

# Minuteman Bikeway Extension

Bedford, MA

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PREPARED FOR

Town of Bedford  
Department of Public Works  
314 Great Road  
Bedford, MA 01730

PREPARED BY



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# Stormwater Report Narrative

This Stormwater Report has been prepared to demonstrate compliance with the Massachusetts Stormwater Management Standards in accordance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) and Water Quality Certification Regulations (314 CMR 9.00).

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## Project Description

The Town of Bedford is proposing to extend the Minuteman Bikeway by constructing 1,665-feet of shared-use path along Railroad Avenue and constructing 8,800 feet of bikeway (the Project) on the Reformatory Branch Trail, from Railroad Avenue to approximately 250 feet west of Concord Road (the Project Limits). As a part of the Railroad Avenue reconstruction, sidewalks, bike accommodations, new drainage, pavement markings and signs and defined curb cuts will be constructed. The project also includes a concrete box culvert at Concord Road to provide a grade-separated crossing under the road, and three small porous pavement parking lots to access the bikeway at Railroad Avenue, Lavender Lane, and Concord Road.

Major components of the Project include the following work activities:

- Installing erosion and sedimentation controls;
- Tree trimming and clearing vegetation where needed;
- Earthwork – including excavating, filling and grading to obtain appropriate grades;
- Construction of paved Bikeway;
- Reconstruction of Railroad Ave, including new full depth pavement, sidewalk, shared-use path, and closed drainage system.
- Construction of three (3) porous pavement vehicular parking lots;
- Installation of wooden bicycle railing in various areas;
- Installation of benches, bike racks, picnic tables, and landscaping;
- Construction of a precast concrete box culvert at the Concord Road crossing and reconstruction of Concord Rd, including relocated utilities;
- Pedestrian traffic signal improvements at Railroad Ave/South St intersection;
- Rectangular Rapid Flashing Beacon pedestrian signals at Railroad Ave & Hartwell Road crossings.
- Construction of wetland replacement area; and
- Application of loam and seed to areas of disturbed earth.

The Bikeway will be open to pedestrians, joggers, bicyclists, rollerbladers and other non-motorized modes of travel. During winter months the Bikeway will not be plowed or maintained for snow and ice control and will be available for use by cross-country



skiing and snowshoeing. Uses of the Bikeway will be non-polluting and will not contribute contaminants to the Bikeway surface or to stormwater runoff from the Bikeway.

A stormwater collection system will not be installed along the Bikeway with the exception of isolated drainage swales in locations where the path is within an excavated area. There will be no inlets, basins, or outlets to manage stormwater. Stormwater will be maintained as a “country” drainage system with no curbing along the Bikeway. Stormwater will be allowed to sheet flow onto the adjacent vegetated areas for treatment and infiltration. An improvement stormwater collection system will be provided on Railroad Ave and Commercial Ave to improve stormwater runoff capture efficiency and capacity of the drainage system to eliminate existing flooding issues. Deep sump hooded catch basins will be provided within the roadways to provide sediment and pollutant treatment.

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## Site Description

The Reformatory Branch Trail is currently unpaved and does not provide safe crossings at Hartwell Avenue or Concord Road. In some portions, the trail is overgrown with vegetation, leaving only a narrow-beaten path. The width of Railroad Avenue varies between 20 and 27 feet, the pavement condition is poor, and although it’s in close proximity to the Bedford High School, only provides intermittent sidewalk. A substandard curve near the entrance of the bike path requires speed advisory signs, substandard drainage causes ponding in several areas, and undefined curb cuts result in parking along the layout line. The existing Minuteman Bikeway is used as a transportation corridor for regional commuters as well as local residents. Extending the bikeway to Concord Road will provide on-road links along Railroad Avenue, and off-road links to Hartwell Road and Concord Road (Route 62) in addition to providing access to the schools and connecting the Mary Putnam Webber 20-acre wildlife preserve, the 19-acre Elm Brook Conservation Area and the 15-acre Dellovo Conservation Area. Existing trails through these conservation areas are part of a network of trails that also meander through MassPort properties near the Concord town line south of the trail extension.

According to the regional Natural Resources Conservation Service (NRCS) soil survey, the most dominant hydrologic soil type within the Project limits is HSG A, with additional areas of HSG B, C, & D<sup>1</sup>. The majority of the Project limits are located within a Zone II Wellhead Protection area<sup>2</sup>. The Project is not located within an Outstanding Resource Water (ORW)<sup>3</sup> or Area of Critical Environmental Concern.

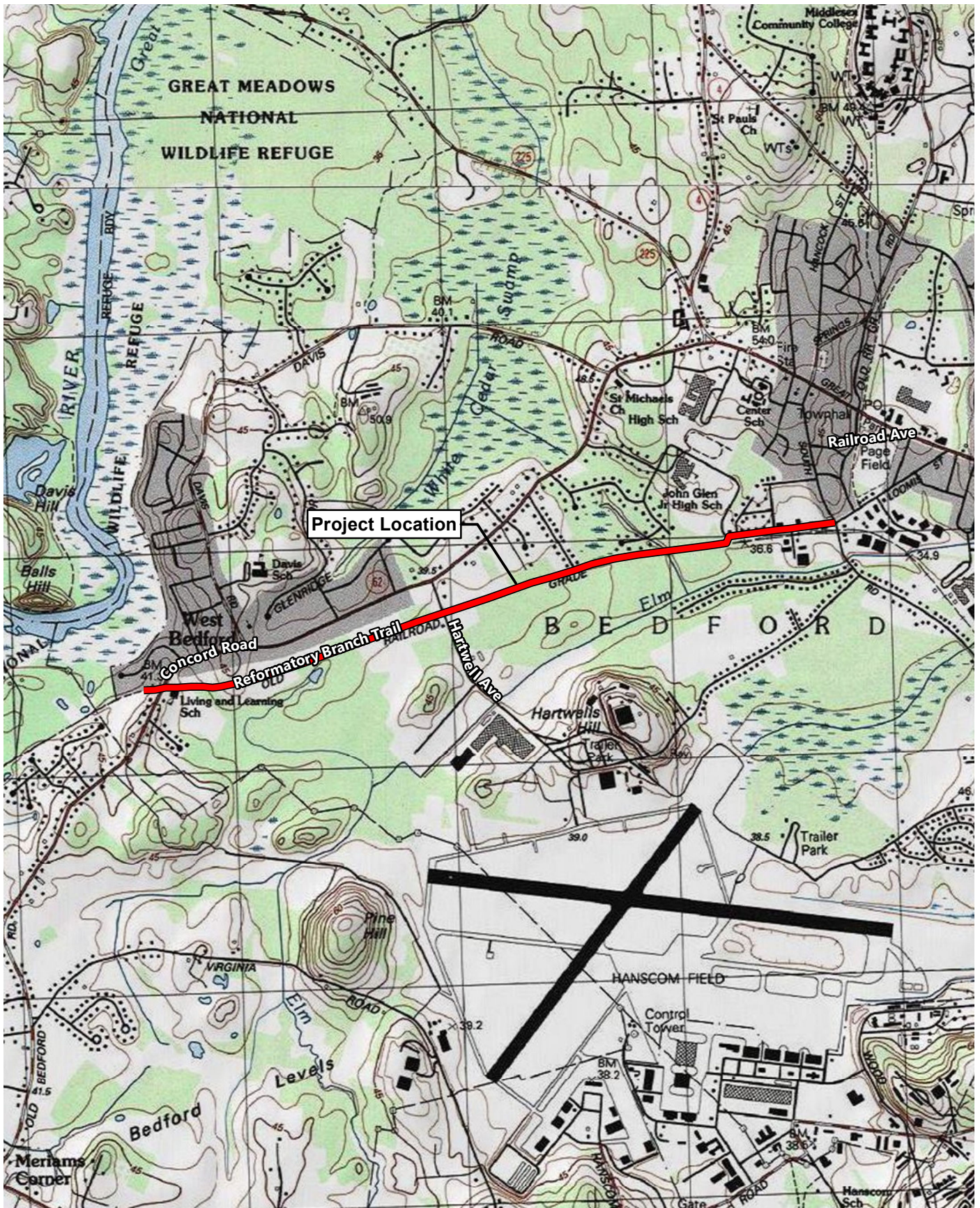
For information regarding the wetland resource areas present on the site see the Project Notice of Intent prepared by VHB dated January 2022.

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<sup>1</sup> USDA Natural Resources Conservation Service, 2019. *Web Soil Survey Middlesex County, Massachusetts. See Map in Appendix B.*

<sup>2</sup> See Zone II Protection Area Map in Appendix B.

<sup>3</sup> DEP, 1993. *Designated Outstanding Resource Waters of Massachusetts.*



Project Location

Concord Road  
Reformatory Branch Trail  
Hartwell Ave



Minuteman Bikeway Extension Bedford, MA

Figure 1 - Project Site Locus  
Source Info: USGS

 Project Alignment



# Regulatory Compliance

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## Massachusetts Department of Environmental Protection (DEP) - Stormwater Management Standards

Under the Stormwater Management Standards, the Project is considered a bike path and shall comply with the standards to the maximum extent practicable. The roadway reconstruction portion of the project is considered to be redevelopment and shall also comply to the maximum extent practicable. The following lists the Stormwater Management Standards, and how the project demonstrates compliance with each.

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### Standard 1: No New Untreated Discharges or Erosion to Wetlands

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

The Project has been designed to fully comply with Standard 1.

No new stormwater conveyances (outfalls) will be created by this Project.

All proposed Project stormwater outlets and conveyances have been designed to not cause erosion or scour to wetlands or receiving waters. Outlets from closed drainage systems have been designed with stone protection to dissipate discharge velocities.

Supporting information is included in Appendix C.

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### 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.*

The Project has been designed to comply to the maximum extent practicable with Standard 2.

Approximately 3.4 acres of new impervious area will be created by the Project over the length of the Project site. All runoff from impervious areas from the Bikeway will be directed to adjacent vegetated areas for infiltration. Any increase in runoff from the



Bikeway will be minimal and will not have a measurable effect on peak discharge rates. There will be opportunity for infiltration in the soils along the Bikeway.

Runoff from the parking lots will be collected within the reservoir course of the porous pavement and allowed to infiltrate. Increase in runoff from the existing compacted gravel parking areas is anticipated to be minimal will not have a measurable effect on peak discharge rates.

Runoff from the roadway surfaces on Railroad Ave, Commercial Ave, and Concord Rd will be collected in a closed drainage system similar to existing conditions. No change in peak discharge rates is anticipated.

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### **Standard 3: Stormwater Recharge**

*Loss of annual recharge to ground water 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.*

The Project has been designed to comply to the maximum extent practicable with Standard 3.

In accordance with the Stormwater Handbook, based on the net impervious area of 3.40 acres for the entire project (consisting of predominantly HSG Type A soils, as well as small areas of HSG Typs B, C, & D), the Required Recharge Volume for the Project is 6,419 cubic feet.

Recharge of stormwater has been provided through the proposed porous pavement parking lots at various locations along the Bikeway. The total provided recharge volume from the storage within the porous pavement reservoir course is 4,344 cubic feet, which meets the required volume to the maximum extent practicable.

Stormwater runoff from the proposed Bikeway path surface will discharge to adjacent pervious vegetated slope and vegetated swale areas. Infiltration will continue in these adjacent pervious areas.

Computations and supporting information, including the Required Recharge Volume are included in Appendix C. The Hydrologic Soils Group Map for the project site is included in Appendix B.



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## Standard 4: Water Quality

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

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

*Full compliance for any component that is not a redevelopment.*

*Full compliance with the long-term pollution plan requirement for new developments and redevelopments.*

The Bikeway has been designed with a "country" drainage system; i.e. without curbs. Stormwater will be allowed to sheet flow onto adjacent pervious areas for treatment and infiltration. This is a Low Impact Design technique and uses the adjacent vegetated areas to filter and treat stormwater runoff in sheet flow. Furthermore, pedestrians and bicyclists using the paths will not contribute the contaminants to the path surfaces. Therefore, there will be little or no nutrients or contaminants on the path surface to be washed off with stormwater runoff. Runoff will be considered clean and not in need of treatment.

For the proposed parking areas that contribute pollutant loading, Water Quality treatment has been provided through the use of porous pavement. The proposed porous pavement BMPs have been designed to provide 80% TSS removal and have been sized based on a 1" water quality volume for locations within the surrounding Zone II Wellhead Protection area, and size base on a 0.5" water quality volume elsewhere. Due to the nature of the Project and the limited ROW, 44% pretreatment is not achieved prior to infiltration.

Computations and supporting information are included in Appendix C. The Long-Term Pollution Prevention Plan included in Appendix D.

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

*For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt and stormwater runoff, the proponent shall use the specific stormwater BMPs determined by the Department to be suitable for such use as provided in the Massachusetts Stormwater Handbook. Stormwater*



*discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00. Full compliance for any component that is not a redevelopment. Full compliance with pollution prevention requirements for new developments and redevelopments.*

The Project is not identified as a Land Use of Higher Potential Pollutant Load (LUHPPL).

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## **Standard 6: Critical Areas**

*Stormwater discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or any other critical area require the use of the specific source control and pollution prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, 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 or Special Resource Waters shall be set back from the receiving water 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 the public water supply. Full compliance for component of project that is not a redevelopment. Full compliance with pollution prevention requirements for new developments and redevelopments.*

The Project has been designed to comply to the maximum extent practicable with Standard 6.

In proposed areas that contribute pollutant loading, such as the proposed Bikeway parking lots, Water Quality has been provided through the use of porous pavement. Most of the Project is within a Zone II Wellhead Protection Area and the BMPs within this area have been sized based on a 1" water quality volume. Due to the nature of the Project and the limited ROW, 44% pretreatment is not achieved prior to infiltration.

In the portion of the Concord Rd reconstruction that falls within the Zone II Wellhead Protection Area is considered to be redevelopment, and compliance has been met to the maximum extent practicable. Deep sump hooded catch basins will be proposed to collect stormwater runoff where proposed curbing is installed and the existing "country" drainage system will be maintained elsewhere.

Supporting calculations and information is included in Appendix C. A map showing the limits of the Zone II Wellhead Protection Area is included in Appendix B. The



proposed source controls and pollution prevention measures that have been identified in the Long-Term Pollution Prevention Plan in Appendix D.

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### **Standard 7: Redevelopments and Other Projects Subject to the Standards only to the Maximum Extent Practicable**

*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 stormwater 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 Project has been designed to comply with all ten of the Stormwater Management Standards.

Refer directly to each Standard for applicable computations and supporting information demonstrating compliance with each.

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### **Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls**

*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), must be developed and implemented.*

*All redevelopment projects shall fully comply with Standard 8.*

The Project will disturb approximately 9.8 acres of land and is therefore required to obtain coverage under the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit. As required under this permit, a Stormwater Pollution Prevention Plan (SWPPP) will be developed and submitted before land disturbance begins.

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### **Standard 9: Operation and Maintenance Plan**

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

*All redevelopment projects shall fully comply with Standard 9.*

The Town of Bedford has developed a long-term operations and maintenance plan for the roadway facilities it owns and operates. The Operation and maintenance of this portion of Railroad Ave, Commercial Ave, Concord Rd, and the Minuteman Bikeway will be conducted in compliance with the existing maintenance plan.



In compliance with Standard 9, a Post Construction Stormwater Operation and Maintenance (O&M) Plan has been developed for the Project. The O&M Plan is included in Appendix D as part of the Long Term Pollution Prevention Plan.

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### **Standard 10: Prohibition of Illicit Discharges**

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

Any illicit connections to sanitary sewer or storm drainage structures found in the project limit of work will be removed or incorporated into the project. The design plans submitted with this report have been designed so that the components included therein are in full compliance with current standards. No statement is made with regard to the drainage system in portions of the site not included in the redevelopment project area. The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges.

#### **Attachments:**

- Appendix A – Stormwater Checklist
- Appendix B – Hydrologic Soils Group Map and Zone II Wellhead Protection Area Map
- Appendix C – Stormwater Calculations
- Appendix D – Operation and Maintenance Plan & Long Term Pollution Prevention Plan



# Attachment A

## Stormwater Checklist





# 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.<sup>1</sup> 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<sup>2</sup>
- 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.

<sup>1</sup> 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.

<sup>2</sup> 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.



# 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.

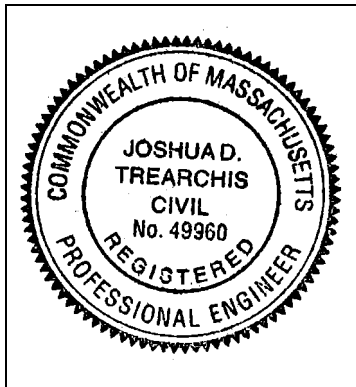
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that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



1/26/2022

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

**The proposed roadway reconstruction of Railroad Ave, Commercial Ave, and Concord Rd are considered Redevelopment. The propose Bikeway and access parking lot are considered New Development.**



# Checklist for Stormwater Report

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## 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): Porous Pavement

### 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

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## 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<sup>1</sup>
- 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.

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<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



# Checklist for Stormwater Report

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## 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. **To the maximum extent**



# Checklist for Stormwater Report

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## 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 proprietary 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) – (N.A.)

- 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 Memorandum & NOI.



# Checklist for Stormwater Report

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## 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

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## 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~~; **included within the Stormwater Management Report.**
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.



## Attachment B


# Hydrologic Soils Group Map and Zone II Wellhead Protection Area Map





## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons





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

#### Soil Rating Lines


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

#### Soil Rating Points






 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Middlesex County, Massachusetts  
 Survey Area Data: Version 21, Sep 2, 2021

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

Date(s) aerial images were photographed: Aug 31, 2020—Oct 22, 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.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		6.5	0.6%
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	A/D	33.2	3.3%
8A	Limerick silt loam, 0 to 3 percent slopes, frequently flooded	B/D	11.0	1.1%
32B	Wareham loamy fine sand, 0 to 5 percent slopes	A/D	68.6	6.8%
36A	Saco mucky silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded	B/D	24.5	2.4%
51A	Swansea muck, 0 to 1 percent slopes	B/D	84.9	8.4%
52A	Freetown muck, 0 to 1 percent slopes	B/D	49.6	4.9%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	5.2	0.5%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	15.9	1.6%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	B	3.4	0.3%
253B	Hinckley loamy sand, 3 to 8 percent slopes	A	4.5	0.4%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	18.1	1.8%
255B	Windsor loamy sand, 3 to 8 percent slopes	A	10.1	1.0%
256A	Deerfield loamy fine sand, 0 to 3 percent slopes	A	261.9	26.0%
256B	Deerfield loamy fine sand, 3 to 8 percent slopes	A	7.3	0.7%
259A	Carver loamy coarse sand, 0 to 3 percent slopes	A	2.5	0.2%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	B	5.8	0.6%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	3.3	0.3%
315B	Scituate fine sandy loam, 3 to 8 percent slopes	D	1.0	0.1%
320B	Birchwood fine sandy loam, 3 to 8 percent slopes	A/D	14.7	1.5%
420C	Canton fine sandy loam, 8 to 15 percent slopes	B	4.0	0.4%
602	Urban land		87.3	8.7%
623C	Woodbridge-Urban land complex, 3 to 15 percent slopes	C/D	12.1	1.2%
624B	Haven-Urban land complex, 0 to 8 percent slopes	A	43.7	4.3%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	184.6	18.4%
629C	Canton-Charlton-Urban land complex, 3 to 15 percent slopes	A	19.5	1.9%
653	Udorthents, sandy		4.2	0.4%
654	Udorthents, loamy		10.3	1.0%
655	Udorthents, wet substratum		2.7	0.3%
656	Udorthents-Urban land complex		4.8	0.5%
<b>Totals for Area of Interest</b>			<b>1,005.6</b>	<b>100.0%</b>

## Description

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

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

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

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

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

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

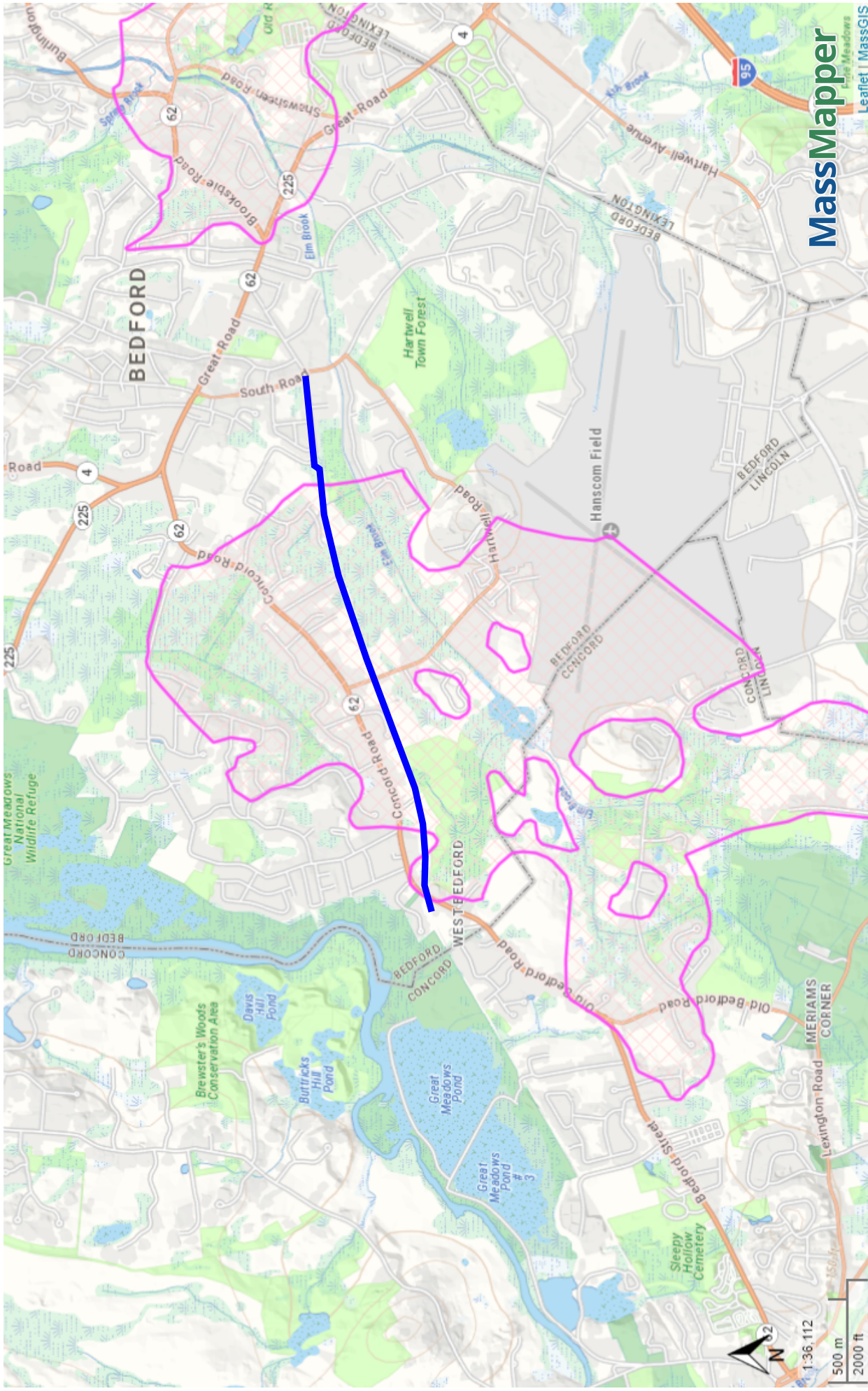
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher



Minuteman Bikeway Extension Bedford, MA

## Zone II Wellhead Protection Map

Project Location



Zone II Wellhead Protection Area





# Attachment C

## Stormwater Calculations



# Stone Apron Sizing at Stormwater Outfalls

HW 73 stone

Structure type: Culvert Outlet Protection

Parameter	Value	Units	Notes
Select Channel	24in pipe to HW 73 Channel Calculator...		
Design Flow	8.810	dfs	
Channel Depth	1.219	ft	
Slope	0.003	ft/ft	
Bottom Width	0.000	ft	
Area	2.006	ft^2	
Top Width	1.951	ft	
Wetted Perimeter	3.584	ft	
Hydraulic Radius	0.560	ft	
<b>Input Parameters</b>			
	Transfer Values From Channel ...		
Flow	8.810	dfs	
Culvert Diameter	2.000	ft	
Normal Depth in Culvert	1.219	ft	
Tailwater Depth	0.800	ft	If tailwater is unknown, use 0.4D
Flow Type	subcritical		
<b>Results</b>			
D50	2.141	in	
D50	0.178	ft	The sizing equation assumes a rock s.g.=2.65. If s.g. is not 2.65, rock size (D50) should be adjusted inversely using the actual s.g.
Riprap Shape	Riprap shape should be angular		
<b>Riprap Class</b>			
Riprap Class Name	CLASS I		
Riprap Class Order	1		
D15	4.50	in	This value is an 'average' of the size fraction range for the selected riprap class
D50	6.50	in	This value is an 'average' of the size fraction range for the selected riprap class
D85	9.00	in	This value is an 'average' of the size fraction range for the selected riprap class
D100	12.00	in	This value is an 'average' of the size fraction range for the selected riprap class
<b>Layout</b>			
Apron Length	8.000	ft	
Apron Thickness	1.896	ft	
Apron Width (at apron end)	11.333	ft	
<b>Computation Variables</b>			
Tailwater Depth Used in Computations	0.800	ft	
Culvert Diameter Used in Calculations	2.000	ft	

# Stone Apron Sizing at Stormwater Outfalls

Stone at FES 139

Structure type: Culvert Outlet Protection

Parameter	Value	Units	Notes
Select Channel	RR Ave Outlet		
	Channel Calculator...		
Design Flow	1.090	cfs	
Channel Depth	0.380	ft	
Slope	0.010	ft/ft	
Bottom Width	0.000	ft	
Area	0.273	ft^2	
Top Width	0.971	ft	
Wetted Perimeter	1.327	ft	
Hydraulic Radius	0.206	ft	
<b>Input Parameters</b>			
	Transfer Values From Channel ...		
Flow	1.090	cfs	
Culvert Diameter	1.000	ft	
Normal Depth in Culvert	0.380	ft	
Tailwater Depth	0.400	ft	If tailwater is unknown, use 0.4D
Flow Type	subcritical		
<b>Results</b>			
D50	0.665	in	
D50	0.055	ft	The sizing equation assumes a rock s.g.=2.65. If s.g. is not 2.65, rock size (D50) should be adjusted inversely using the actual s.g.
Riprap Shape	Riprap shape should be angular		
<b>Riprap Class</b>			
Riprap Class Name	CLASS I		
Riprap Class Order	1		
D15	4.50	in	This value is an 'average' of the size fraction range for the selected riprap class
D50	6.50	in	This value is an 'average' of the size fraction range for the selected riprap class
D85	9.00	in	This value is an 'average' of the size fraction range for the selected riprap class
D100	12.00	in	This value is an 'average' of the size fraction range for the selected riprap class
<b>Layout</b>			
Apron Length	4.000	ft	
Apron Thickness	1.896	ft	
Apron Width (at apron end)	5.667	ft	
<b>Computation Variables</b>			
Tailwater Depth Used in Computations	0.400	ft	
Culvert Diameter Used in Calculations	1.000	ft	

# Stone Apron Sizing at Stormwater Outfalls

Stone at FES 135 & 143

Structure type: Culvert Outlet Protection

Parameter	Value	Units	Notes
<b>Channel Parameters</b>			
Select Channel	18" Single Channel Calculator ...		
Design Flow	2.921	cfs	
Channel Depth	0.494	ft	
Slope	0.012	ft/ft	
Bottom Width	0.000	ft	
Area	0.507	ft^2	
Top Width	1.410	ft	
Wetted Perimeter	1.834	ft	
Hydraulic Radius	0.277	ft	
<b>Input Parameters</b>			
	Transfer Values From Channel ...		
Flow	2.921	cfs	
Culvert Diameter	1.500	ft	
Normal Depth in Culvert	0.158	ft	
Tailwater Depth	0.600	ft	If tailwater is unknown, use 0.4D
Flow Type	subcritical		
<b>Results</b>			
D50	0.962	in	
D50	0.080	ft	The sizing equation assumes a rock s.g.=2.65. If s.g. is not 2.65, rock size (D50) should be adjusted inversely using the actual s.g.
Riprap Shape	Riprap shape should be angular		
<b>Riprap Class</b>			
Riprap Class Name	CLASS I		
Riprap Class Order	1		
D15	4.50	in	This value is an 'average' of the size fraction range for the selected riprap class
D50	6.50	in	This value is an 'average' of the size fraction range for the selected riprap class
D85	9.00	in	This value is an 'average' of the size fraction range for the selected riprap class
D100	12.00	in	This value is an 'average' of the size fraction range for the selected riprap class
<b>Layout</b>			
Apron Length	6.000	ft	
Apron Thickness	1.896	ft	
Apron Width (at apron end)	8.500	ft	
<b>Computation Variables</b>			
Tailwater Depth Used in Computations	0.600	ft	
Culvert Diameter Used in Calculations	1.500	ft	



## Groundwater Recharge Calculations

<b>Project Name:</b> Minuteman Bikeway Extension	<b>Proj. No.:</b> 9393.01
	<b>Date:</b> 1/10/2022
<b>Project Location:</b> Bedford, MA	<b>Calculated by:</b> JDT

### Proposed Impervious Surface Summary

#### Net Proposed Impervious Areas by Hydrologic Soil Group (HSG) in acres

Area	HSG A	HSG B	HSG C	HSG D	Total Area
Railroad Ave	0.00	0.00	0.00	0.33	<b>0.33</b>
Commercial Ave	0.00	0.00	0.00	0.00	<b>0.00</b>
Concord Rd	0.00	0.00	0.00	0.00	<b>0.00</b>
Bikeway & Parking Lots	2.69	0.25	0.13	0.00	<b>3.07</b>
<b>TOTAL</b>	<b>2.69</b>	<b>0.25</b>	<b>0.13</b>	<b>0.33</b>	<b>3.40</b>

### Required Recharge Volume (Cubic Feet)

HSG	Area (acres)	Recharge Depth* (in.)	Required Volume (c.f.)
<b>A</b>	2.69	0.60	5,859
<b>B</b>	0.25	0.35	323
<b>C</b>	0.13	0.25	118
<b>D</b>	0.33	0.10	120
<b>Total</b>	<b>3.40</b>		<b>6,419</b>

\* Massachusetts DEP Infiltration requirement: HSG A = 0.60 in; HSG B = 0.35 in; HSG C = 0.25 in; HSG D = 0.10 in.

### Provided Recharge Volume (Cubic Feet)

BMP	Imperv. Area (acres)	Volume** (c.f.)
Railroad Ave Parking Lot Lavender Lane	0.09	1,005
Parking Lot Concord Rd	0.17	2,004
Parking Lot	0.11	1,325
<b>Total</b>	<b>0.37</b>	<b>4,334</b>

\*\*Provided Volume = Reservoir Course Storage = Area x 8" Depth x 40% Voids









## Water Quality Volume Calculations

**Project Name:** Minuteman Bikeway  
Extension

**Proj. No.:** 9393.01

**Date:** 1/10/2022

**Project Location:** Bedford, MA

**Calculated by:** JDT

### Required Water Quality Volume (Cubic Feet)

<b>BMP</b>	<b>Impervious Area</b> (acres)	<b>WQV Depth*</b> (in.)	<b>Required Volume</b> (c.f.)	<b>Provided Volume</b> (c.f.)
<b>Railroad Ave Parking Lot</b>	0.09	0.5	156	1,005
<b>Lavender Lane Parking Lot</b>	0.17	1.0	628	2,004
<b>Concord Rd Parking Lot</b>	0.11	1.0	414	1,325
	<b>0.37</b>		<b>1,198</b>	<b>1,325</b>

Assumptions:

\* Lavender Lane & Concord Rd parking lots are located within a Zone II Wellhead Protection Area, and therefore are required to treat a WQV of 1"



VHB, Inc.  
 101 Walnut Street  
 Post Office Box 9151  
 Watertown, MA 02471  
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# TSS Removal Calculation Worksheet

Project Name: **Minuteman Bikeway Extensio**  
 Project Number: **09393.01**  
 Location: **Bedford, MA**  
 Discharge Point: \_\_\_\_\_  
 Drainage Area(s): **Parking Lots**

Sheet: **1 of 2**  
 Date: **10-Jan-2022**  
 Computed by: **JDT**  
 Checked by: \_\_\_\_\_

A	B	C	D	E
BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Porous Pavement	80%	1.00	0.80	0.20
	0%	0.20	0.00	0.20
	0%	0.20	0.00	0.20
	0%	0.20	0.00	0.20
	0%	0.20	0.00	0.20

\* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.

\*\* Equals remaining load from previous BMP (E)

**Treatment Train  
 TSS Removal =**

80%
-----



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## TSS Removal Calculation Worksheet

Project Name: **Minuteman Bikeway Extensio**  
 Project Number: **09393.01**  
 Location: **Bedford, MA**  
 Discharge Point: \_\_\_\_\_  
 Drainage Area(s): **Roadway Surfaces**

Sheet: **2 of 2**  
 Date: **10-Jan-2022**  
 Computed by: **JDT**  
 Checked by: \_\_\_\_\_

A	B	C	D	E
BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	25%	1.00	0.25	0.75
	0%	0.75	0.00	0.75
	0%	0.75	0.00	0.75
	0%	0.75	0.00	0.75
	0%	0.75	0.00	0.75

\* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.

\*\* Equals remaining load from previous BMP (E)

**Treatment Train  
 TSS Removal =**

<b>25%</b>
------------



## Attachment D

# Long Term Pollution Prevention Plan



# **Minuteman Bikeway Extension Stormwater Management System**

## **Operation and Maintenance Plan (O&M) and Long Term Pollution Prevention Plan (LTPPP)**

**January 2022**

This Stormwater Management System Operation and Maintenance Plan provides for the inspection and maintenance of structural Best Management Practices (BMPs) and for measures to prevent pollution associated with the Stormwater Management System on the Minuteman Bikeway Extension.

This document has been prepared in accordance with the requirements of the Stormwater Regulations included in the Massachusetts Wetlands Protection Act Regulations (310 CMR 10).

### **Responsible Party**

Town of Bedford Department of Public Works (DPW) will be responsible for the maintenance of the Bikeway facility and associated stormwater management features.

### **Maintenance Measures**

The following maintenance program is recommended to ensure the continued effectiveness of the water quality controls previously described. The long term stormwater maintenance will be conducted by the Town of Bedford Department of Public Works.

#### Pavement Systems

- Vacuum porous pavement parking areas at least two times per year with a commercial cleaning unit and properly dispose of removed material.
- More frequent maintenance of porous pavement surfaces will result in less sediment that will clog the pavement voids and underlying stone substrata.
- De-icing of the path surface and adjacent roadway and/or sidewalks shall comply with the Bedford DPW standards.

### Deep Sump and Hooded Catch Basins

- All catch basins are recommended to be inspected and cleaned at least twice per year.
- Sediment (if more than six inches deep) and/or floatable pollutants shall be pumped from the basin and disposed of at an approved offsite facility in accordance with all applicable regulations.
- Cleaning of the structures shall take place in the event an inadvertent spill or incident causes a larger than normal accumulation of pollutants.
- Any structural damage or other indication of malfunction will be reported to the stormwater manager and repaired as necessary.
- During colder periods, the catch basin grates must be kept free of snow and ice.
- During warmer periods, the catch basin grates must be kept free of leaves, litter, sand, and debris.

### Stormwater Outfalls

- Inspect outfall locations monthly for the first three months after construction to ensure proper functioning and correct any areas that have settled or experienced washouts.
- Inspect outfalls annually after initial three-month period.
- Annual inspections should be supplemented after large storms, when washouts may occur.
- Maintain vegetation around outfalls to prevent blockages at the outfall.
- Maintain stone protection below each outfall and replace any washouts.
- Remove and dispose of any trash or debris at the outfall.

### Vegetated Areas Maintenance

Although not a structural component of the drainage system, the maintenance of vegetated areas may affect the functioning of stormwater management practices. This includes the health/density of vegetative cover and activities such as the application and disposal of lawn and garden care products, disposal of leaves and yard trimmings.

- Inspect planted areas on a semi-annual basis and remove any litter.
- Maintain planted areas adjacent to pavement to prevent soil washout.
- Immediately clean any soil deposited on pavement.
- Re-seed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- Plant alternative mixture of grass species in the event of unsuccessful establishment.
- No dumping of any debris or leaves and grass clippings into the basin areas shall be allowed.
- Fertilizer usage should be avoided. If deemed necessary, only low nitrogen fertilizer shall be allowed and shall be used in moderation. Fertilizer may be used to begin the establishment of vegetation in bare or damaged areas, but should not be applied on a regular basis.

## **Practices for Long Term Pollution Prevention**

In general, long term pollution prevention and related maintenance activities will be conducted consistent with Town of Bedford's NPDES Stormwater MS4 Permit(s), and the measures outlined in the Stormwater Management Plans (SWMP).

For the facilities covered by this Operation and Maintenance Plan, long term pollution prevention includes the following measures:

### Litter Pick-up

The Town of Bedford DPW will conduct litter pick-up from the stormwater management facilities in conjunction with routine maintenance activities.

### Routine Inspection and Maintenance of Stormwater BMPs

The Town of Bedford DPW will conduct inspection and maintenance of the stormwater management practices in accordance with the guidelines discussed above.

### Spill Prevention and Response

The Town of Bedford DPW will implement response procedures for releases of significant materials such as fuels, oils, or chemical materials onto the ground or other areas that could reasonably be expected to discharge to surface or groundwater.

- Reportable quantities will immediately be reported to the applicable Federal, State, and local agencies as required by law. The applicable DCR office should also be notified.
- Applicable containment and cleanup procedures will be performed immediately. Impacted material collected during the response must be removed promptly and disposed of in accordance with Federal, State, and local requirements. A licensed emergency response contractor may be required to assist in cleanup of releases depending on the amount of the release and the ability of the responsible party to perform the required response.
- Reportable quantities of chemical, fuels, or oils are established under the Clean Water Act and enforced through DEP.

### Maintenance of Landscaped Areas

Routine mowing should be conducted. As indicated in the attached O&M table, embankments designed to impound water should be mowed as required to prevent establishment of woody vegetation.

The use of fertilizers, herbicides, and pesticides for the maintenance of facilities will be minimized under this plan. Any use of fertilizers, herbicides, or pesticides shall be reviewed and approved by the applicable agencies prior to application. Local Conservation Commission review may also be required.

Snow and Ice Management

Snow and Ice Management shall be conducted consistent with the Town of Bedford DPW standard practices.

Prohibition of Illicit Discharges

The DEP Stormwater Management Standards prohibit illicit discharges to the storm water management system. Illicit discharges are discharges that do not entirely consist of stormwater, except for certain specified non-stormwater discharges.

Discharges from the following activities are not considered illicit discharges:

- |   |   |
|---|---|
| firefighting                              | foundation drains                         |
| water line flushing                       | footing drains                            |
| landscape irrigation                      | individual resident car washing           |
| uncontaminated groundwater                | flows from riparian habitats and wetlands |
| potable water sources                     | dechlorinated water from swimming pools   |
| water used to clean residential buildings | water used for street washing             |
| without detergents                        | air conditioning condensation             |

There are no known or proposed illicit connections associated with this project. If a potential illicit discharge to the facilities covered by this plan is detected (e.g., dry weather flows at any pipe outlet, evidence of contamination of surface water discharge by non-stormwater sources), the Town of Bedford DPW shall be notified for resolution through the Town's IDDE program.

**Appendix: Best Management Practices: Operation & Maintenance Measures**

<b>Best Management Practice</b>	<b>Sweep</b>	<b>Mow</b>	<b>Inspect</b>	<b>Clean / Vacuum</b>	<b>Repair</b>
Vegetated Swales	N/A	Mow swales as needed	Annually	ANI	ANI
Porous Pavement	N/A	N/A	Twice Annually	Twice Annually	ANI
Deep Sump Hooded Catch Basins	N/A	N/A	Annually	Twice Annually	ANI

ANI= As needed based on inspection