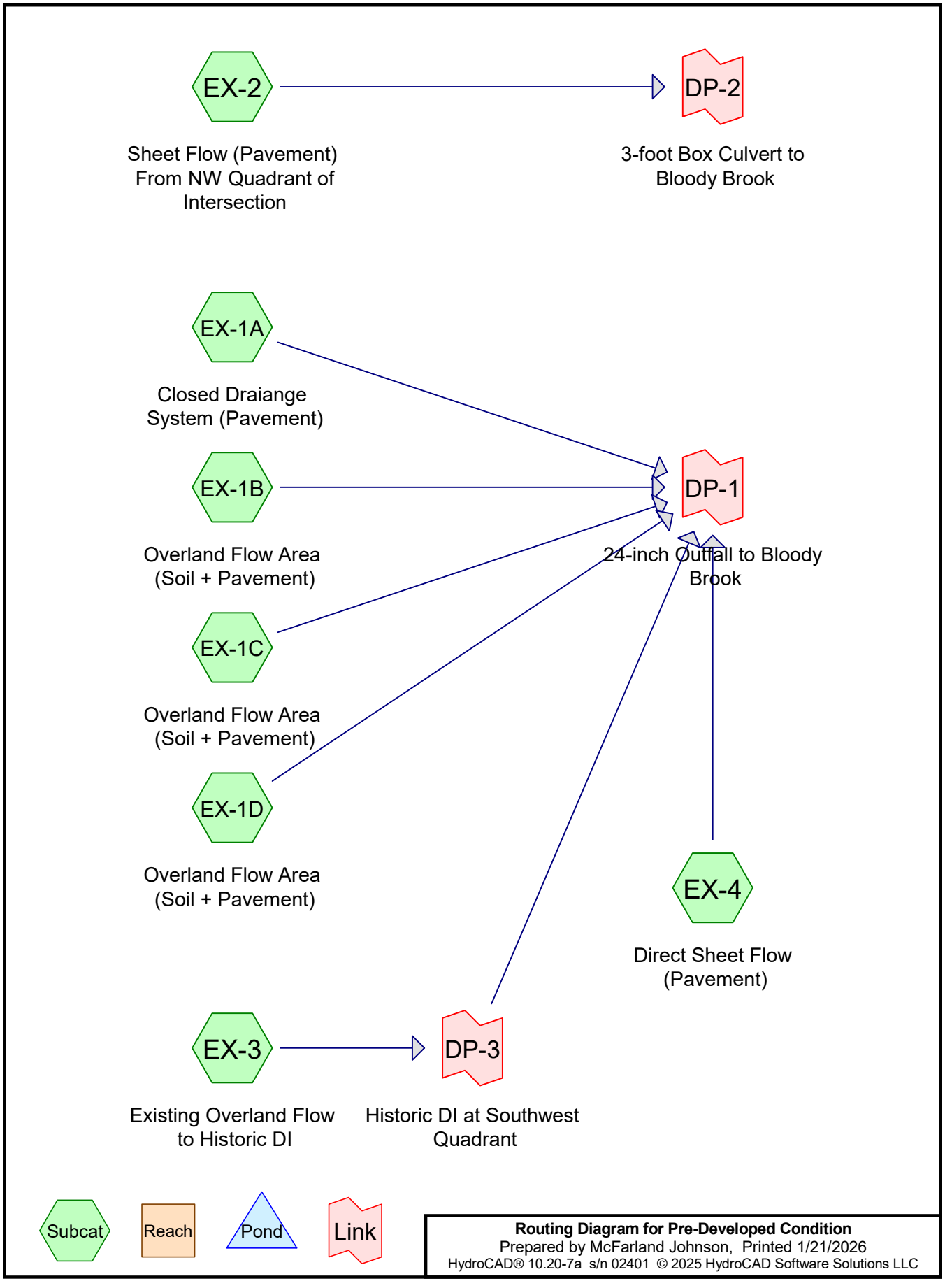
Project: 613708
Prepared By: RFC
Date: 1/20/2026

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

# Appendix D: Hydraulic and Hydrologic Data

- Existing HydroCAD
- Proposed HydroCAD




**Routing Diagram for Pre-Developed Condition**
Prepared by McFarland Johnson, Printed 1/21/2026

## Rainfall Events Listing (selected events)

| 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 | 3.02 | 2 |
| 2 | 10-Year | Type III 24-hr | | Default | 24.00 | 1 | 4.33 | 2 |
| 3 | 100-Year | Type III 24-hr | | Default | 24.00 | 1 | 7.29 | 2 |

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 5.435 | 80 | >75% Grass cover, Good, HSG D (EX-1A, EX-1B, EX-1C, EX-1D, EX-2, EX-3) |
| 2.191 | 98 | Pavement (EX-1A, EX-1B, EX-1C, EX-1D, EX-2, EX-3, EX-4) |
| 1.079 | 77 | Woods, Good, HSG D (EX-1C, EX-3) |
| **8.705** | **84** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 0.000 | HSG A | |
| 0.000 | HSG B | |
| 0.000 | HSG C | |
| 6.514 | HSG D | EX-1A, EX-1B, EX-1C, EX-1D, EX-2, EX-3 |
| 2.191 | Other | EX-1A, EX-1B, EX-1C, EX-1D, EX-2, EX-3, EX-4 |
| **8.705** | | **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

**Subcatchment EX-1A: Closed Draiange** Runoff Area=0.614 ac 88.93% Impervious Runoff Depth>2.43"
Tc=5.0 min CN=96 Runoff=1.74 cfs 0.124 af

**Subcatchment EX-1B: Overland Flow Area** Runoff Area=1.672 ac 12.92% Impervious Runoff Depth>1.28"
Flow Length=504' Tc=34.2 min CN=82 Runoff=1.44 cfs 0.178 af

**Subcatchment EX-1C: Overland Flow Area** Runoff Area=1.451 ac 12.89% Impervious Runoff Depth>1.22"
Flow Length=262' Tc=16.9 min CN=81 Runoff=1.60 cfs 0.148 af

**Subcatchment EX-1D: Overland Flow Area** Runoff Area=3.371 ac 23.58% Impervious Runoff Depth>1.41"
Flow Length=1,180' Tc=24.3 min CN=84 Runoff=3.74 cfs 0.397 af

**Subcatchment EX-2: Sheet Flow** Runoff Area=0.230 ac 58.70% Impervious Runoff Depth>1.96"
Tc=10.0 min CN=91 Runoff=0.48 cfs 0.038 af

**Subcatchment EX-3: Existing Overland** Runoff Area=1.340 ac 21.27% Impervious Runoff Depth>1.28"
Flow Length=391' Tc=34.3 min CN=82 Runoff=1.15 cfs 0.143 af

**Subcatchment EX-4: Direct Sheet Flow** Runoff Area=0.027 ac 100.00% Impervious Runoff Depth>2.61"
Tc=10.0 min CN=98 Runoff=0.07 cfs 0.006 af

**Link DP-1: 24-inch Outfall to Bloody Brook** Inflow=8.02 cfs 0.996 af
Primary=8.02 cfs 0.996 af

**Link DP-2: 3-foot Box Culvert to Bloody Brook** Inflow=0.48 cfs 0.038 af
Primary=0.48 cfs 0.038 af

**Link DP-3: Historic DI at Southwest Quadrant** Inflow=1.15 cfs 0.143 af
Primary=1.15 cfs 0.143 af

**Total Runoff Area = 8.705 ac Runoff Volume = 1.034 af Average Runoff Depth = 1.42"**
**74.83% Pervious = 6.514 ac 25.17% Impervious = 2.191 ac**

## Summary for Subcatchment EX-1A: Closed Draiange System (Pavement)

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.74 cfs @ 12.07 hrs, Volume= 0.124 af, Depth> 2.43"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.546 | 98 | Pavement |
| | 0.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.614 | 96 | Weighted Average |
| | 0.068 | | 11.07% Pervious Area |
| | 0.546 | | 88.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment EX-1B: Overland Flow Area (Soil + Pavement)

Runoff = 1.44 cfs @ 12.49 hrs, Volume= 0.178 af, Depth> 1.28"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 1.456 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.216 | 98 | Pavement |
| | 1.672 | 82 | Weighted Average |
| | 1.456 | | 87.08% Pervious Area |
| | 0.216 | | 12.92% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.9 | 100 | 0.0048 | 0.09 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 11.3 | 404 | 0.0073 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.2 | 504 | Total | | | |

## Summary for Subcatchment EX-1C: Overland Flow Area (Soil + Pavement)

Runoff = 1.60 cfs @ 12.24 hrs, Volume= 0.148 af, Depth> 1.22"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.461 | 77 | Woods, Good, HSG D |
| | 0.803 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.187 | 98 | Pavement |
| | 1.451 | 81 | Weighted Average |
| | 1.264 | | 87.11% Pervious Area |
| | 0.187 | | 12.89% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.1 | 100 | 0.0198 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 1.8 | 162 | 0.0444 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 16.9 | 262 | Total | | | |

## Summary for Subcatchment EX-1D: Overland Flow Area (Soil + Pavement)

Runoff = 3.74 cfs @ 12.34 hrs, Volume= 0.397 af, Depth> 1.41"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 2.576 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.795 | 98 | Pavement |
| | 3.371 | 84 | Weighted Average |
| | 2.576 | | 76.42% Pervious Area |
| | 0.795 | | 23.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 100 | 0.0867 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 13.7 | 1,080 | 0.0354 | 1.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 24.3 | 1,180 | Total | | | |

## Summary for Subcatchment EX-2: Sheet Flow (Pavement) From NW Quadrant of Intersection

Runoff = 0.48 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 1.96"
Routed to Link DP-2 : 3-foot Box Culvert to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.095 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.135 | 98 | Pavement |
| | 0.230 | 91 | Weighted Average |
| | 0.095 | | 41.30% Pervious Area |
| | 0.135 | | 58.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment EX-3: Existing Overland Flow to Historic DI

Runoff = 1.15 cfs @ 12.49 hrs, Volume= 0.143 af, Depth> 1.28"
Routed to Link DP-3 : Historic DI at Southwest Quadrant

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.618 | 77 | Woods, Good, HSG D |
| | 0.437 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.285 | 98 | Pavement |
| | 1.340 | 82 | Weighted Average |
| | 1.055 | | 78.73% Pervious Area |
| | 0.285 | | 21.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 24.0 | 100 | 0.0023 | 0.07 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 5.3 | 291 | 0.0174 | 0.92 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.3 | 391 | Total | | | |

## Summary for Subcatchment EX-4: Direct Sheet Flow (Pavement)

Runoff = 0.07 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.61"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.027 | 98 | Pavement |
| | 0.027 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Link DP-1: 24-inch Outfall to Bloody Brook

Inflow Area = 8.475 ac, 24.26% Impervious, Inflow Depth > 1.41" for 2-Year event
Inflow = 8.02 cfs @ 12.34 hrs, Volume= 0.996 af
Primary = 8.02 cfs @ 12.34 hrs, Volume= 0.996 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-2: 3-foot Box Culvert to Bloody Brook

Inflow Area = 0.230 ac, 58.70% Impervious, Inflow Depth > 1.96" for 2-Year event
Inflow = 0.48 cfs @ 12.14 hrs, Volume= 0.038 af
Primary = 0.48 cfs @ 12.14 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-3: Historic DI at Southwest Quadrant

Inflow Area = 1.340 ac, 21.27% Impervious, Inflow Depth > 1.28" for 2-Year event
Inflow = 1.15 cfs @ 12.49 hrs, Volume= 0.143 af
Primary = 1.15 cfs @ 12.49 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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

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

**Subcatchment EX-1A: Closed Draiange** Runoff Area=0.614 ac 88.93% Impervious Runoff Depth>3.64"
Tc=5.0 min CN=96 Runoff=2.56 cfs 0.186 af

**Subcatchment EX-1B: Overland Flow Area** Runoff Area=1.672 ac 12.92% Impervious Runoff Depth>2.30"
Flow Length=504' Tc=34.2 min CN=82 Runoff=2.59 cfs 0.321 af

**Subcatchment EX-1C: Overland Flow Area** Runoff Area=1.451 ac 12.89% Impervious Runoff Depth>2.23"
Flow Length=262' Tc=16.9 min CN=81 Runoff=2.93 cfs 0.270 af

**Subcatchment EX-1D: Overland Flow Area** Runoff Area=3.371 ac 23.58% Impervious Runoff Depth>2.48"
Flow Length=1,180' Tc=24.3 min CN=84 Runoff=6.52 cfs 0.697 af

**Subcatchment EX-2: Sheet Flow** Runoff Area=0.230 ac 58.70% Impervious Runoff Depth>3.15"
Tc=10.0 min CN=91 Runoff=0.75 cfs 0.060 af

**Subcatchment EX-3: Existing Overland** Runoff Area=1.340 ac 21.27% Impervious Runoff Depth>2.30"
Flow Length=391' Tc=34.3 min CN=82 Runoff=2.07 cfs 0.257 af

**Subcatchment EX-4: Direct Sheet Flow** Runoff Area=0.027 ac 100.00% Impervious Runoff Depth>3.81"
Tc=10.0 min CN=98 Runoff=0.10 cfs 0.009 af

**Link DP-1: 24-inch Outfall to Bloody Brook** Inflow=14.09 cfs 1.739 af
Primary=14.09 cfs 1.739 af

**Link DP-2: 3-foot Box Culvert to Bloody Brook** Inflow=0.75 cfs 0.060 af
Primary=0.75 cfs 0.060 af

**Link DP-3: Historic DI at Southwest Quadrant** Inflow=2.07 cfs 0.257 af
Primary=2.07 cfs 0.257 af

**Total Runoff Area = 8.705 ac Runoff Volume = 1.799 af Average Runoff Depth = 2.48"**
**74.83% Pervious = 6.514 ac 25.17% Impervious = 2.191 ac**

## Summary for Subcatchment EX-1A: Closed Draiange System (Pavement)

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.56 cfs @ 12.07 hrs, Volume= 0.186 af, Depth> 3.64"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.546 | 98 | Pavement |
| | 0.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.614 | 96 | Weighted Average |
| | 0.068 | | 11.07% Pervious Area |
| | 0.546 | | 88.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment EX-1B: Overland Flow Area (Soil + Pavement)

Runoff = 2.59 cfs @ 12.48 hrs, Volume= 0.321 af, Depth> 2.30"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 1.456 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.216 | 98 | Pavement |
| | 1.672 | 82 | Weighted Average |
| | 1.456 | | 87.08% Pervious Area |
| | 0.216 | | 12.92% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.9 | 100 | 0.0048 | 0.09 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 11.3 | 404 | 0.0073 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.2 | 504 | Total | | | |

## Summary for Subcatchment EX-1C: Overland Flow Area (Soil + Pavement)

Runoff = 2.93 cfs @ 12.24 hrs, Volume= 0.270 af, Depth> 2.23"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.461 | 77 | Woods, Good, HSG D |
| | 0.803 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.187 | 98 | Pavement |
| | 1.451 | 81 | Weighted Average |
| | 1.264 | | 87.11% Pervious Area |
| | 0.187 | | 12.89% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.1 | 100 | 0.0198 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 1.8 | 162 | 0.0444 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 16.9 | 262 | Total | | | |

## Summary for Subcatchment EX-1D: Overland Flow Area (Soil + Pavement)

Runoff = 6.52 cfs @ 12.33 hrs, Volume= 0.697 af, Depth> 2.48"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 2.576 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.795 | 98 | Pavement |
| | 3.371 | 84 | Weighted Average |
| | 2.576 | | 76.42% Pervious Area |
| | 0.795 | | 23.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 100 | 0.0867 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 13.7 | 1,080 | 0.0354 | 1.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 24.3 | 1,180 | Total | | | |

## Summary for Subcatchment EX-2: Sheet Flow (Pavement) From NW Quadrant of Intersection

Runoff = 0.75 cfs @ 12.14 hrs, Volume= 0.060 af, Depth> 3.15"
Routed to Link DP-2 : 3-foot Box Culvert to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.095 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.135 | 98 | Pavement |
| | 0.230 | 91 | Weighted Average |
| | 0.095 | | 41.30% Pervious Area |
| | 0.135 | | 58.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment EX-3: Existing Overland Flow to Historic DI

Runoff = 2.07 cfs @ 12.47 hrs, Volume= 0.257 af, Depth> 2.30"
Routed to Link DP-3 : Historic DI at Southwest Quadrant

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.618 | 77 | Woods, Good, HSG D |
| | 0.437 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.285 | 98 | Pavement |
| | 1.340 | 82 | Weighted Average |
| | 1.055 | | 78.73% Pervious Area |
| | 0.285 | | 21.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 24.0 | 100 | 0.0023 | 0.07 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 5.3 | 291 | 0.0174 | 0.92 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.3 | 391 | Total | | | |

## Summary for Subcatchment EX-4: Direct Sheet Flow (Pavement)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 3.81"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.027 | 98 | Pavement |
| | 0.027 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Link DP-1: 24-inch Outfall to Bloody Brook

Inflow Area = 8.475 ac, 24.26% Impervious, Inflow Depth > 2.46" for 10-Year event
Inflow = 14.09 cfs @ 12.33 hrs, Volume= 1.739 af
Primary = 14.09 cfs @ 12.33 hrs, Volume= 1.739 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-2: 3-foot Box Culvert to Bloody Brook

Inflow Area = 0.230 ac, 58.70% Impervious, Inflow Depth > 3.15" for 10-Year event
Inflow = 0.75 cfs @ 12.14 hrs, Volume= 0.060 af
Primary = 0.75 cfs @ 12.14 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-3: Historic DI at Southwest Quadrant

Inflow Area = 1.340 ac, 21.27% Impervious, Inflow Depth > 2.30" for 10-Year event
Inflow = 2.07 cfs @ 12.47 hrs, Volume= 0.257 af
Primary = 2.07 cfs @ 12.47 hrs, Volume= 0.257 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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

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

**Subcatchment EX-1A: Closed Draiange** Runoff Area=0.614 ac 88.93% Impervious Runoff Depth>6.36"
Tc=5.0 min CN=96 Runoff=4.38 cfs 0.325 af

**Subcatchment EX-1B: Overland Flow Area** Runoff Area=1.672 ac 12.92% Impervious Runoff Depth>4.85"
Flow Length=504' Tc=34.2 min CN=82 Runoff=5.33 cfs 0.675 af

**Subcatchment EX-1C: Overland Flow Area** Runoff Area=1.451 ac 12.89% Impervious Runoff Depth>4.76"
Flow Length=262' Tc=16.9 min CN=81 Runoff=6.13 cfs 0.576 af

**Subcatchment EX-1D: Overland Flow Area** Runoff Area=3.371 ac 23.58% Impervious Runoff Depth>5.09"
Flow Length=1,180' Tc=24.3 min CN=84 Runoff=12.99 cfs 1.429 af

**Subcatchment EX-2: Sheet Flow** Runoff Area=0.230 ac 58.70% Impervious Runoff Depth>5.87"
Tc=10.0 min CN=91 Runoff=1.36 cfs 0.113 af

**Subcatchment EX-3: Existing Overland** Runoff Area=1.340 ac 21.27% Impervious Runoff Depth>4.85"
Flow Length=391' Tc=34.3 min CN=82 Runoff=4.27 cfs 0.541 af

**Subcatchment EX-4: Direct Sheet Flow** Runoff Area=0.027 ac 100.00% Impervious Runoff Depth>6.50"
Tc=10.0 min CN=98 Runoff=0.17 cfs 0.015 af

**Link DP-1: 24-inch Outfall to Bloody Brook** Inflow=28.47 cfs 3.561 af
Primary=28.47 cfs 3.561 af

**Link DP-2: 3-foot Box Culvert to Bloody Brook** Inflow=1.36 cfs 0.113 af
Primary=1.36 cfs 0.113 af

**Link DP-3: Historic DI at Southwest Quadrant** Inflow=4.27 cfs 0.541 af
Primary=4.27 cfs 0.541 af

**Total Runoff Area = 8.705 ac Runoff Volume = 3.674 af Average Runoff Depth = 5.06"**
**74.83% Pervious = 6.514 ac 25.17% Impervious = 2.191 ac**

## Summary for Subcatchment EX-1A: Closed Draiange System (Pavement)

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.38 cfs @ 12.07 hrs, Volume= 0.325 af, Depth> 6.36"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.546 | 98 | Pavement |
| | 0.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.614 | 96 | Weighted Average |
| | 0.068 | | 11.07% Pervious Area |
| | 0.546 | | 88.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment EX-1B: Overland Flow Area (Soil + Pavement)

Runoff = 5.33 cfs @ 12.46 hrs, Volume= 0.675 af, Depth> 4.85"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 1.456 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.216 | 98 | Pavement |
| | 1.672 | 82 | Weighted Average |
| | 1.456 | | 87.08% Pervious Area |
| | 0.216 | | 12.92% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.9 | 100 | 0.0048 | 0.09 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 11.3 | 404 | 0.0073 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.2 | 504 | Total | | | |

## Summary for Subcatchment EX-1C: Overland Flow Area (Soil + Pavement)

Runoff = 6.13 cfs @ 12.23 hrs, Volume= 0.576 af, Depth> 4.76"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.461 | 77 | Woods, Good, HSG D |
| | 0.803 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.187 | 98 | Pavement |
| | 1.451 | 81 | Weighted Average |
| | 1.264 | | 87.11% Pervious Area |
| | 0.187 | | 12.89% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.1 | 100 | 0.0198 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 1.8 | 162 | 0.0444 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 16.9 | 262 | Total | | | |

## Summary for Subcatchment EX-1D: Overland Flow Area (Soil + Pavement)

Runoff = 12.99 cfs @ 12.33 hrs, Volume= 1.429 af, Depth> 5.09"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 2.576 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.795 | 98 | Pavement |
| | 3.371 | 84 | Weighted Average |
| | 2.576 | | 76.42% Pervious Area |
| | 0.795 | | 23.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 100 | 0.0867 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 13.7 | 1,080 | 0.0354 | 1.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 24.3 | 1,180 | Total | | | |

## Summary for Subcatchment EX-2: Sheet Flow (Pavement) From NW Quadrant of Intersection

Runoff = 1.36 cfs @ 12.14 hrs, Volume= 0.113 af, Depth> 5.87"
Routed to Link DP-2 : 3-foot Box Culvert to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.095 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.135 | 98 | Pavement |
| | 0.230 | 91 | Weighted Average |
| | 0.095 | | 41.30% Pervious Area |
| | 0.135 | | 58.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment EX-3: Existing Overland Flow to Historic DI

Runoff = 4.27 cfs @ 12.46 hrs, Volume= 0.541 af, Depth> 4.85"
Routed to Link DP-3 : Historic DI at Southwest Quadrant

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.618 | 77 | Woods, Good, HSG D |
| | 0.437 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.285 | 98 | Pavement |
| | 1.340 | 82 | Weighted Average |
| | 1.055 | | 78.73% Pervious Area |
| | 0.285 | | 21.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 24.0 | 100 | 0.0023 | 0.07 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 5.3 | 291 | 0.0174 | 0.92 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.3 | 391 | Total | | | |

## Summary for Subcatchment EX-4: Direct Sheet Flow (Pavement)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 6.50"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.027 | 98 | Pavement |
| | 0.027 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Link DP-1: 24-inch Outfall to Bloody Brook

Inflow Area = 8.475 ac, 24.26% Impervious, Inflow Depth > 5.04" for 100-Year event
Inflow = 28.47 cfs @ 12.32 hrs, Volume= 3.561 af
Primary = 28.47 cfs @ 12.32 hrs, Volume= 3.561 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-2: 3-foot Box Culvert to Bloody Brook

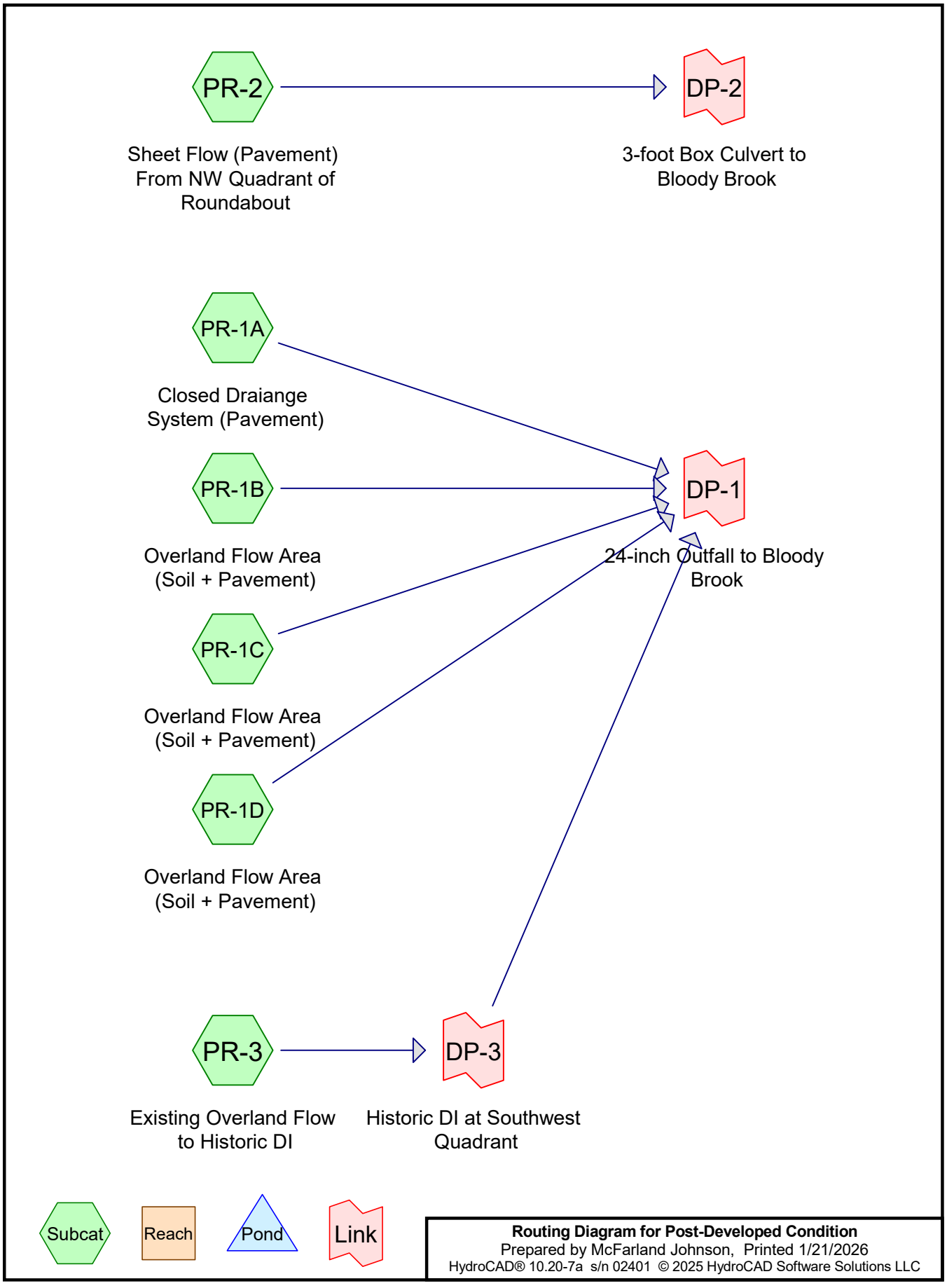
Inflow Area = 0.230 ac, 58.70% Impervious, Inflow Depth > 5.87" for 100-Year event
Inflow = 1.36 cfs @ 12.14 hrs, Volume= 0.113 af
Primary = 1.36 cfs @ 12.14 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-3: Historic DI at Southwest Quadrant

Inflow Area = 1.340 ac, 21.27% Impervious, Inflow Depth > 4.85" for 100-Year event
Inflow = 4.27 cfs @ 12.46 hrs, Volume= 0.541 af
Primary = 4.27 cfs @ 12.46 hrs, Volume= 0.541 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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




**Routing Diagram for Post-Developed Condition**
Prepared by McFarland Johnson, Printed 1/21/2026

## Rainfall Events Listing (selected events)

| 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 | 3.02 | 2 |
| 2 | 10-Year | Type III 24-hr | | Default | 24.00 | 1 | 4.33 | 2 |
| 3 | 100-Year | Type III 24-hr | | Default | 24.00 | 1 | 7.29 | 2 |

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 4.937 | 80 | >75% Grass cover, Good, HSG D (PR-1A, PR-1B, PR-1C, PR-1D, PR-3) |
| 2.690 | 98 | Pavement (PR-1A, PR-1B, PR-1C, PR-1D, PR-2, PR-3) |
| 1.078 | 77 | Woods, Good, HSG D (PR-1C, PR-3) |
| **8.705** | **85** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 0.000 | HSG A | |
| 0.000 | HSG B | |
| 0.000 | HSG C | |
| 6.015 | HSG D | PR-1A, PR-1B, PR-1C, PR-1D, PR-3 |
| 2.690 | Other | PR-1A, PR-1B, PR-1C, PR-1D, PR-2, PR-3 |
| **8.705** | | **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

**Subcatchment PR-1A: Closed Draiange** Runoff Area=1.114 ac 92.82% Impervious Runoff Depth>2.52"
Tc=5.0 min CN=97 Runoff=3.23 cfs 0.234 af

**Subcatchment PR-1B: Overland Flow Area** Runoff Area=1.546 ac 11.97% Impervious Runoff Depth>1.28"
Flow Length=504' Tc=34.2 min CN=82 Runoff=1.33 cfs 0.165 af

**Subcatchment PR-1C: Overland Flow Area** Runoff Area=1.420 ac 19.58% Impervious Runoff Depth>1.35"
Flow Length=262' Tc=16.9 min CN=83 Runoff=1.74 cfs 0.160 af

**Subcatchment PR-1D: Overland Flow Area** Runoff Area=3.371 ac 23.58% Impervious Runoff Depth>1.41"
Flow Length=1,180' Tc=24.3 min CN=84 Runoff=3.74 cfs 0.397 af

**Subcatchment PR-2: Sheet Flow** Runoff Area=0.159 ac 100.00% Impervious Runoff Depth>2.61"
Tc=10.0 min CN=98 Runoff=0.40 cfs 0.035 af

**Subcatchment PR-3: Existing Overland** Runoff Area=1.095 ac 21.83% Impervious Runoff Depth>1.28"
Flow Length=391' Tc=34.3 min CN=82 Runoff=0.94 cfs 0.117 af

**Link DP-1: 24-inch Outfall to Bloody Brook** Inflow=8.34 cfs 1.072 af
Primary=8.34 cfs 1.072 af

**Link DP-2: 3-foot Box Culvert to Bloody Brook** Inflow=0.40 cfs 0.035 af
Primary=0.40 cfs 0.035 af

**Link DP-3: Historic DI at Southwest Quadrant** Inflow=0.94 cfs 0.117 af
Primary=0.94 cfs 0.117 af

**Total Runoff Area = 8.705 ac Runoff Volume = 1.107 af Average Runoff Depth = 1.53"**
**69.10% Pervious = 6.015 ac 30.90% Impervious = 2.690 ac**

## Summary for Subcatchment PR-1A: Closed Draiange System (Pavement)

[49] Hint: Tc<2dt may require smaller dt

Runoff = 3.23 cfs @ 12.07 hrs, Volume= 0.234 af, Depth> 2.52"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.034 | 98 | Pavement |
| | 0.080 | 80 | >75% Grass cover, Good, HSG D |
| | 1.114 | 97 | Weighted Average |
| | 0.080 | | 7.18% Pervious Area |
| | 1.034 | | 92.82% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment PR-1B: Overland Flow Area (Soil + Pavement)

Runoff = 1.33 cfs @ 12.49 hrs, Volume= 0.165 af, Depth> 1.28"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 1.361 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.185 | 98 | Pavement |
| | 1.546 | 82 | Weighted Average |
| | 1.361 | | 88.03% Pervious Area |
| | 0.185 | | 11.97% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.9 | 100 | 0.0048 | 0.09 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 11.3 | 404 | 0.0073 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.2 | 504 | Total | | | |

## Summary for Subcatchment PR-1C: Overland Flow Area (Soil + Pavement)

Runoff = 1.74 cfs @ 12.24 hrs, Volume= 0.160 af, Depth> 1.35"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.461 | 77 | Woods, Good, HSG D |
| | 0.681 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.278 | 98 | Pavement |
| | 1.420 | 83 | Weighted Average |
| | 1.142 | | 80.42% Pervious Area |
| | 0.278 | | 19.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.1 | 100 | 0.0198 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 1.8 | 162 | 0.0444 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 16.9 | 262 | Total | | | |

## Summary for Subcatchment PR-1D: Overland Flow Area (Soil + Pavement)

Runoff = 3.74 cfs @ 12.34 hrs, Volume= 0.397 af, Depth> 1.41"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 2.576 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.795 | 98 | Pavement |
| | 3.371 | 84 | Weighted Average |
| | 2.576 | | 76.42% Pervious Area |
| | 0.795 | | 23.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 100 | 0.0867 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 13.7 | 1,080 | 0.0354 | 1.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 24.3 | 1,180 | Total | | | |

## Summary for Subcatchment PR-2: Sheet Flow (Pavement) From NW Quadrant of Roundabout

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.035 af, Depth> 2.61"
Routed to Link DP-2 : 3-foot Box Culvert to Bloody Brook

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.159 | 98 | Pavement |
| | 0.159 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment PR-3: Existing Overland Flow to Historic DI

Runoff = 0.94 cfs @ 12.49 hrs, Volume= 0.117 af, Depth> 1.28"
Routed to Link DP-3 : Historic DI at Southwest Quadrant

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=3.02"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.617 | 77 | Woods, Good, HSG D |
| | 0.239 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.239 | 98 | Pavement |
| | 1.095 | 82 | Weighted Average |
| | 0.856 | | 78.17% Pervious Area |
| | 0.239 | | 21.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 24.0 | 100 | 0.0023 | 0.07 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 5.3 | 291 | 0.0174 | 0.92 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.3 | 391 | Total | | | |

## Summary for Link DP-1: 24-inch Outfall to Bloody Brook

Inflow Area = 8.546 ac, 29.62% Impervious, Inflow Depth > 1.51" for 2-Year event
Inflow = 8.34 cfs @ 12.32 hrs, Volume= 1.072 af
Primary = 8.34 cfs @ 12.32 hrs, Volume= 1.072 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-2: 3-foot Box Culvert to Bloody Brook

Inflow Area = 0.159 ac,100.00% Impervious, Inflow Depth > 2.61" for 2-Year event
Inflow = 0.40 cfs @ 12.14 hrs, Volume= 0.035 af
Primary = 0.40 cfs @ 12.14 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-3: Historic DI at Southwest Quadrant

Inflow Area = 1.095 ac, 21.83% Impervious, Inflow Depth > 1.28" for 2-Year event
Inflow = 0.94 cfs @ 12.49 hrs, Volume= 0.117 af
Primary = 0.94 cfs @ 12.49 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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

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

**Subcatchment PR-1A: Closed Draiange** Runoff Area=1.114 ac 92.82% Impervious Runoff Depth>3.73"
Tc=5.0 min CN=97 Runoff=4.70 cfs 0.346 af

**Subcatchment PR-1B: Overland Flow Area** Runoff Area=1.546 ac 11.97% Impervious Runoff Depth>2.30"
Flow Length=504' Tc=34.2 min CN=82 Runoff=2.40 cfs 0.296 af

**Subcatchment PR-1C: Overland Flow Area** Runoff Area=1.420 ac 19.58% Impervious Runoff Depth>2.40"
Flow Length=262' Tc=16.9 min CN=83 Runoff=3.08 cfs 0.284 af

**Subcatchment PR-1D: Overland Flow Area** Runoff Area=3.371 ac 23.58% Impervious Runoff Depth>2.48"
Flow Length=1,180' Tc=24.3 min CN=84 Runoff=6.52 cfs 0.697 af

**Subcatchment PR-2: Sheet Flow** Runoff Area=0.159 ac 100.00% Impervious Runoff Depth>3.81"
Tc=10.0 min CN=98 Runoff=0.58 cfs 0.050 af

**Subcatchment PR-3: Existing Overland** Runoff Area=1.095 ac 21.83% Impervious Runoff Depth>2.30"
Flow Length=391' Tc=34.3 min CN=82 Runoff=1.69 cfs 0.210 af

**Link DP-1: 24-inch Outfall to Bloody Brook** Inflow=14.42 cfs 1.833 af
Primary=14.42 cfs 1.833 af

**Link DP-2: 3-foot Box Culvert to Bloody Brook** Inflow=0.58 cfs 0.050 af
Primary=0.58 cfs 0.050 af

**Link DP-3: Historic DI at Southwest Quadrant** Inflow=1.69 cfs 0.210 af
Primary=1.69 cfs 0.210 af

**Total Runoff Area = 8.705 ac Runoff Volume = 1.884 af Average Runoff Depth = 2.60"**
**69.10% Pervious = 6.015 ac 30.90% Impervious = 2.690 ac**

## Summary for Subcatchment PR-1A: Closed Draiange System (Pavement)

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.70 cfs @ 12.07 hrs, Volume= 0.346 af, Depth> 3.73"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.034 | 98 | Pavement |
| | 0.080 | 80 | >75% Grass cover, Good, HSG D |
| | 1.114 | 97 | Weighted Average |
| | 0.080 | | 7.18% Pervious Area |
| | 1.034 | | 92.82% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment PR-1B: Overland Flow Area (Soil + Pavement)

Runoff = 2.40 cfs @ 12.48 hrs, Volume= 0.296 af, Depth> 2.30"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 1.361 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.185 | 98 | Pavement |
| | 1.546 | 82 | Weighted Average |
| | 1.361 | | 88.03% Pervious Area |
| | 0.185 | | 11.97% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.9 | 100 | 0.0048 | 0.09 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 11.3 | 404 | 0.0073 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.2 | 504 | Total | | | |

## Summary for Subcatchment PR-1C: Overland Flow Area (Soil + Pavement)

Runoff = 3.08 cfs @ 12.23 hrs, Volume= 0.284 af, Depth> 2.40"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.461 | 77 | Woods, Good, HSG D |
| | 0.681 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.278 | 98 | Pavement |
| | 1.420 | 83 | Weighted Average |
| | 1.142 | | 80.42% Pervious Area |
| | 0.278 | | 19.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.1 | 100 | 0.0198 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 1.8 | 162 | 0.0444 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 16.9 | 262 | Total | | | |

## Summary for Subcatchment PR-1D: Overland Flow Area (Soil + Pavement)

Runoff = 6.52 cfs @ 12.33 hrs, Volume= 0.697 af, Depth> 2.48"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 2.576 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.795 | 98 | Pavement |
| | 3.371 | 84 | Weighted Average |
| | 2.576 | | 76.42% Pervious Area |
| | 0.795 | | 23.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 100 | 0.0867 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 13.7 | 1,080 | 0.0354 | 1.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 24.3 | 1,180 | Total | | | |

## Summary for Subcatchment PR-2: Sheet Flow (Pavement) From NW Quadrant of Roundabout

Runoff = 0.58 cfs @ 12.14 hrs, Volume= 0.050 af, Depth> 3.81"
Routed to Link DP-2 : 3-foot Box Culvert to Bloody Brook

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.159 | 98 | Pavement |
| | 0.159 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment PR-3: Existing Overland Flow to Historic DI

Runoff = 1.69 cfs @ 12.47 hrs, Volume= 0.210 af, Depth> 2.30"
Routed to Link DP-3 : Historic DI at Southwest Quadrant

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 10-Year Rainfall=4.33"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.617 | 77 | Woods, Good, HSG D |
| | 0.239 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.239 | 98 | Pavement |
| | 1.095 | 82 | Weighted Average |
| | 0.856 | | 78.17% Pervious Area |
| | 0.239 | | 21.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 24.0 | 100 | 0.0023 | 0.07 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 5.3 | 291 | 0.0174 | 0.92 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.3 | 391 | Total | | | |

## Summary for Link DP-1: 24-inch Outfall to Bloody Brook

Inflow Area = 8.546 ac, 29.62% Impervious, Inflow Depth > 2.57" for 10-Year event
Inflow = 14.42 cfs @ 12.32 hrs, Volume= 1.833 af
Primary = 14.42 cfs @ 12.32 hrs, Volume= 1.833 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-2: 3-foot Box Culvert to Bloody Brook

Inflow Area = 0.159 ac,100.00% Impervious, Inflow Depth > 3.81" for 10-Year event
Inflow = 0.58 cfs @ 12.14 hrs, Volume= 0.050 af
Primary = 0.58 cfs @ 12.14 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-3: Historic DI at Southwest Quadrant

Inflow Area = 1.095 ac, 21.83% Impervious, Inflow Depth > 2.30" for 10-Year event
Inflow = 1.69 cfs @ 12.47 hrs, Volume= 0.210 af
Primary = 1.69 cfs @ 12.47 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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

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

**Subcatchment PR-1A: Closed Draiange** Runoff Area=1.114 ac 92.82% Impervious Runoff Depth>6.43"
Tc=5.0 min CN=97 Runoff=7.99 cfs 0.597 af

**Subcatchment PR-1B: Overland Flow Area** Runoff Area=1.546 ac 11.97% Impervious Runoff Depth>4.85"
Flow Length=504' Tc=34.2 min CN=82 Runoff=4.93 cfs 0.625 af

**Subcatchment PR-1C: Overland Flow Area** Runoff Area=1.420 ac 19.58% Impervious Runoff Depth>4.98"
Flow Length=262' Tc=16.9 min CN=83 Runoff=6.23 cfs 0.590 af

**Subcatchment PR-1D: Overland Flow Area** Runoff Area=3.371 ac 23.58% Impervious Runoff Depth>5.09"
Flow Length=1,180' Tc=24.3 min CN=84 Runoff=12.99 cfs 1.429 af

**Subcatchment PR-2: Sheet Flow** Runoff Area=0.159 ac 100.00% Impervious Runoff Depth>6.50"
Tc=10.0 min CN=98 Runoff=0.98 cfs 0.086 af

**Subcatchment PR-3: Existing Overland** Runoff Area=1.095 ac 21.83% Impervious Runoff Depth>4.85"
Flow Length=391' Tc=34.3 min CN=82 Runoff=3.49 cfs 0.442 af

**Link DP-1: 24-inch Outfall to Bloody Brook** Inflow=28.70 cfs 3.683 af
Primary=28.70 cfs 3.683 af

**Link DP-2: 3-foot Box Culvert to Bloody Brook** Inflow=0.98 cfs 0.086 af
Primary=0.98 cfs 0.086 af

**Link DP-3: Historic DI at Southwest Quadrant** Inflow=3.49 cfs 0.442 af
Primary=3.49 cfs 0.442 af

**Total Runoff Area = 8.705 ac Runoff Volume = 3.769 af Average Runoff Depth = 5.20"**
**69.10% Pervious = 6.015 ac 30.90% Impervious = 2.690 ac**

## Summary for Subcatchment PR-1A: Closed Draiange System (Pavement)

[49] Hint: Tc<2dt may require smaller dt

Runoff = 7.99 cfs @ 12.07 hrs, Volume= 0.597 af, Depth> 6.43"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.034 | 98 | Pavement |
| | 0.080 | 80 | >75% Grass cover, Good, HSG D |
| | 1.114 | 97 | Weighted Average |
| | 0.080 | | 7.18% Pervious Area |
| | 1.034 | | 92.82% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment PR-1B: Overland Flow Area (Soil + Pavement)

Runoff = 4.93 cfs @ 12.46 hrs, Volume= 0.625 af, Depth> 4.85"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 1.361 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.185 | 98 | Pavement |
| | 1.546 | 82 | Weighted Average |
| | 1.361 | | 88.03% Pervious Area |
| | 0.185 | | 11.97% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.9 | 100 | 0.0048 | 0.09 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 11.3 | 404 | 0.0073 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.2 | 504 | Total | | | |

## Summary for Subcatchment PR-1C: Overland Flow Area (Soil + Pavement)

Runoff = 6.23 cfs @ 12.23 hrs, Volume= 0.590 af, Depth> 4.98"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.461 | 77 | Woods, Good, HSG D |
| | 0.681 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.278 | 98 | Pavement |
| | 1.420 | 83 | Weighted Average |
| | 1.142 | | 80.42% Pervious Area |
| | 0.278 | | 19.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.1 | 100 | 0.0198 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 1.8 | 162 | 0.0444 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 16.9 | 262 | Total | | | |

## Summary for Subcatchment PR-1D: Overland Flow Area (Soil + Pavement)

Runoff = 12.99 cfs @ 12.33 hrs, Volume= 1.429 af, Depth> 5.09"
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 2.576 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.795 | 98 | Pavement |
| | 3.371 | 84 | Weighted Average |
| | 2.576 | | 76.42% Pervious Area |
| | 0.795 | | 23.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 100 | 0.0867 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 13.7 | 1,080 | 0.0354 | 1.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 24.3 | 1,180 | Total | | | |

## Summary for Subcatchment PR-2: Sheet Flow (Pavement) From NW Quadrant of Roundabout

Runoff = 0.98 cfs @ 12.14 hrs, Volume= 0.086 af, Depth> 6.50"
Routed to Link DP-2 : 3-foot Box Culvert to Bloody Brook

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.159 | 98 | Pavement |
| | 0.159 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Summary for Subcatchment PR-3: Existing Overland Flow to Historic DI

Runoff = 3.49 cfs @ 12.46 hrs, Volume= 0.442 af, Depth> 4.85"
Routed to Link DP-3 : Historic DI at Southwest Quadrant

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 100-Year Rainfall=7.29"

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.617 | 77 | Woods, Good, HSG D |
| | 0.239 | 80 | >75% Grass cover, Good, HSG D |
| * | 0.239 | 98 | Pavement |
| | 1.095 | 82 | Weighted Average |
| | 0.856 | | 78.17% Pervious Area |
| | 0.239 | | 21.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 24.0 | 100 | 0.0023 | 0.07 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.01" |
| 5.3 | 291 | 0.0174 | 0.92 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.0 | | | | | **Direct Entry,** |
| 34.3 | 391 | Total | | | |

## Summary for Link DP-1: 24-inch Outfall to Bloody Brook

Inflow Area = 8.546 ac, 29.62% Impervious, Inflow Depth > 5.17" for 100-Year event
Inflow = 28.70 cfs @ 12.31 hrs, Volume= 3.683 af
Primary = 28.70 cfs @ 12.31 hrs, Volume= 3.683 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-2: 3-foot Box Culvert to Bloody Brook

Inflow Area = 0.159 ac,100.00% Impervious, Inflow Depth > 6.50" for 100-Year event
Inflow = 0.98 cfs @ 12.14 hrs, Volume= 0.086 af
Primary = 0.98 cfs @ 12.14 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min

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

## Summary for Link DP-3: Historic DI at Southwest Quadrant

Inflow Area = 1.095 ac, 21.83% Impervious, Inflow Depth > 4.85" for 100-Year event
Inflow = 3.49 cfs @ 12.46 hrs, Volume= 0.442 af
Primary = 3.49 cfs @ 12.46 hrs, Volume= 0.442 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP-1 : 24-inch Outfall to Bloody Brook

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

# Appendix E: O&M Plan and LTPPP

- Stormwater Management System Operation and Maintenance (O&M) Plan
- Long-Term Pollution Prevention Plan (LTPPP)
- *Illicit Discharge Compliance Statement (IDCS)*

# Deerfield Roundabout

## Stormwater Management System Operation and Maintenance Plan and Long-Term Pollution Prevention Plan

***Deerfield, MA***

***MassDOT #613708***

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*01/09/2026*

# Table of Contents

# 1

# Stormwater Management System Operation and Maintenance (O&M) Plan

This Stormwater Management System Operation and Maintenance (O&M) Plan describes the approach for inspection and maintenance of drainage infrastructure and structural stormwater control measures (SCMs) to minimize contaminant loading for the Deerfield Roundabout Project in Deerfield, MA. In general, inspection and maintenance activities will be conducted consistent with the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer System (MS4) and MassDOT's anticipated NPDES Transportation Separate Storm Sewer System (TS4) Permit.

This document has been prepared per the requirements of Massachusetts Department of Environmental Protection (MassDEP) Regulations 310 CMR 10.05 (6)(k)(9) and satisfies the requirements of Massachusetts Stormwater Standard 9.

## 1.1 Responsible Party

In accordance with MassDOT procedures, the MassDOT District *2* office located in *Northampton* MA, is responsible for the maintenance of all stormwater management systems on MassDOT roads within the project area.

Questions or concerns regarding activities associated with this O&M Plan should be addressed to MassDOT's District *2* office located at 811 North King Street, Northampton, MA 01060, phone *(857) 368-2000*, during regular weekday hours, or to MassDOT's Highway Operations Center located in South Boston, MA at (800) 227-0608 during all other times and days, including weekends and holidays.

## 1.2 Inspection and Maintenance Measures and Record-Keeping

See Figure *5* of the Stormwater Management Report for the proposed stormwater system within the project limits. The stormwater management system covered by this O&M Plan consists of the following measures:

- Proposed deep sump catch basins
- Proposed flared end section located near the existing outlet location and rip rap protection

MassDOT strives to achieve inspection and maintenance frequencies of SCMs and catch basins as outlined in MassDEP's Stormwater Handbook. However, it is a challenge for MassDOT as a statewide agency to meet the stated inspection and maintenance frequencies set forth by MassDEP. As a result of this, MassDOT is in the process of developing a Programmatic Operations and Maintenance Plan (POMP) which will allow for the O&M of stormwater assets to be executed using a data driven approach. This POMP will implement a performance-based inspection and maintenance program for SCMs and catch basins. Once implemented, the POMP will supersede this project-specific operations and maintenance plan.

For SCMs, MassDOT's overall approach is to inspect SCMs, and based on the results of the inspections, perform maintenance to preserve functionality. For catch basins, MassDOT's approach is to perform maintenance at an interval that maintains the functionality of the catch basin (e.g., sump is less than 50% full of sediment). Catch basin inspections, including documentation of sediment accumulation, and maintenance will generally occur simultaneously.

Inspections and maintenance are recorded by personnel using hand-held tablets in the field to document sediment accumulation, maintenance action performed, and follow-up actions needed. Data is recorded in MassDOT's asset management system which is accessible in the field (mobile) or the office (desktop).

The table below summarizes data that is generally collected for each asset type. For all assets, the inspector and inspection date are recorded. Photo documentation of structure condition is taken and attached to the inspection record.

| Inspection Form | Applicable Stormwater Assets | Information Collected |
|---|---|---|
| Inlets | › Catch basins<br>› Outlet control structures | › Sediment accumulation<br>› Trash/Debris accumulation<br>› Signs of contamination<br>› Frame and grate condition<br>› Overall structure condition |
| Storm Discharge Points | › Outlets to SCMs | › Presence of flow<br>› Signs of contaminated flow<br>› Sediment accumulation<br>› Level of erosion<br>› Pipe condition<br>› Scour protection condition<br>› Overall structure condition |

Inspection and maintenance records can be made available using the asset management system through request with the MassDOT District 2 Environmental Engineer. Records will be kept for at least three years. Representatives of the Deerfield's Conservation Commission(s), MassDEP, and US EPA may obtain access to these records, upon request. Additionally, MassDOT will allow members and agents of MassDEP and the Conservation Commission(s) to enter and inspect the premises, upon request, to evaluate and ensure that the Operation and Maintenance Plan requirements for each SCM are being followed.

Maintenance to be performed on the stormwater system includes:

| Stormwater Feature | Potential Maintenance Actions | |
|---|---|---|
| Inlets and Outlets<br>• 16 New Catch Basins<br>• 1 New Outlet | • Clear inlet and remove and properly dispose of sediment, trash, leaf litter, debris, and vegetation<br>• Regrade areas that show signs of ponding and channelization<br>• Repair or replace structural components<br>• Repair damaged or eroded areas | • Provide or rehabilitate erosion control at the outlet<br>• Regrade and replace the channel materials<br>• Remove woody growth<br>• Stabilize or reconstruct eroded areas<br>• Treat invasive plants according to MassDOT Vegetation Management Plan |

Based on the results of the inspection, repairs will be made in accordance with MassDOT standard practices. Maintenance will be prioritized given the urgency of the required maintenance and availability of staff, contracts, etc. Maintenance may require contracting if existing contracts are unavailable to perform the work. More intensive remedial activities may require permitting and/or an engineering solution.

## 1.3 Erosion and Sediment Control Measures during Maintenance Activities

For maintenance activities that could result in discharges of sediments or other contaminants into wetlands, waterways, or other resource areas regulated under 310 CMR 10.00, the responsible maintenance personnel will employ measures to prevent migration of these sediments/contaminants. Such temporary measures may include, but are not necessarily limited to, the use of siltation barriers, catch basin silt sacks/filter bags, pipe plugs, cofferdams deployed within the stormwater structure, turbidity curtains, or other practices designed to prevent such discharges.

Where maintenance occurs in areas that are confined, with no risk of discharge to adjacent water bodies, no special measures may be needed. Examples include, but are not limited to: (1) cleaning of a forebay under dry conditions when the work can be completed and exposed surfaces stabilized prior to placing it back into service; and (2) catch basin cleaning where the activity is limited to removing material from a sump below the elevation of the outlet pipe.

## 1.4 O&M Budget

MassDOT performs maintenance for stormwater management systems as part of their routine operation and maintenance budget for roadways and bridges. Budgets are managed at the district level and vary by fiscal year, depending on funding sources.

## 4 Stormwater Management System Operation and Maintenance (O&M) Plan

# 2

# Long-Term Pollution Prevention Plan

This Long-Term Pollution Prevention Plan (LTPPP) describes the approach for pollution prevention and related maintenance activities for Deerfield Roundabout located in Deerfield MA. In general, long-term pollution prevention and related maintenance activities will be conducted consistent with:

- The National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer System (MS4),
- MassDOT's anticipated NPDES Transportation Separate Storm Sewer System (TS4) Permit, and
- Measures outlined in MassDOT's Stormwater Management Plan (SWMP).

This LTPPP satisfies the requirements related to pollution prevention under Massachusetts Stormwater Standards 4, 5, 6, and 10.

## 2.1 Practices for Long-Term Pollution Prevention

For the facilities covered, long-term pollution prevention includes the following measures.

- good housekeeping;
- storing materials and waste products inside or under cover;
- vehicle washing;
- routine inspections and maintenance of SCMs;
- spill prevention and response;
- maintenance of lawns, gardens, and other landscaped areas;
- storage and use of fertilizers, herbicides, and pesticides;
- pet waste management;
- operation and management of septic systems; and
- proper management of deicing chemicals and snow.

### 2.1.1 Litter Pick-up

MassDOT will conduct litter pick-up from the stormwater management facilities in conjunction with routine road maintenance activities.

### 2.1.2 Inspection and Maintenance of Stormwater Assets

MassDOT will conduct inspection and maintenance of drainage infrastructure and the stormwater control measures (SCMs) in accordance with the O&M Plan, as described in Section 1.

### 2.1.3 Maintenance of Landscaped Areas

Routine mowing will be conducted according to standard MassDOT practices. SCM basin bottoms and embankments designed to impound water should be mowed as required to prevent establishment of woody vegetation.

Except in rare circumstances, MassDOT does not use fertilizers, herbicides, and pesticides for the maintenance of facilities. Exceptions include using fertilizer to ensure the survival of new plantings and herbicides to control invasive plants. Use of fertilizers and herbicides is reviewed and approved by the MassDOT Landscape Design Section and District 2 Environmental Engineer prior to application. Local Conservation Commission review may also be required.

### 2.1.4 Snow and Ice Management

Snow and Ice Management will be conducted consistent with the practices outlined in the MassDOT Snow and Ice Control Program Environmental Status and Planning Report (ESPR), formerly known as the Snow and Ice Control Generic Environmental Impact Report (GEIR).

In accordance with the Snow and Ice Control ESPR, no sand is used on MassDOT properties for snow and ice control. The exception to this rule is within reduced salt areas where high sodium levels have been found in drinking water sources.

### 2.1.5 Street Sweeping

Routine highway cleaning, with a brush-type street sweeper, will be conducted in accordance with standard MassDOT practices. Sweeping will occur annually in the Spring.

### 2.1.6 Prohibition of Illicit Discharges

The MassDEP Stormwater Management Standard 10 prohibits illicit discharges to the stormwater management system. Illicit discharges are discharges that do not consist entirely of stormwater, except for certain specified non-stormwater discharges.

In accordance with the existing MS4 permit and anticipated TS4 permit requirements, examples of discharges from the following sources are not considered illicit discharges:

- Firefighting activities*
- Foundation drains
- Water line flushing
- Flows from riparian habitats/wetlands
- Potable water sources
- Dechlorinated swimming pool water

- Footing drains
- Landscape irrigation
- Individual residential car washing
- Uncontaminated groundwater
- Rising groundwater
- Diverted stream flows
- Street wash waters
- Wash water from residential buildings (no detergents)
- Condensation from air conditioning units
- Run-on from private driveways caused by precipitation
- Lawn watering
- Water from crawl space pumps

*Water from firefighting activities is allowed and need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

Based on plan review and confirmation in the field, there are no known or proposed illicit connections associated with Deerfield Roundabout. Should an interconnection to the stormwater management system be identified, the MassDOT PM will coordinate with the District Permits Engineer to confirm if the connections are authorized. For unauthorized connections, the MassDOT PM and/or MassDOT Environmental Services Section will investigate the connections and if they are determined to be illicit, the connections will be managed through MassDOT's Illicit Discharge Detection and Elimination (IDDE) program and/or through other agencies.

### 2.1.7 Spill Prevention and Response

Reportable quantities will immediately be reported to the applicable Federal, State, and local agencies as required by law. Reportable quantities of chemicals, fuels, or oils are established under the Clean Water Act and enforced through MassDEP. The MassDEP Emergency Response Program shall be immediately notified in accordance with required procedures for the report of a release (telephone (888) 304-1133).

MassDOT works with first responders and/or public water supply owners to determine the best approach to protect water supplies and provides training and materials to carry out action plans. In the case of a spill, applicable containment and clean-up procedures will be performed immediately. These procedures are implemented in accordance with the Unified Response Manual at the local level by first responders, which includes the Deerfield public safety departments (e.g., fire, police, public works, board of health). MassDOT will be on-site to aid with traffic control and to provide clean-up supplies, as necessary. Spill material collected during the response will be promptly removed and disposed of in accordance with Federal, State, and local requirements. If necessary, a licensed emergency response contractor will assist in cleanup of releases depending on the amount of the release and the ability of the responsible party to perform the required response.

# Illicit Discharge Compliance Statement

Per Standard 10 of the Massachusetts Stormwater Handbook, the following is an Illicit Discharge Compliance Statement:

The design plans submitted for the Notice of Intent have been designed in full compliance with current standards.

The Long-Term Pollution Prevention Plan is part of the Operation and Maintenance Plan and includes measures to prevent illicit discharges. There are no known combined sewer outfalls and to the best of our knowledge all closed stormwater systems within the project limits discharge per Massachusetts DEP requirements. Based on available known data the site does not contain any known existing illicit discharges.

Registered Professional Engineer Block and Signature


1/29/2026

Signature and Date

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**Signature:** Paula K. Simmons

**Email:** paula.simmons@dot.state.ma.us