

**Year 4 Annual Report**  
**Massachusetts Small MS4 General Permit**  
**Reporting Period: July 1, 2021-June 30, 2022**

*\*\*Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form\*\**

*Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed. Please ONLY report on activities between July 1, 2021 and June 30, 2022 unless otherwise requested.*

**Part I: Contact Information**

Name of Municipality or Organization:

EPA NPDES Permit Number:

**Primary MS4 Program Manager Contact Information**

Name:

Title:

Street Address Line 1:

Street Address Line 2:

City:

State:

Zip Code:

Email:

Phone Number:

**Stormwater Management Program (SWMP) Information**

SWMP Location (web address):

Date SWMP was Last Updated:

If the SWMP is not available on the web please provide the physical address:

## Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found [here](#):

<b>Impairment(s)</b>			
<input checked="" type="checkbox"/> Bacteria/Pathogens	<input type="checkbox"/> Chloride	<input type="checkbox"/> Nitrogen	<input checked="" type="checkbox"/> Phosphorus
<input checked="" type="checkbox"/> Solids/ Oil/ Grease (Hydrocarbons)/ Metals			
<b>TMDL(s)</b>			
<i>In State:</i>	<input type="checkbox"/> Assabet River Phosphorus	<input checked="" type="checkbox"/> Bacteria and Pathogen	<input type="checkbox"/> Cape Cod Nitrogen
	<input checked="" type="checkbox"/> Charles River Watershed Phosphorus	<input type="checkbox"/> Lake and Pond Phosphorus	
<i>Out of State:</i>	<input type="checkbox"/> Bacteria/Pathogens	<input type="checkbox"/> Metals	<input type="checkbox"/> Nitrogen
			<input type="checkbox"/> Phosphorus
<a href="#">Clear Impairments and TMDLs</a>			

Next, check off all requirements below that have been completed. **By checking each box you are certifying that you have completed that permit requirement fully.** If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.

### Year 4 Requirements

- ☐ Developed a report assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover, made it available as part of the SWMP, and:

- ☐ No updates were recommended
- ☐ Updates were recommended. The anticipated date or date of completion for updates is/was:

- ☐ Developed a report assessing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist, made it available as part of the SWMP, and:

- ☐ No updates were recommended
- ☐ Updates were recommended. The anticipated date or date of completion for updates is/was:

- ☒ Identified a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious cover

*Optional:* If you would like to describe progress made on any incomplete requirements listed above, provide an update on previous incomplete milestones, or provide any additional details, please use the box below:

*The assessments of local guidelines and regulations for street design, parking lots and green infrastructure were not completed in PY4 due to budget restrictions. The code assessment report(s) will be completed in PY5.*



Annual Requirements

- ☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements
- ☒ Kept records relating to the permit available for 5 years and made available to the public
- ☐ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented
  - ☒ This is not applicable because we do not have sanitary sewer
  - ☐ This is not applicable because we did not find any new SSOs
  - ☐ The updated SSO inventory is attached to the email submission
  - ☐ The updated SSO inventory can be found at the following website:
- ☒ Updated system map due in year 2 as necessary
- ☒ Provided training to employees involved in IDDE program within the reporting period
- ☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters
- ☒ All curbed roadways were swept at least once within the reporting period
- ☒ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- ☒ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- ☒ Updated inventory of all permittee owned facilities as necessary
- ☒ O&M programs for all permittee owned facilities have been completed and updated as necessary
- ☒ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs
- ☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- ☐ Inspected all permittee owned treatment structures (excluding catch basins)

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

*As of PY4 there were no permittee-owned treatment structures. In PY5 the Town began construction on its first BMP at Town Hall.*

**Bacteria/ Pathogens** (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)Annual Requirements*Public Education and Outreach\**

- ☒ Annual message was distributed encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☒ Permittee or its agents disseminated educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time
- ☒ Provided information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

*\* Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

## **Phosphorus** (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

### Annual Requirements

#### *Public Education and Outreach\**

- ☒ Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers
- ☒ Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☒ Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

*\* Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

#### *Good Housekeeping and Pollution Prevention for Permittee Owned Operations*

- ☐ Increased street sweeping frequency of all municipal owned streets and parking lots subject to Permit part 2.3.7.a.iii.(c) to a minimum of two times per year (spring and fall)

#### *Phosphorus Source Identification Report*

- ☒ Completed the Phosphorus Source Identification Report
  - ☒ The Phosphorus Source Identification Report is attached to the email submission
  - ☐ The Phosphorus Source Identification Report can be found at the following website:

#### *Potential structural BMPs*

- ☐ Any structural BMPs already existing or installed in the regulated area by the permittee or its agents was tracked and the phosphorus removal by the BMP was estimated consistent with Attachment 3 to Appendix F. The BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated phosphorus removed in mass per year by the BMP were documented.

- ☐ The BMP information is attached to the email submission
- ☐ The BMP information can be found at the following website:

*The Town is in the process of constructing its first municipally-owned stormwater treatment structure at Town Hall. The system will be tracked starting in PY5.*



*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:



*The Town sweeps all municipal street and parking areas once per year. Due to staffing shortages a second sweeping was not feasible. No sand is used for winter deicing.*

## **Solids, Oil and Grease (Hydrocarbons), or Metals**

### Annual Requirements

#### *Good Housekeeping and Pollution Prevention for Permittee Owned Operations*

- ☒ Increased street sweeping frequency of all municipal owned streets and parking lots to a schedule that targets areas with potential for high pollutant loads
- ☐ The street sweeping schedule is attached to the email submission
  - ☐ The street sweeping schedule can be found at the following website:

- ☒ Prioritized inspection and maintenance for catch basins to ensure that no sump shall be more than 50 percent full; Cleaned catch basins more frequently if inspection and maintenance activities indicated excessive sediment or debris loadings

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

*The Town sweeps all municipal street and parking areas once per year. Due to staffing shortages a second sweeping was not feasible. No sand is used for winter deicing.*

## **Charles River Watershed Phosphorus TMDL**

- ☒ Defined the scope of the Phosphorus Control Plan (PCP). *Please select one of the following:*
- ☐ The PCP scope is the entire area within our jurisdiction within the Charles River Watershed
  - ☒ The PCP scope is the urbanized area portion of our jurisdiction within the Charles River Watershed

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

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*NON-TRADITIONAL AND TRANSPORTATION MS4s ONLY- municipalities please skip this section:*

- ☐ Estimated the current impervious area of permittee owned property, determined the Land Use information for permittee owned property, calculated the phosphorus removal in pounds per year for any structural BMP owned by the permittee in accordance with Appendix F Attachment 3, and recorded the date of last maintenance activity for all structural BMPs for which phosphorus removal is calculated
- ☐ The above information is attached to the email submission
  - ☐ The above information can be found at the following website:

*Optional:* Use the box below to provide any additional information you would like to share as part of your self-assessment:

### Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

☒ Yes

☐ No

If yes, describe below, including any relevant impairments or TMDLs:

*Based on review of the Massachusetts Final 2018/2020 Integrated List of Water-bodies, updates to the SWMP were completed and posted on the Town's website.*

## Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

### MCM1: Public Education

Number of educational messages completed **during this reporting period:**

Below, report on the educational messages completed **during this reporting period**. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.

#### **BMP:Multimedia Methods for Residents**

Message Description and Distribution Method:

*The Town of Mendon maintains a storm water web page with educational information for residents. Educational topics include the proper use of slow-release fertilizers, pet waste management, leaf litter management, and proper care of septic systems. These material were used to meet the requirements per Appendix H for discharge to waters impaired for phosphorus and discharges to waters impaired for bacteria and nitrogen.*

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

*The educational information is available to all visitors to the Town website. The website was visited 129 times in PY4.*

Message Date(s):

Message Completed for:    Appendix F Requirements ☒    Appendix H Requirements ☒

Was this message different than what was proposed in your NOI?    Yes ☐    No ☒

If yes, describe why the change was made:

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#### **BMP:Multimedia Methods for Businesses**

Message Description and Distribution Method:

*The Town of Mendon maintains a storm water web page with education information for businesses on topics such as managing grease, waste, cleaning up spills, preventing pollution, and winter deicing.*

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

*The educational information is available to all visitors to the Town website. The website was visited 129 times in PY4.*

Message Date(s): *The educational material is available at all times on the Town's website.*

Message Completed for: Appendix F Requirements ☒ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

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### **BMP:Multimedia Methods for Construction Developers**

Message Description and Distribution Method:

*The Town of Mendon maintains a storm water web page with educational information for construction developers on erosion and sediment control and BMP maintenance.*

Targeted Audience: *Developers (construction)*

Responsible Department/Parties: *Highway Department*

Measurable Goal(s):

*The educational information is available to all visitors to the Town website. The website was visited 129 times in PY4.*

Message Date(s): *The educational material is available at all times on the Town's website.*

Message Completed for: Appendix F Requirements ☒ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

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### **BMP:Multimedia Methods for Industrial Facilities**

Message Description and Distribution Method:

*The Town of Mendon has very few industrial facilities. However, the Town maintains a storm water web page with educational information for automotive facilities on practicing good housekeeping and pollution prevention.*



Targeted Audience: *Industrial facilities*

Responsible Department/Parties: *Highway Department*

Measurable Goal(s):

*The educational information is available to all visitors to the Town website. The website was visited 129 times in PY4.*

Message Date(s): *The educational material is available at all times on the Town's website.*

Message Completed for: Appendix F Requirements ☒ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

*Add an Educational Message*

## MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) **during this reporting period:**

*Stormwater Task Force met in September 2021 and reviewed the SWMP status and reporting metrics. No changes were suggested.*

Was this opportunity different than what was proposed in your NOI? Yes ☐ No ☒

Describe any other public involvement or participation opportunities conducted **during this reporting period:**

*Mendon's annual clean-up was held during the weeks of April 24 - May 2, 2021. Sixty individuals or families signed up to participate.*

## MCM3: Illicit Discharge Detection and Elimination (IDDE)

### Sanitary Sewer Overflows (SSOs)

*Check off the box below if the statement is true.*

☒ This SSO section is NOT applicable because we DO NOT have sanitary sewer

*Below, report on the number of SSOs identified in the MS4 system and removed **during this reporting period.***

Number of SSOs identified:

Number of SSOs removed:

**MS4 System Mapping**

*Optional: Provide additional status information regarding your map:*

*Mendon's Stormwater System mapping is complete.*

**Screening of Outfalls/Interconnections**

*If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses. Please also include the updated inventory and ranking of outfalls/interconnections based on monitoring results.*

- ☒ No outfalls were inspected
- ☐ The outfall screening data is attached to the email submission
- ☐ The outfall screening data can be found at the following website:

*Below, report on the number of outfalls/interconnections screened **during this reporting period**.*

Number of outfalls screened:

*Below, report on the percent of outfalls/interconnections screened **to date**.*

Percent of outfalls screened:

*Optional: Provide additional information regarding your outfall/interconnection screening:*

*Outfall monitoring is complete, no additional outfalls were added.*

**Catchment Investigations**

*If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.*

- ☒ No catchment investigations were conducted
- ☐ The catchment investigation data is attached to the email submission
- ☐ The catchment investigation data can be found at the following website:

*Below, report on the number of catchment investigations completed **during this reporting period**.*

Number of catchment investigations completed this reporting period:

*Below, report on the percent of catchments investigated **to date**.*

Percent of total catchments investigated:

*Optional: Provide any additional information for clarity regarding the catchment investigations below:*

No catchment investigations were completed during PY4.

### **IDDE Progress**

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ☒ No illicit discharges were found
- ☐ The illicit discharge removal report is attached to the email submission
- ☐ The illicit discharge removal report can be found at the following website:

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed **during this reporting period**.

Number of illicit discharges identified:

Number of illicit discharges removed:

Estimated volume of sewage removed:  gallons/day

Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed **since the effective date of the permit (July 1, 2018)**.

Total number of illicit discharges identified:

Total number of illicit discharges removed:

*Optional:* Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

The Board of Health and Highway Department confirmed there were no identified illicit discharges since the effective date of the permit.

### **Employee Training**

Describe the frequency and type of employee training conducted **during this reporting period**:

Virtual IDDE Training was provided for all Highway Department Personnel in 2022.

### **MCM4: Construction Site Stormwater Runoff Control**

Below, report on the construction site plan reviews, inspections, and enforcement actions completed **during this reporting period**.

Number of site plan reviews completed:

Number of site plan reviews completed:



## MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

### Ordinance or Regulatory Mechanism

Date update was completed (due in year 3):

### As-built Drawings

Below, report on the number of as-built drawings received **during this reporting period**.

Number of as-built drawings received:

*Optional:* Enter any additional information relevant to the submission of as-built drawings:

*Mendon already requires the submission of as-built drawings and long term operation and maintenance for completed construction sites through the Mendon Stormwater Management General Bylaw , Chapter XXVI.*

### Retrofit Properties Inventory

Below, list the permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas (at least 5):

*Rank Name Parcel ID Address*

*1 Old Library and Town Hall /11-174-18 and 11-174-20/ 18 Main Street and 20 Main Street*

*2 Mendon Elderly Housing/ 12-108-9/ 9 Blackstone*

*3 Taft Public Library/ 8-189-29-31/ 29 North Avenue*

*4 Veteran's Park Ballfield /11-178-29/ 29 Millville Street*

*5 Founders Park Museum/ 8-174-1/ 1 Main Street*

*Alternate DPW/Highway Garage/ 12-206-64/ 64 Providence St*

## MCM6: Good Housekeeping

### Catch Basin Cleaning

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins **during this reporting period**.

Number of catch basins inspected:

Number of catch basins cleaned:

Total volume or mass of material removed from all catch basins:

Below, report on the total number of catch basins in the MS4 system.

Total number of catch basins:

*If applicable:*

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

### **Street Sweeping**

Report on street sweeping completed **during this reporting period** using one of the three metrics below.

☒ Number of miles cleaned:

☐ Volume of material removed:

☐ Weight of material removed:

### **Stormwater Pollution Prevention Plan (SWPPP)**

Below, report on the number of site inspections for facilities that require a SWPPP completed **during this reporting period**.

Number of site inspections completed:

Describe any corrective actions taken at a facility with a SWPPP:

*The Mendon Highway Garage was inspected quarterly by the Highway Surveyor. No corrective action during the reporting period was identified.*

## **Additional Information**

### **Monitoring or Study Results**

*Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.*

- ☒ Not applicable
- ☐ The results from additional reports or studies are attached to the email submission
- ☐ The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

**Additional Information**

*Optional:* Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

**COVID-19 Impacts**

*Optional:* If any of the above year 4 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

**Activities Planned for Next Reporting Period**

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 5 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

**Annual Requirements**

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected

- Sweep all curbed streets at least annually
- Continue investigations of catchments associated with Problem Outfalls
- Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary
- Review O&M programs for all permittee owned facilities; update if necessary
- Implement all maintenance procedures for permittee owned facilities in accordance with O&M programs
- Implement program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- Enclose all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- Review as-built drawings for new and redevelopment to ensure compliance with post construction bylaws, regulations, or regulatory mechanism consistent with permit requirements
- Inspect all permittee owned treatment structures (excluding catch basins)
- Identify additional permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious areas so that the permittee maintains a minimum of 5 sites in their inventory, until such a time when the permittee has less than 5 sites remaining

Provide any additional details on activities planned for permit year 5 below:

**Part V: Certification of Small MS4 Annual Report 2021****40 CFR 144.32(d) Certification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

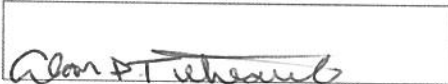
Name:

Alan D. Tetreault

Title:

Town Surveyor

Signature:



Date:

9-28-22

*[Signatory may be a duly authorized representative]*



***Town of Mendon***  
***Training Sign In Sheet***

**Training Topic:** IDDE TRAINING

**Date:** June 20, 2022

[illegible]

# Desktop Screening and Preliminary Ranking of Town-Owned Sites with Potential for Stormwater BMP Retrofits

**TO:** Alan Tetreault, DPW Director  
**FROM:** Gabrielle Belfit, CFM, Haley Rivers, & Jessica Cajigas-Smith, Tighe & Bond  
**COPY:** Thomas Mahanna, PE, Vice President, Tighe & Bond  
**DATE:** June 30, 2022

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## 1 Background

Per Section 2.3.6.d of the United States Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (referred to herein as "2016 Small MS4 General Permit"), within four years from the effective date of the permit, permittees are required to identify a minimum of five permittee-owned properties that could be potentially modified or retrofitted with best management practices (BMPs) designed to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from its MS4 through the reduction of impervious area (IA).

Mendon has twenty-six Town-owned or controlled properties within the designated MS4 area that were evaluated in this preliminary assessment. The following memorandum summarizes the desktop screening and ranking for municipal properties with potential for stormwater BMP retrofits based on retrofit criteria described in the 2016 Small MS4 General Permit and physical site characteristics. The remaining elements to finalize the retrofit inventory will be completed in the future and include field assessment and development of site maps of the highest ranked parcels, an evaluation of structural BMP's best suited for nutrient removal, a planning level fact sheet about each location, and preliminary design drawings and schedule to complete a demonstration BMP.

### 1.1 Retrofit Assessment Requirements

According to EPA's requirements for the Retrofit Inventory, the following Town-owned properties and infrastructure could be evaluated for modification or retrofit to provide reduction in frequency, volume or pollutant loads of stormwater. EPA highlights evaluating those with the potential for reduction of on-site IA as well as those that could provide reduction of off-site IA.

- Parking lots
- Buildings
- Maintenance yards
- Existing street rights-of-way
- Outfalls
- Conventional stormwater conveyances and controls (including swales and detention practices)

In determining the potential for modifying or retrofitting particular properties, multiple screening criteria should be considered, as follows:

- Access for maintenance purposes
- Subsurface geology
- Depth to water table
- Proximity to aquifers and subsurface infrastructure including sanitary sewers and septic systems
- Existing stormwater pollutant potential and loading
- Opportunities for public use and education

In determining a site's priority ranking, factors such as schedules for planned capital improvements (e.g., stormwater infrastructure, paving projects); current stormwater level of service; and control of discharges to water quality limited waters, first or second order streams, public swimming beaches, and drinking water supply sources should be considered.

Section 2 of this letter report describes the methodology which Town-owned properties and infrastructure were evaluated during the retrofit assessment. Section 3 summarizes the findings of the ranking analysis. Section 4 describes the next steps to finalize the retrofit analysis under the 2016 Small MS4 General Permit.

## 2 Preliminary Analysis of Municipal Properties for Retrofit Inventory

Tighe & Bond has performed a desktop analysis using the Town of Mendon's GIS data to assess municipal properties for potential modification or retrofits with BMPs based on criteria outlined in Section 2.3.6.d of the 2016 Small MS4 General Permit. Tighe & Bond considered properties with significant impervious cover (including parking lots, buildings, and maintenance yards) within the urbanized area that could be modified or retrofitted with a stormwater BMP to reduce stormwater quantity and/or improve quality.

Tighe & Bond further included consideration of subsurface geology, parcel size, hydrology, location of flood zones, location of water supply protection areas, and existing stormwater infrastructure. The ranking criteria used in the BMP retrofit analysis are included in Table 1 and the steps used to complete the analysis are listed in Table 2.

**Table 1**  
Mendon BMP Retrofit Ranking Criteria

Ranking Criteria	Priority Value (0 through 5)						Notes
	Cut-off Values (criteria specific)						
	0	1	2	3	4	5	5 = highest priority rank  0 = lowest priority rank
Area (acres)	-	0	0.5	1	5	10	Larger parcel size ranks higher
Hydrologic Soil Conditions	C, D, or C/D	-	-	A/D, B/D, or Null	A/C, B/C	A, B, or A/B	Soil types range from A - D and can be mixed. Soil type A provides best infiltration rates and therefore ranks highest. Soil type D ranks lowest.
Wetland Area (% Coverage)	-	0.05	0.03	0.02	0.01	0	Smaller cover ranks higher



Ranking Criteria	Priority Value (0 through 5) Cut-off Values (criteria specific)						Notes
	0	1	2	3	4	5	5 = highest priority rank  0 = lowest priority rank
Proximity to FEMA Flood Zone (mi)	-	0	0.25	0.5	0.75	1	Farther away ranks higher
Depth To Water table (cm)	-	Shallow: 0-36	-	Null	Deep: > 36	-	Deeper water table ranks higher
Is there stormwater infrastructure on-site?	-	No	-	Abutting	-	On-site	Parcels with stormwater infrastructure (i.e., catch basins, manholes, drainage pipes, etc.) rank higher
Proximity to Aquifer (mi)	-	1	0.75	0.5	0.25	0	Closer ranks higher
Distance to Surface Water (m)	-	300 and greater	200-299	100-199	50-99	0-49	Closer ranks higher
Impervious Area %	-	0-19	20-39	40-59	60-79	80-100	Higher percent ranks higher
Distance to Drainline (m)	-	300 and greater	200-299	100-199	50-99	0-49	Closer ranks higher
Are there opportunities for public use and education?	-	Low	-	Medium	-	High	More opportunities for public use and education ranks higher

**Table 2**  
Desktop Screening Analysis Steps

Step 1	Collect GIS land use data and spatially isolate to the 26 town-owned parcels
Step 2	Populate the attribute table with values from each data layer as shown in Table 3
Step 3	Rank the parcels according to Table 1 "Ranking Criteria"
A.	For each category, sort the parcels by most suitable to least suitable for BMP retrofit
B.	Cemeteries, solar field and storage locations were not included
C.	The parcels with the highest count were chosen as the most suitable for BMP retrofit as shown in Table 4

**Table 3**  
Town of Mendon Municipal Properties Ranking Criteria Values

OBJECTID	Map Parcel ID	Name	Category	Address	Distance to Flood Hazards (m)	Distance to Aquifers (m)	Distance to Water (m)	Impervious (%)	Wetland (%)	Depth to Water Table	Soil Hydro Group	Storm Infrastructure Onsite	Distance to Drain line (m)	Parcel Size (m²)	Public Use & Education Opportunities
1	8-189-29-31	Taft Public Library	Municipal Buildings	29 North Avenue	269.6	676.2	75.9	24.20%	0	68	C	0	0.7	11404.6	High
2	8-189-10	Clough Elementary and Clough Field	School Buildings	10 North Avenue	325	585.6	147.1	35.00%	0.221	68	C	0	2.8	45944	High
3	3-189-148	Miscoe Hill Elementary	School Buildings	148 North Avenue	0	1725.5	0	20.40%	0.103	0	A	0	0.2	111572.9	High
4	12-133-8	George Cemetery	Parks and Open Space	8 George Street	220.7	206	316.8	0.00%	0	0	B	0	49.5	4679.2	Low
5	8-174-1	Founders Park Museum	Municipal Buildings	1 Main Street	487.1	554.5	157.6	1.70%	0	68	C	0	2.9	2475.4	High
6	11-174-18	Old Library	Municipal Buildings	18 Main Street	435.8	494.4	338	84.70%	0	68	C	0	3.6	3296.5	High
7	11-174-20	Town Hall	Municipal Buildings	20 Main Street	391.4	452.3	359.3	62.30%	0	68	C	0	36.4	3622.4	High
8	9-177-36	Solar Field	Solar Field	36 Milford Street	0	213.2	47.1	0.00%	0.003	0	B	0	157.9	135294	Low
9	8-174-13	Historical Society Records Room	Municipal Buildings	13 Main Street	477.8	553.2	252	0.00%	0	68	C	0	31.9	103.4	Low
10	11-236-63	Old House	Municipal Buildings	63 Uxbridge Road	46.8	2382.6	51.7	9.50%	0	0	D	0	260.4	693.2	Low
11	11-225-45	Town Beach	Municipal Buildings	45 Taft Avenue	0	1938.9	7.5	66.20%	0	68	C	0	7.2	1662.3	High
12	11-225-47	Memorial Park	Garden and Active Recreation	47 Taft Avenue	0	1936.1	7.6	78.00%	0.044	68	C	0	2.6	626.5	High
13	17-140-15	Swandale Cemetery	Parks and Open Space	15 Harvard Ave East	33.3	33.9	61	6.50%	0	0	B	0	245	15925.5	Low
14	18-140-54	Olney Cook Artisan Shop	Municipal Buildings	54 Hartford Avenue East	248	100.8	369.5	2.50%	0	0	B	0	123.2	2100.7	Low
15	28-118-10	Grover Field	Garden and Active Recreation	10 Colonial Drive	0	0	0	0.10%	0.324	0	A	0	3.3	15736.7	Medium
16	20-202-73	Town of Mendon Cemetery	Parks and Open Space	73 Park Street	120.8	1576.1	165	0.00%	0	77	C	0	315.5	617.4	Low
17	28-206-218	Pine Hill Cemetery	Parks and Open Space	218 Providence Street	50.5	0	70.6	0.10%	0	0	A	0	46.5	5785.4	Low
18	17-186-8	Fire Station	Fire and Safety	8 Morrison Drive	356.6	340.6	370.5	9.90%	0.162	0	B	0	18.4	42458.5	Medium

OBJECTID	Map Parcel ID	Name	Category	Address	Distance to Flood Hazards (m)	Distance to Aquifers (m)	Distance to Water (m)	Impervious (%)	Wetland (%)	Depth to Water Table	Soil Hydro Group	Storm Infrastructure Onsite	Distance to Drain line (m)	Parcel Size (m²)	Public Use & Education Opportunities
19	13-140-113	Bicknell Cemetery	Parks and Open Space	113 Hartford Ave East	190.9	0	33.7	2.40%	0	0	A	0	2.9	4697.8	Low
20	12-206-64	DPW/ Highway Garage	Municipal Buildings	64 Providence Street	0	0	168.8	12.50%	0.012	0	A	1	0	49188.2	Medium
21	12-206-1	Town of Mendon Cemetery	Parks and Open Space	1 Providence Street	429.2	351.8	466.7	0.10%	0	0	B	0	32.7	8104.9	Low
22	12-108-9	Mendon Elderly Housing	Municipal Buildings	9 Blackstone Street	493.3	523.3	289.8	13.70%	0.027	68	C	1	0	41264.4	Medium
23	11-178-29	Veteran's Park Ball Field	Garden and Active Recreation	29 Millville Street	43.8	1710.1	47	14.70%	0	68	C	1	0	29570.6	High
24	11-225-4	Memorial Park	Garden and Active Recreation	4 Taft Avenue	73.6	1704.9	66.1	1.50%	0	68	C	0	1	46525	High
25	22-149-26	Steel Storage Building	Municipal Buildings	26 Inman Hill Road	309.3	1460.6	0	0.30%	0.011	68	C	0	38.3	94334.1	Low
26	28-206-214	Town of Mendon Cemetery	Parks and Open Space	214 Providence Street	0	0	0	0.00%	0.237	0	B/D	0	53	45159	Low

**Table 4**  
Mendon BMP Retrofit Municipal Parcel Ranking Results

OBJECTID	Map Parcel ID	Name	Category	Address	Distance to Flood Hazards (m)	Distance to Aquifers (m)	Distance to Surface Water (m)	Impervious (%)	Wetland (%)	Depth to Water Table	Soil Hydro Group	Storm Infrastructure Onsite	Distance to Drain line (m)	Parcel Size (m²)	Public Use & Education Opportunities	Total Suitability Count
Municipal Parcels considered to be most feasible for BMP Retrofits ranked in order from highest to lowest																
6	11-174-18	Old Library	Municipal Buildings	18 Main Street	5	4	1	5	5	4	1	1	5	2	5	38
20	12-206-64	DPW/Highway Garage	Municipal Buildings	64 Providence Street	1	5	3	1	4	1	5	5	5	5	3	38
22	12-108-9	Mendon Elderly Housing	Municipal Buildings	9 Blackstone Street	5	4	2	1	3	4	1	5	5	5	3	38
1	8-189-29-31	Taft Public Library	Municipal Buildings	29 North Avenue	3	4	4	2	5	4	1	1	5	3	5	37
23	11-178-29	Veteran's Park Ball Field	Garden and Active Recreation	29 Millville Street	1	1	5	1	5	4	1	5	5	4	5	37
7	11-174-20	Town Hall	Municipal Buildings	20 Main Street	4	4	1	4	5	4	1	1	5	2	5	36
5	8-174-1	Founders Park Museum	Municipal Buildings	1 Main Street	5	4	3	1	5	4	1	1	5	2	5	36
2	8-189-10	Clough Elementary and Clough Field	School Buildings	10 North Avenue	4	4	3	2	1	4	1	1	5	5	5	35
24	11-225-4	Memorial Park	Garden and Active Recreation	4 Taft Avenue	1	1	4	1	5	4	1	1	5	5	5	33
11	11-225-45	Town Beach	Municipal Buildings	45 Taft Avenue	1	1	5	4	5	4	1	1	5	1	5	33
3	3-189-148	Miscoe Hill Elementary	School Buildings	148 North Avenue	1	1	5	2	1	1	5	1	5	5	5	32
18	17-186-8	Fire Station	Fire and Safety	8 Morrison Drive	4	5	1	1	1	1	5	1	5	5	3	32
15	28-118-10	Grover Field	Garden and Active Recreation	10 Colonial Drive	1	5	5	1	1	1	5	1	5	3	3	31
9	8-174-13	Historical Society Records Room	Municipal Buildings	13 Main Street	5	4	2	1	5	4	1	1	5	1	1	30
12	11-225-47	Memorial Park	Garden and Active Recreation	47 Taft Avenue	1	1	5	4	2	4	1	1	5	1	5	30

OBJECTID	Map Parcel ID	Name	Category	Address	Distance to Flood Hazards (m)	Distance to Aquifers (m)	Distance to Surface Water (m)	Impervious (%)	Wetland (%)	Depth to Water Table	Soil Hydro Group	Storm Infrastructure Onsite	Distance to Drain line (m)	Parcel Size (m²)	Public Use & Education Opportunities	Total Suitability Count
14	18-140-54	Olney Cook Artisan Shop	Municipal Buildings	54 Hartford Avenue East	3	5	1	1	5	1	5	1	3	2	1	28
10	11-236-63	Old House	Municipal Buildings	63 Uxbridge Road	1	1	4	1	5	1	1	1	2	1	1	19
Municipal Parcels considered to be less feasible for BMP Retrofits based on land use																
19	13-140-113	Bicknell Cemetery	Parks and Open Space	113 Hartford Ave East	2	5	5	1	5	1	5	1	5	3	1	34
8	9-177-36	Solar Field	Solar Field	36 Milford Street	1	5	5	1	5	1	5	1	3	5	1	33
25	22-149-26	Steel Storage Building	Municipal Buildings	26 Inman Hill Road	4	2	5	1	4	4	1	1	5	5	1	33
21	12-206-1	Town of Mendon Cemetery	Parks and Open Space	1 Providence Street	5	5	1	1	5	1	5	1	5	3	1	33
17	28-206-218	Pine Hill Cemetery	Parks and Open Space	218 Providence Street	1	5	4	1	5	1	5	1	5	3	1	32
4	12-133-8	George Cemetery	Parks and Open Space	8 George Street	3	5	1	1	5	1	5	1	5	3	1	31
13	17-140-15	Swandale Cemetery	Parks and Open Space	15 Harvard Ave East	1	5	4	1	5	1	5	1	2	3	1	29
26	28-206-214	Town of Mendon Cemetery	Parks and Open Space	214 Providence Street	1	5	5	1	1	1	3	1	4	5	1	28
16	20-202-73	Town of Mendon Cemetery	Parks and Open Space	73 Park Street	2	2	3	1	5	4	1	1	1	1	1	22

### 3 Preliminary Retrofit Inventory Results

The Desktop Screening included in Table 4 on the previous page, lists the 26 municipally owned parcels from the Mendon Good Housekeeping Inventory, and ranking scores. Parcels with the top 5 highest ranking scores are included below in Table 5. Two additional parcels, which ranked 6<sup>th</sup> and 7<sup>th</sup> in the ranking scores, are also included in Table 5 because in the Phosphorus Source Identification Report for Mendon, completed concurrently with this report, these parcels were found to be high-priority parcels for BMP Retrofit for phosphorus load reductions.

**Table 5**

Recommended Municipally Owned Sites for Future Retrofit Feasibility Analysis

Name	Parcel ID	Address	Site Suitability Characteristics
Old Library	11-174-18	18 Main Street	Far from flood hazards No wetlands High depth to water table
DPW/ Highway Garage	12-206-64	64 Providence Street	Far from aquifers High impervious surface cover Suitable Soils Large Parcel
Mendon Elderly Housing	12-108-9	9 Blackstone Street	Far from aquifers Far from flood hazards High depth to water table
Taft Public Library	8-189-29-31	29 North Avenue	Far from flood hazards Far from water features High impervious surface cover No wetlands High depth to water table
Veteran's Park Ball Field	11-178-29	29 Millville Street	No wetlands on parcel High depth to water table Far from water supply/ wellhead protection areas
Town Hall	11-174-20	20 Main Street	Far from flood hazards No wetlands High depth to water table Co-located with the Old Library
Founders Park Museum	8-174-1	1 Main Street	No wetlands on parcel High depth to water table

### 3.1 Discussion of Results

As indicated in Table 4, due to current land uses and the restrictions they would provide, Town Cemetery's, the Solar Field, and the Steel Storage Building were not included in the final inventory regardless of scores achieved. An initial review of the inventory and ranking scores indicates that several parcels with zero or very low IA scored very high in the analysis, such as the DPW/Highway Garage and Founders Park Museum. It should be noted though that overall, Town-owned parcels do not have a high percentage of IA. In fact, only four of the 26 Town-owned parcels reviewed in this assessment received a score of 4 or 5 for percent impervious. Tighe & Bond suggests that lower ranked parcels that have a higher percent IA (Town Hall), or that are located nearer to impaired water bodies (Mendon Elderly Housing or Veterans Park Ball Field) be weighted more heavily when it comes to BMP retrofit implementation.

Since Mendon currently does not have any Town-owned BMPs, they should capitalize on locating a demonstration system where it has high visibility, a large opportunity for public use and education purposes, and where it will be the most beneficial for nutrient reduction. Therefore, the final recommended inventory of 5 Town-owned properties that could potentially be modified or retrofitted with BMPs designed to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from its MS4 includes those parcels listed in Table 6.

**Table 6**

Recommended Top 5 Town-Owned Properties for Future Retrofit Feasibility Analysis

Rank	Name	Parcel ID	Address	Notes
1	Old Library and Town Hall	11-174-18 and 11-174-20	18 Main Street and 20 Main Street	These properties are located adjacent to one another and a single BMP project could be implemented to address both properties. These locations also provide a great opportunity for public use and education.
2	Mendon Elderly Housing	12-108-9	9 Blackstone	These properties had high scores and were high priority parcels for phosphorus load reductions.
3	Taft Public Library	8-189-29-31	29 North Avenue	
4	Veteran's Park Ballfield	11-178-29	29 Millville Street	
5	Founders Park Museum	8-174-1	1 Main Street	
Alternate	DPW/Highway Garage	12-206-64	64 Providence St	This property had a high score but low IA and was not a high priority parcel for phosphorus load reductions

## **4 Next Steps to Complete BMP Retrofit Inventory**

The remaining steps to complete the BMP Retrofit Inventory include review with the Town on the ranking results, a field assessment and development of site maps for the highest ranked parcels. Following this, an evaluation of structural BMP's best suited for nutrient removal, and a planning level fact sheet should be completed for each location. Town Staff suggest that the Town complete these steps in Planning Year 5. In addition, Section 2.3.6.d requires preliminary design drawings and a schedule to complete a demonstration BMP be completed in Planning Year 5.

\\\\tighebond.com\data\Data\Projects\M\M0799 Town of Mendon Stormwater Mapping\Stormwater Compliance\M0799-14 FY22 NPDES\Task 2- BMP Retrofit\Final\Mendon Desktop BMP Retrofit Report.docx



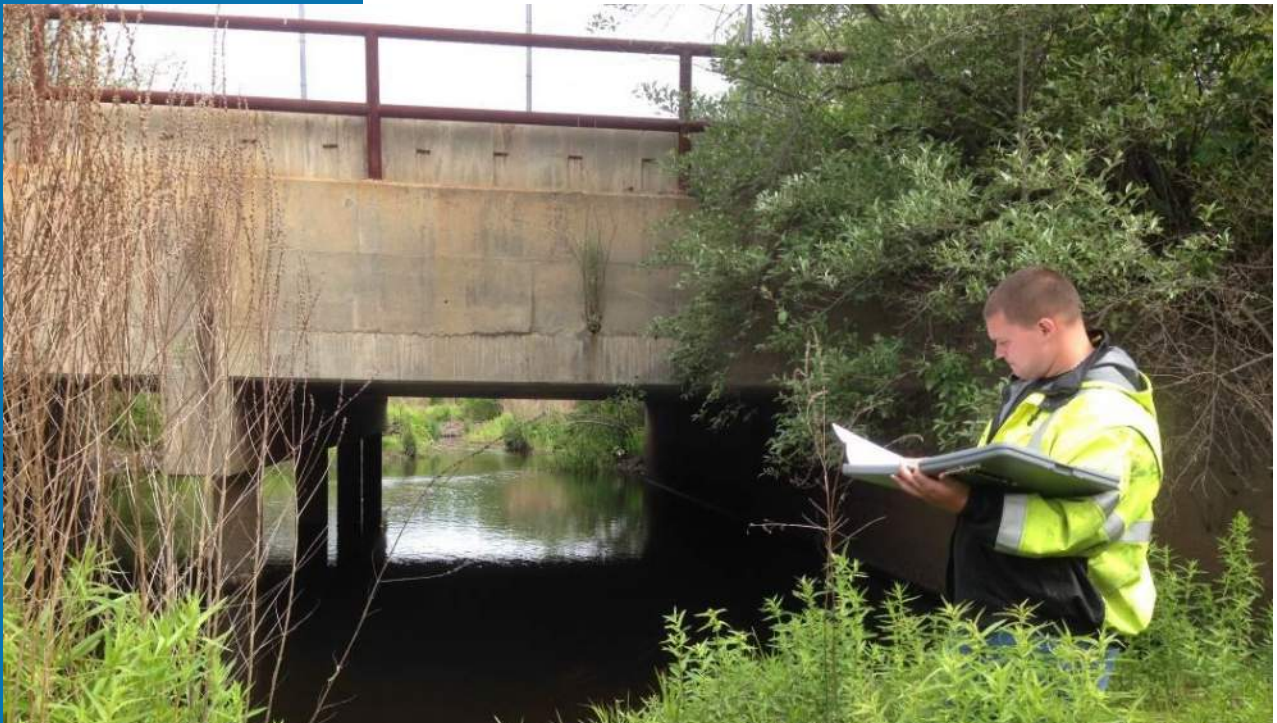
No.	Year	Make/Model	No.	Year	Make/Model
T11	2015	DODGE RAM 2500 Pickup	H11		PRO MAC 690 Concrete Saw
T12	2006	FORD F450 Pickup	H27	2007	EZ-SET Grapple Claw
T15	2019	FORD F450 Pickup	H28	2008	Grapple to E27 (Granite Claw)
T16	2022	FORD F350 Pickup	H34		TITAN Paint Striper GX160
T17	2001	FORD SRWSUP Pickup	H36		CLIPPER Concrete Saw
T21	1993	INT'L 2554	H38		Plate Compactor
T22	2001	INT'L 2554	H39		HOMELITE Mud Pump
T23	2010	INT'L 7400	H49		ARIENS Power Broom
T24	2016	INT'L 7400	H51	2008	ICS 12" Concrete Saw
T26	2008	INT'L 7400	H55	2009	18" Chainsaw 350
T28	1998	INT'L 4700	H56		Spreader Bar (Homemade)
			H57		HOMELITE Brush Cutter
			H58		DIETZ Arrow Board
			H59		MILWAUKEE Hammer Drill
E14	1988	FORD 5610 Tractor	H62		REDMAX Blower
E114	1988	ALAMO Broom	H63		HUSQ. Pressure Washer (Gas)
E214		VALBY Chipper	H64		HONDA 6500 KW Generator
E314		ALAMO Brush Mower Deck	H65		Traffic Stand
E414		ALAMO Flail Head	H66	2009	HONDA Pump WD30X
E15	1983	FORD 1700 Tractor	H67	2007	NORTHSTAR Sprayer
E115		FORD Finish Mower Deck	H68		LITTLE WONDER Blower (Used)
E215	2009	WOODS Brush Hog	H70	2011	HONDA Water Pump
E16	1987	IR Compressor	H71		DYNA Plate Compactor
E216		CP Jackhammer	H72		WALKER BS500 Compactor
E17	1986	BOBCAT 843 Skidsteer	H73	2010	HUSQVARNA 576XP
E117		FORD Snowblower	H74		CP Rockdrill CP32A-1
E217		SWEEPSTER 5' Power Broom	H75	2017	HUSQVARNA 543XP
E317		BOBCAT Dust Pan Sweeper	H76	2017	CHICAGO Pneumatics MV90
E417	2003	15C Power Auger	H77	2017	STIHL HT103 Pole Saw
E20	2003	SNOWBEAR Trailer	H78	2018	HUSQVARNA K760 Rescue Saw
E21	2003	JOHN DEERE Backhoe	H79	2018	REDMAX EBZ7500 Leaf Blower
E23		Leaf Vac Unit	H80	2018	HUSQVARNA 550XP - 18" Chain Saw
E24	2005	Tailgate Spreader	H81	2017	ECHO PPT-2620/H Power Pruner
E25		5000 Gallon Ice Ban Tank	H82	2019	HUSQVARNA 562XP
E26		Paint Trailer (Homemade)			
E28	2008	JD 544 Loader	P1	2008	FORD F350 Pickup
E29		Dump Body (for T22)	P30	1993	FORD F150 Pickup
E35	2016	BELMONT Equipment Trailer	P31		JOHN DEERE Ride-On Mower 72"
E36	2011	CAR-MATE Emergency Resp Trailer	P44		Agricultural Spreader
E37	1995	HOLDER C9700H	P55		MID-ATLANTIC Equipment Trailer
E50	2000	STOW Roller	P56	2008	JOHN DEERE Walk-Behind Mower
E51	2010	CRA Mini Melter	P57	2008	POULAN 20" Push Mower
E52	2011	STEPP SSPH-1.0 Hot Box	P58		JOHN DEERE Walk-Behind Mower
E53		Shop Made Plate Compactor Carrier	P59		JOHN DEERE Ride-On Mower 38"
E54	2006	ELGIN Sweeper	P60		TRAC VAC
E55	1999	MORBARK Chipper	P63	2014	HUSQVARNA 525 LST
			P64	2014	HUSQVARNA 525 LST
			P65	2009	HUSQVARNA 326 LS
			R1		Recycle Box

<u>No.</u>	<u>Year</u>	<u>Make/Model</u>	<u>No.</u>	<u>Year</u>	<u>Make/Model</u>
E721		FRINK 10' 3910 P1SAWG Poly Plow	S-2		BENWIL Lift
E822	2000	HI-WAY Sander	S-3		MILLERMATIC 251 Mig Welder
E824		TORWEL 6 Yd. SS Sander	S-4		1000 Gallon Fuel Tank
E828		TORWEL 3.2 Yd. SS Sander	S-5		MCNAUGHT Minilube
E912		FISHER 9' Plow (for T12)	S-6		MILWAUKEE Heat Gun
E913	2015	MEYER 8' Pro Plow	S-8		ARO AIR Grease Gun
E914	2016	FISHER Minute Mount 2 - 8'	S-10		CHICAGO Air Hammer
E921	1982	FRINK 10' Poly Plow	S-11	2010	POWER EAGLE Pressure Washer
E922	2000	EVEREST 11' Steel Plow (for T24)	S-12		SEARS Compressor (Inman)
E923	2000	EVEREST 11' Wing Plow (for T26)	S-13		SOLAR Power Pack
E924	1999	MONROE 10' Plow	S-14		PT 11 GAL PORT Air Tank (in T14)
E925		FISHER 8' Plow	S-15	2016	DEWALT 20V Impact Driver
E926	2008	EVEREST 11' Steel Plow	S-16		AIPHONE Intercom System
E928		FRINK 9' Poly Plow	S-18		ALLIED Engine Hoist
E931	1970	WAUSAU 10' Plow	S-19		LINCOLN Mig Welder
E932		MONROE MS-5510 Scraper (for T22)	S-20		REELCRAFT Air Hose Reel
E933		MONROE MF5 Scraper (for T21)	S-21		OTC 20T Bottle Jack
E935	2008	EVEREST 11' Plow (for T22)	S-23		I/R Air Compressor
E936	2011	FISHER 10' Plow (for T28)	S-24	2016	DEWALT 20V Hammer Drive
E937	2015	EVEREST 11' High Discharge Plow	S-25		MTD Tripod Jack Stand
E940	2016	EVEREST 11' Wing	S-26		LINCOLN Stick Welder
			S-27		MTD Jack Stand
			S-28		MTD Transmission Jack
			S-29		OTC 3T Floor Jack Model # 1504A
			S-30		IR 3H Drive Ratchet Model # 107XP
			S-31	2012	SNAP ON 1/2 Impact Wrench
			S-32	2006	MILWAUKEE Sawzall
			S-33		Battery Charger
			S-34		THOMAS and BETTS Battery Crimp Tool
			S-35		CHICAGO D.A. Sander CP 870 (B&T)
			S-36		EVERCLEAR 30 Gal Parts Washer
			S-37		ROL-AIR Compressor
			S-38	2016	DEWALT 20V Sawzall
			S-39	2010	MAKITA 7" Grinder
			S-40	2011	BIG RED 3 Ton Jack
			S-41	2011	Shop Press 40T
			S-42	2012	AIR KING M35P
			S-43		Used Pallet Jack
			S-44	2014	MURRAY 927ES Snow Blower
			S-45	2014	MURRAY 824EX Snow Blower
			S-46		DEWALT 12" Cut-Off Saw
			S-47	2012	AIR KING Filtration System

**Tighe&Bond**

NPDES SMALL MS4 STORMWATER GENERAL PERMIT MCM 6

# PHOSPHOROUS SOURCE ID REPORT MENDON, MA



SUBMITTED TO

**Town of Mendon**  
**Mendon, MA 01756**

6/30/2022

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# Section 1 Background

Per Part 2.2.2.b.ii of the United States Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (referred to herein as "2016 Small MS4 General Permit"), within four years from the effective date of the permit, certain permittees are required to complete a Phosphorus Source Identification (ID) Report. Nutrient Source ID Reports are required for those MS4s with discharges within watersheds that are impaired for nitrogen and/or phosphorus.

Per Part 2.3.6.d of the 2016 Small MS4 General Permit, within four years from the effective date of the permit, permittees are also required to identify a minimum of five permittee-owned properties that could be potentially modified or retrofitted with best management practices (BMPs) designed to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from its MS4 through the reduction of impervious area (IA). Town-owned properties were identified for BMP retrofit potential in a separate report for partial compliance with Part 2.3.6.d. These properties were further assessed by Tighe & Bond to identify priority sites for phosphorus removal in proximity to areas of higher nutrient loading identified within this phosphorus source identification report.

Relevant to this report is the Blackstone River, which is phosphorus impaired. Mendon tributaries to the Blackstone River including Mill River, Muddy Brook, Rock Meadow Brook, Round Meadow Brook, and Miscoe Brook are not impaired, but as they are within the Blackstone River watershed, the Town is subject meeting requirements for 2.2.2.b.ii. The requirements for Phosphorus Source Identification are specified in more detail below. This report was developed to identify sources of nutrients in Mendon that are within the watershed of impaired waters.

## 1.1 Phosphorus Source Identification Requirements

Per Appendix H Part II.1.b. of the 2016 Small MS4 General Permit, the Town of Mendon is required to complete a Phosphorus Source Identification Report within four years of the permit effective date due to discharges within the watershed of Blackstone River, which is impaired for Total Phosphorous. The report must include the following elements:

- Calculation of total MS4 area draining to the water quality limited receiving water segments or their tributaries, incorporating updated mapping of the MS4 and catchment delineations produced pursuant to Part 2.3.4.6 of the 2016 Small MS4 General Permit.
- Screening and monitoring results pursuant to Part 2.3.4.7.b., targeting the receiving water segment(s).
- Impervious areas and directly connected impervious areas (DCIA) for the target catchment. Tighe & Bond has estimated DCIA based on EPA guidance.
- Identification, delineation, and prioritization of potential catchments with high phosphorus loading.

- Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment, including the removal of impervious area.

## 1.2 Other Nutrient Related Enhanced BMP Requirements

The MS4 permit includes additional Best Management Practices (BMPs) requirements to address nutrient related impairments as described below.

### 1.2.1 Phosphorus Requirements

The Source Identification Report required by Appendix H of the 2016 Small MS4 General Permit is one part of an overall program that must be established to reduce phosphorus loading within the Blackstone River watershed. The Town must also comply with the additional or enhanced BMP requirements outlined in Appendix H Part A.II.1 of the 2016 Small MS4 General Permit. Enhanced BMP's include conducting public education and outreach in appropriate timeframes in order to encourage the proper use and disposal of materials that may be a significant contributor of phosphorus charges. Language from Appendix H Part II.1.a.i.1 is included herein for reference:

*The permittee shall distribute an annual message in the spring (March/April) timeframe that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorus-free fertilizers. The permittee shall distribute an annual message in the summer (June/July) timeframe encouraging the proper management of pet waste, including noting any existing ordinances where appropriate. The permittee shall distribute an annual message in the Fall (August/September/October) timeframe encouraging the proper disposal of leaf litter. The permittee shall deliver an annual message on each of these topics, unless the permittee determines that one or more of these issues is not a significant contributor of phosphorus to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP.*

Mendon is in compliance with these requirements through posting of messages on the Town website. The Town seasonally updates web page messages for residents to manage their grass clippings, pet waste, and leaf litter at the appropriate time of year.

In addition, Appendix H Part II.1.a.i.2 of the 2016 Small MS4 General Permit includes enhancement of BMPs to ensure that current phosphorus loads do not increase. The Town's Stormwater Management Bylaw for post construction includes a requirement that BMPs be optimized for phosphorus removal.

Mendon must also comply with requirements in Part 2.3.6.a.ii.4 of the 2016 Small MS4 General Permit, which outlines pollutant removal requirements for BMPs for development and redevelopment sites. These requirements target TSS and Total Phosphorus. Excerpts from Part 2.3.6.a.ii.4 are included herein for reference:

*Stormwater management systems on redevelopment sites shall be designed to meet an average annual pollutant removal equivalent to 80% of the average annual postconstruction load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface*

*area on the site (based on the average annual loading and not on the basis of any individual storm event).*

*a) Average annual pollutant removal requirements in 2.3.6.a.ii.4 above are achieved through one of the following methods:*

- 1. installing BMPs that meet the pollutant removal percentages; or*
- 2. retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-construction impervious surface area on the redeveloped site; or*
- 3. meeting a combination of retention and treatment that achieves the above standards; or*
- 4. utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the redevelopment site.*

Mendon updated its Stormwater Management Bylaw to address this regulatory requirement and incorporate language that allows for the implementation of BMPs.

### **1.3 Data Sources**

Tighe & Bond estimated existing phosphorus loading within Mendon using the methodology in Attachment 1 of Appendix F of the 2016 Small MS4 General Permit. The following datasets from the Massachusetts Bureau of Geographic Information (MassGIS) and the Town were used to perform the analysis:

- 2016 Land Use
- Soil hydrogeography group
- Preliminary catchment delineations developed as part of the Integrated Water Resources Management Planning Project and in support of the Illicit Discharge Detection and Elimination (IDDE) Program
- Town Parcel Boundaries

The methodology for the calculations included within this report can be found in Appendix A. The calculations and full dataset for phosphorus loading can be found in Appendix B.



## **Section 2**

# **Blackstone River Phosphorus Source Identification Requirements**

### **2.1 Background Characteristics**

The total area of Mendon is about 11,512 acres. The Blackstone River watershed is 214,660 acres in total, of which 11,318 acres are within the Town of Mendon.

The maps in Appendix C show within Mendon the location of the Blackstone River watershed as well as the outfalls and catchment areas.

Of the total 11,318 acres of the Blackstone River watershed located in Mendon, 3,302 acres are mapped as urbanized area. Figure 2-1 shows the MS4 Mapping of the Urbanized area, subject to the 2016 Small MS4 General Permit,

Mendon's MS4 within the Blackstone River watershed consists of 105 outfalls.



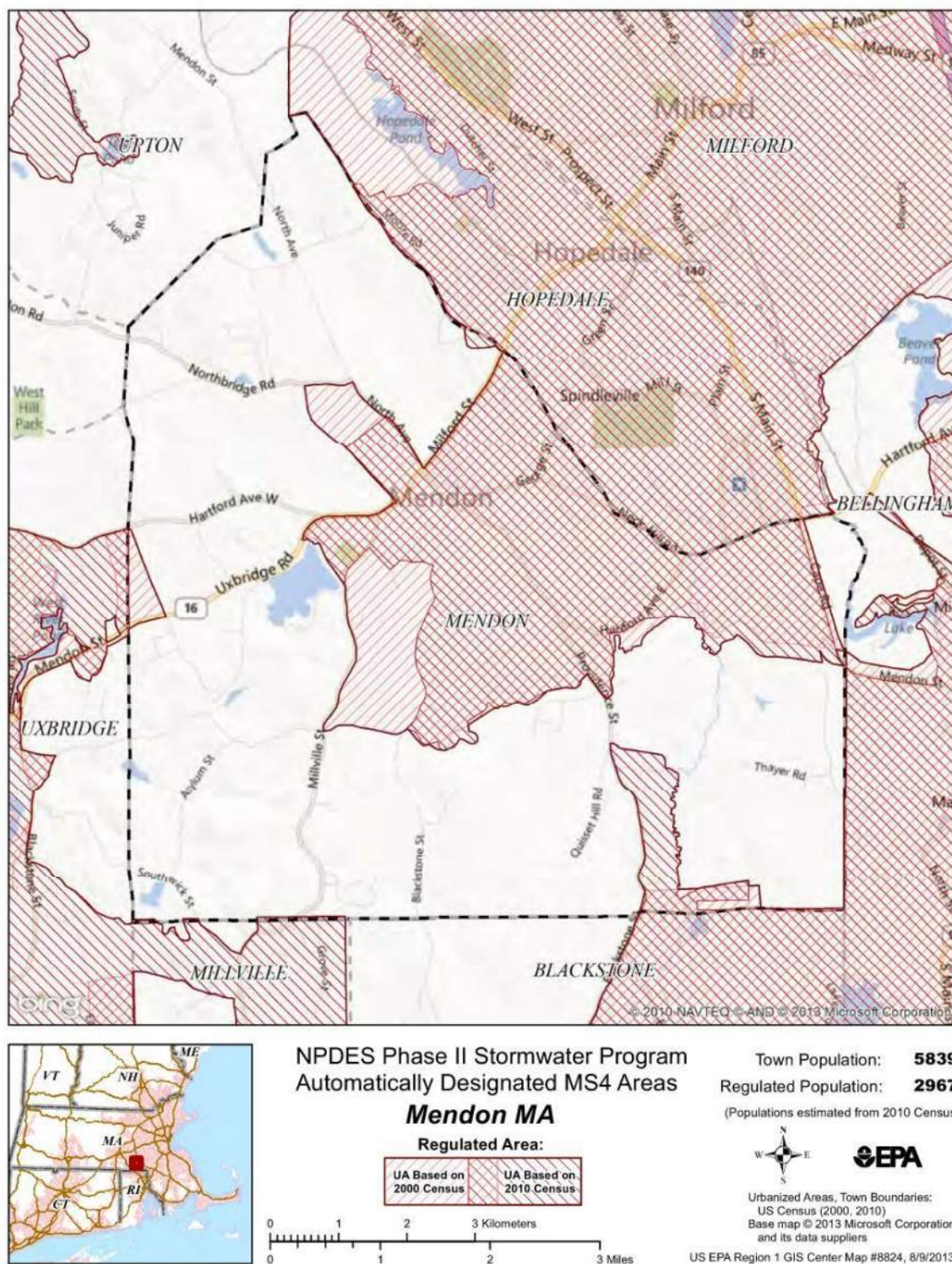


Figure 2-1: Mendon MS4 Map

## **2.2 Screening and Monitoring Results in Blackstone River Watershed**

Mendon performed dry weather outfall screening and monitoring within the Blackstone River watershed in 2021. The segments of the Mill River which are phosphorus impaired, are downstream from Mendon. There are no known phosphorus impairment waterbodies in the Town itself. Total Phosphorus analysis was not completed during the outfall screening, or any pollutant known to be representative of potential phosphorus pollution.

## **2.3 Summary Statistics**

Table 2-1 below summarizes the total IA and DCIA within the Blackstone River watershed and the Town's MS4 regulated area.

**Table 2-1**

Summary of IA and DCIA within the Blackstone River Watershed

	<b>Acres</b>
Total Impervious Area within MS4 Area	208.19
Total Estimated DCIA within MS4 Area	840.05

Using the methods described in Appendix A of this report, estimates of phosphorus loading potential were created for each of the Town's outfalls.

Table 2-2 below shows the information for the 10 catchments within the MS4 regulated area with the most IA. The catchments are labeled using the Town's identifier in ArcGIS for the outfall to which they drain. The table is sorted in descending order of total IA.

**Table 2-2**

10 Catchments with the Most Impervious Area within Blackstone River Watershed

<b>Outfall ID</b>	<b>Total Impervious Area (acres)</b>
NP-08	18.67
MB-41	13.93
MB-38	11.84
MR-19	9.67
MB-61	6.82
MB-50	6.61
MB-16	6.41
SP-07	5.51
MB-13	5.15
12_OF	5.08

## 2.4 Land Use and Prioritization of Potential Catchments with High Phosphorus Loading

Using the methods described in Appendix A to this report, estimates of phosphorus loading potential were created for each of the Town's storm drain outfall catchments within the Blackstone River watershed.

Table 2-3 shows the five catchments with the highest estimated phosphorus loading in the Blackstone River watershed area. To see the complete dataset for all catchments within Mendon, please refer to Appendix B.

**Table 2-3**

Five (5) outfalls within the Blackstone River watershed with the Highest Estimated Phosphorus Loading

Outfall ID	Phosphorus Load (lbs/year)
NP-08	60.86
MB-41	50.80
MB-38	39.72
MB-13	36.73
MB-61	34.20
<b>Top 5 as a % of Total Town Load</b>	<b>26.46%</b>

The subsections included below describe the factors that may contribute to high phosphorus loading for the five outfalls identified in Table 2-5. Installation of BMPs and reduction of impervious cover on roadways and in residential areas may significantly reduce the phosphorus loading within Mendon.

Note these are estimated loadings based on soil type, land use, and estimated DCIA. Actual loading may vary considerably from site to site depending on what stormwater control measures are actually present. These estimates provide a valuable guide to help identify those areas of the Town that should be the highest priorities for interventions to reduce pollutant loading.

### 2.4.1 Outfall NP-08

Table 2-4 provides a breakdown of the land use types that are estimated to contribute phosphorus loading to the catchment area surrounding outfall NP-08, which has the highest estimated phosphorus loading and the highest IA within its catchment area of the outfalls within the MS4 area.

**Table 2-4**

Land use types with high phosphorus loading within outfall NP-08

	<b>Land Use Type</b>	<b>Acres / catchment / land use</b>	<b>Phosphorus Load (pounds/year)</b>	<b>% of Phosphorus Load (pounds/year/outfall)</b>
<b>Impervious Cover</b>	Commercial / Industrial	14.37	47.8	78.54%
	Open	2.94	7.9	12.98%
	Roadways	1.19	2.9	4.77%

### 2.4.2 Outfall MB-41

Table 2-5 provides a breakdown of the land use types that are estimated to contribute phosphorus loading to the catchment area surrounding outfall MB-41, which has the second highest estimated phosphorus loading and the second highest IA within its catchment area of the outfalls within the MS4 area.

**Table 2-5**

Land use types with high phosphorus loading within outfall MB-41

	<b>Land Use Type</b>	<b>Acres / catchment / land use</b>	<b>Phosphorus Load (pounds/year)</b>	<b>% of Phosphorus Load (pounds/year/outfall)</b>
<b>Impervious Cover</b>	Commercial / Industrial	8.62	25.0	49.21%
	Roadways	3.55	9.3	18.31%
	Low-density residential	1.45	3.76	7.40%
<b>Pervious Cover</b>	Low-density residential	17.00	4.4	8.66%
	Agricultural	9.07	4.1	8.07%

### 2.4.3 Outfall MB-38

Table 2-6 provides a breakdown of the land use types that are estimated to contribute phosphorus loading to the catchment area surrounding outfall MB-38, which has the third highest estimated phosphorus loading and the third highest IA within its catchment area of the outfalls within the MS4 area.

**Table 2-6**

Land use types with high phosphorus loading within outfall MB-38

	<b>Land Use Type</b>	<b>Acres / catchment / land use</b>	<b>Phosphorus Load (pounds/year)</b>	<b>% of Phosphorus Load (pounds/year/outfall)</b>
<b>Impervious Cover</b>	Roadways	6.60	17.9	45.07%
	Multi-family / High-density residential	1.93	8.1	20.39%
	Low-density residential	1.74	4.6	11.58%
	Commercial / Industrial	1.52	4.0	10.07%
<b>Pervious Cover</b>	Multi-family / High-density residential	11.59	1.8	4.53%
	Low-density residential	11.38	1.8	4.53%

### 2.4.4 Outfall MB-13

Table 2-7 provides a breakdown of the land use types that are estimated to contribute phosphorus loading to the catchment area surrounding outfall MB-13, which has the fourth highest estimated phosphorus loading and the fourth highest IA within its catchment area of the outfalls within the MS4 area.

**Table 2-7**

Land use types with high phosphorus loading within area of outfall MB-13

	<b>Land Use Type</b>	<b>Acres / catchment / land use</b>	<b>Phosphorus Load (pounds/year)</b>	<b>% of Phosphorus Load (pounds/year/outfall)</b>
<b>Pervious Cover</b>	Low-density residential	83.97	18.0	49.00%
	Multi-family / High-density residential	31.92	5.3	14.43%
<b>Impervious Cover</b>	Low-density residential	3.88	10.1	27.50%
	Roadways	1.27	3.2	8.71%

### 2.4.5 Outfall MB-61

Table 2-8 provides a breakdown of the land use types that are estimated to contribute phosphorus loading to the catchment area surrounding outfall MB-61, which has the fifth highest estimated phosphorus loading and the fifth highest IA within its catchment area of the outfalls within the MS4 area.

**Table 2-8**

Land use types with high phosphorus loading within outfall MB-61

	<b>Land Use Type</b>	<b>Acres / catchment / land use</b>	<b>Phosphorus Load (pounds/year)</b>	<b>% of Phosphorus Load (pounds/year/outfall)</b>
<b>Impervious Cover</b>	Roadways	3.66	9.4	27.49%
	Low-density residential	1.36	3.5	10.23%
	Commercial / Industrial	1.20	3.1	9.06%
<b>Pervious Cover</b>	Low-density residential	25.12	6.9	20.18%

## 2.5 Potential Retrofit Opportunities

In Mendon's BMP Retrofit Inventory, five municipally owned sites were recommended as suitable for potential green infrastructure retrofits based on factors including soil type, proximity to water bodies, and potential for nutrient load reduction.

After identifying the five outfalls within the MS4 regulated area with the highest estimated nitrogen and phosphorus loading in Section 2.4 of this document, their proximity to the locations noted in the BMP Retrofit Inventory were assessed. Table 2-9 shows those locations that were identified as high-priority parcels to be considered for control of phosphorus loading in the BMP Retrofit Inventory as well as their proximity to outfalls with the high estimated phosphorus loading.

**Table 2-9**

High-Priority Parcels to be Considered for Control of Phosphorus Loading

<b>Location</b>	<b>Address</b>	<b>High Phosphorus Loading Outfall in Proximity</b>
Veteran's Park Ball Field	29 Millville Street	MB-61
Mendon Elderly Housing	9 Blackstone Street	MB-38 & MB-41
Old Library	18 Main Street	MB-38 & MB-41
Founder's Park Museum	1 Main Street	MB-38 & MB-41
Town Hall	20 Main Street	MB-38 & MB-41

As previously stated in Section 2.4 of this document, the installation of BMPs and reduction of impervious cover on roadways and in residential areas may significantly reduce the

nitrogen and phosphorus loading within Mendon. Outfalls MB-61, MB-38, and MB-41 are estimated to be three of the largest contributors of phosphorus loading within the MS4 area. In addition, MB-61 is in very close proximity to Nipmuc Pond, and MB-38 and MB-41 are in close proximity to each other and to Muddy Brook. For all three of these outfalls, impervious cover on roadways, commercial/industrial areas, and residential areas is estimated to serve as a major factor in phosphorus loading. This information confirms the recommendations that sites listed Table 2-9 be prioritized for BMP installation.

In the future, the Town should consider the potential for additional retrofit opportunities at sites closer to the other outfalls with high estimated phosphorus loading.

## Section 3

# Conclusions and Recommendations

Overall, it has been noted that potential major factors contributing to Mendon's phosphorus loading of its impaired waterways are high amounts of impervious cover associated with commercial / industrial area, roadways, and residential areas, as well as pervious cover associated with residential areas. Prime areas to prioritize for BMP retrofit have been identified in Table 2-9 based on the estimated phosphorus loading data. BMPs significantly reduce Mendon's phosphorus output to its waterways.

### 3.1 Reporting and Annual Update

This Nitrogen and Phosphorus Source Identification Report must be submitted to EPA and MassDEP with the Permit Year 4 Annual Report, due on September 28, 2022.

The results of this report provide a valuable starting point for the next phase of requirements in Appendix H of the 2016 Small MS4 General Permit which are due by the end of Permit Year 5 (06/30/2023) which include:

1. Evaluate all properties identified as presenting retrofit opportunities or areas for structural BMP installation under permit Part 2.3.6.d.ii or identified in the Phosphorus Source Identification Report. The evaluation shall include:
  - a. The next planned infrastructure, resurfacing, or redevelopment activity planned for the property (if applicable) OR planned retrofit date
  - b. The estimated cost of redevelopment or retrofit BMPs, and
  - c. The engineering and regulatory feasibility of redevelopment or retrofit BMPs.
2. Provide a listing of planned structural BMPs and a plan and schedule for implementation in the year 5 annual report.

J:\M\M0799 Town of Mendon Stormwater Mapping\Stormwater Compliance\M0799-14 FY22 NPDES\Task 3- PO4 ID\Draft\07.11.22\_Mendon Phosphorus Source Identification Report.docx



**APPENDIX A**

## Methodology for Nitrogen and Phosphorus Source Identification Calculations

This appendix explains the methodology used to calculate loadings for Total Phosphorous on a catchment basis for the Blackstone River watershed.

All actions described were performed in ArcGIS Pro 2.6.0 / ArcMap and Microsoft Excel.

### Data Sources

The following datasets from the Massachusetts Bureau of Geographic Information (MassGIS) and the Town were used to perform the analysis:

- 2016 Land use/land cover
- Soil hydrography group
- Preliminary catchment delineations developed by Tighe & Bond as part of the Illicit Discharge Detection and Elimination (IDDE) Program in Permit Year 1 and refined by Tighe & Bond in Permit Year 4
- Town Parcel Boundaries
- BMP Retrofit Assessment (June 2021) developed by MVPC as part of a grant program

The phosphorus source identification analysis included four GIS shapefiles shown in Table 1 below. Based on permit applicability for the Town of Mendon, this analysis was conducted for phosphorous loadings.

**TABLE 1**  
Shapefiles Used in Phosphorus Source Identification Analysis

Layer	Use	Origin
Watershed drainage area delineations	Area of interest for phosphorus loading analysis	Varies
Outfall Catchment Delineations	Area(s) of interest for phosphorus loading analysis	Town files
2016 Land Use/Land Cover	Land use and cover classifications	MassGIS
Subsurface Geology (SSURGO_Soils)	Soil hydrologic groups	NRCS Soils Layer

Using the data sources above the following key areas were calculated:

- **Total Impervious Area** was determined using the MassGIS 2016 Land Cover/Land Use layer.
- **Directly Connected Impervious Area (DCIA)** is the impervious area directly connected to the MS4 system. This parameter was calculated using Sutherland equations within the EPA guidance document entitled "Estimating Change in

Impervious Area (IA) and Directly Connected Impervious Areas (DCIA) for Massachusetts Small MS4 Permit” (Revised April 2014).

- **Disconnected Impervious Area** is the DCIA subtracted from the total impervious area.
- **Pervious Area** is any land cover/land use not classified as impervious or water. These areas are distinguished by land use and hydrologic soil group combinations.

Export rates for each of the key areas described above were then applied to determine the nutrient loading from each parameter.

A base shapefile was created to determine phosphorus loading rates separately. This base shapefile was developed similar to the method taken by the Pioneer Valley Regional Planning commission. This approach developed a crosswalk table<sup>1</sup> for the 2016 land use/land cover layer, which expands on the 2005 crosswalk in the Small MS4 General Permit. This crosswalk established a “PLCRSS” attribute based on land use/land cover combinations. This table was used in catchment loading calculations for the Blackstone River watershed.

## **Catchment Loading Calculations**

Catchment loadings were determined by calculating the areas of each land use/cover soil combinations within a given catchment. After calculating areas, directly connected impervious area (DCIA), disconnected impervious area, and pervious area loadings were calculated in excel. The GIS and excel steps taken are as follows:

1. Create two new fields in the 2016 Land Use / Land Cover shapefile called *Concat* and *PLCRSS*
2. Populate *Concat* field using field calculator to equal the Land Use and Land Cover attributes, separated by a comma (i.e. “Commercial, Pervious”)
3. Populate *PLCRSS* by joining the cross-walk table and using the *Concat* field as the join ID
4. Intersect the “Land Use Land Cover” shapefile with the “SSURGO Soils” Layer to create a new flayer called “LandUseLandCover2016\_ClipppedTowns\_SoilsIntersect”
5. Create a new field called *Land Use Soil Category*
6. Populate the *Land Use Soil Category* field to equal the *PLCRSS* field plus the string “TIA” if the land cover was impervious
7. Populate the *Land Use Soil Category* field to equal the *PLCRSS* field plus the string “PERV” plus the intersecting soil hydrologic group if the land cover was not impervious

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<sup>1</sup> Source: <https://yourcleanwater.org/wp-content/uploads/2021/10/Methods-Appendix-June-30-20201.pdf>

8. Assign phosphorous and nitrogen export rates for each *Land Use Soil Category* value based on Table 3-1 and 3-2 in Attachment 3 of Appendix F of the 2016 Massachusetts Small MS4 General Permit
9. Clip the "LandUseLandCover2016\_ClipppedTowns\_SoilsIntersect" to the watershed of interest within the Town's MS4 area
10. Intersect the clipped layer with the Town's catchment layer
11. Select and export anything with a *Land Use Soil Category* ending in "TIA" to a new layer representing the Total Impervious Area within the MS4 area in the watershed of interest
12. Dissolve the new layer by *Land Use Soil Category* and the *Catchment/Outfall ID*
13. Add a new field to the dissolved layer and calculate area in acres
14. Export attribute table to excel
15. Query out features not ending in "TIA" and repeat steps 11 through 13
16. Calculate nutrient loading by multiplying the *Land Use Soil Category* of a given catchment by its respective nutrient export rate
17. Export out attribute table to excel

In Microsoft Excel, the total catchment impervious and pervious areas were calculated using both table exports. These values were then summed to calculate the total catchment area. The total pervious phosphorus loadings were calculated in the same manner.

The percent impervious area (IA) was calculated for each *Land Use Soil Category* in a given catchment by dividing the exported area of the *Land Use Soil Category* by the total catchment area. The percent DCIA was then calculated using this percent IA and the Sutherland Equations. Equation 1 shows the Sutherland Equation and Table 4 below outlines the exponents (E) and multipliers (M) used in the Sutherland Equation.

$$(1) \quad \%DCIA = M * \%IA^E$$

**TABLE 4**  
Sutherland Equation Multiplier and Exponents by Land Use Soil Category

Land Use Soil Category	Multiplier (M)	Exponent (E)
Com_IndTIA	0.1	1.5
MFR_HDRTIA	0.4	1.2
MDRTIA	0.1	1.5
LDRTIA	0.1	1.5
HWYTIA	0.1	1.5
FORTIA	0.01	2
OpenTIA	0.1	1.5
AgTIA	0.01	2

The percent DCIA was then multiplied by the total catchment area to get the DCIA in acres and the disconnected IA was calculated by subtracting the calculated DCIA from the original *Land Use Soil Category* area. A DCIA export rate was then assigned according to Table 3-1 and 3-2 in Attachment 3 of Appendix F of the 2016 Small MS4 General Permit.

A disconnected impervious area export rate equivalent to that of Hydrologic Soil Group C was assigned. DCIA loadings and disconnected impervious area loadings were determined by multiplying the areas by their respective export rates. Total DCIA, disconnected impervious area, and pervious area loadings and areas were then summed by catchment.



**Phosphorus loading and types of area per catchment**

Catchment ID	Total Area (acres)	Total Impervious Area (acres)	DCIA (acres)	Disconnected IA (acres)	Pervious Area (acres)	Pervious Area Nutrient Load (lbs/year)	Disconnected Area Nutrient Load (lbs/year)	DCIA Nutrient Load (lbs/year)	Nutrient Load in (lbs/year)
1_OF	15.08467519	0.971735718	0.017309789	0.954425929	14.11293947	0.474718923	2.290622229	0.210077171	2.975418323
12_OF	60.95204468	5.075545285	0.104981028	4.970564257	55.87649939	8.328698611	11.92935422	1.344509364	21.60256219
13_OF	4.800857317	0.444339366	0.009604102	0.434735264	4.356517951	0.723935338	1.043364634	0.121033091	1.888333063
2_OF	2.912845423	0.380490233	0.00993608	0.370554153	2.53235519	0.304787659	0.889329967	0.115908048	1.310025674
3_OF	5.694782771	0.970257823	0.028332628	0.941925195	4.724524948	0.567793992	2.260620468	0.345747534	3.174161994
4_OF	2.780881288	0.521870135	0.022185382	0.499684753	2.259011153	0.370947708	1.199243408	0.233074801	1.803265916
5_OF	1.401768983	0.177492524	0.016316764	0.16117576	1.224276459	0.195012926	0.386821823	0.223923413	0.805758162
6_OF	71.5796467	2.552229105	0.030766352	2.521462753	69.0274176	16.92311647	6.051510606	0.380756854	23.35538393
7_OF	15.13756902	2.027324331	0.046006952	1.981317379	13.11024469	3.576038065	4.755161708	0.591431923	8.922631697
8_OF	3.88052259	0.657682337	0.019160736	0.638521601	3.222840253	0.386995388	1.532451842	0.233287351	2.152734581
9_OF	1.146493429	0.230861334	0.007877731	0.222983603	0.915632095	0.184163006	0.535160647	0.088160399	0.807484053
MB	86.75691465	5.033637165	0.12401142	4.909625745	81.72327749	16.65335232	11.78310179	1.602327793	30.0387819
MB-03	15.6034153	0.541016615	0.008823748	0.532192867	15.06239868	3.041015126	1.277262881	0.12308735	4.441365357
MB-09	0.51191433	0.13267494	0.006042651	0.126632289	0.37923939	0.078780116	0.303917493	0.064081133	0.446778742
MB-1	7.095227957	0.588526912	0.022632881	0.565894031	6.506701045	0.877102669	1.358145674	0.310354149	2.545602491
MB-10	12.41810383	1.359528914	0.054965143	1.304563772	11.05857492	2.315925927	3.130953052	0.717220832	6.164099811
MB-12	16.78974549	1.947065272	0.044057456	1.903007817	14.84268022	3.015349834	4.56721876	0.515413205	8.097981799
MB-13	122.2509208	5.149185691	0.08205104	5.067134651	117.1017351	23.4557748	12.16112316	1.110347235	36.72724519
MB-14	10.39232716	1.167164868	0.028190689	1.13897418	9.225162288	1.110705611	2.733538031	0.363599333	4.207842975
MB-15	11.51380439	0.961363918	0.018840319	0.942523599	10.55244047	1.661536378	2.262056637	0.222263498	4.145856513
MB-16	50.25621194	6.408987069	0.218951173	6.190035897	43.84722487	6.138701561	14.85608615	2.874731731	23.86951944
MB-18	5.756715156	1.275511642	0.046006428	1.229505214	4.481203513	0.538074994	2.950812514	0.512645187	4.001532696
MB-19	16.1635135	1.032565124	0.018507496	1.014057628	15.13094837	2.303823664	2.433738308	0.223268692	4.960830665
MB-20	5.466760475	0.407314085	0.008285143	0.399028942	5.05944639	0.621449134	0.95766946	0.093948226	1.67306682
MB-21	4.302241805	0.552191086	0.014053184	0.538137902	3.750050719	0.451190567	1.291530965	0.168664461	1.911385994
MB-22	3.945261427	0.73791725	0.022957724	0.714959526	3.207344177	0.5262975	1.715902863	0.295440953	2.537641317
MB-24	0.964267275	0.224301848	0.007761243	0.216540605	0.739965427	0.088795849	0.519697452	0.091399334	0.699892635
MB-26	20.83792773	2.951718645	0.078736727	2.872981918	17.88620908	2.335079312	6.895156603	0.951780227	10.18201614
MB29	1.474947818	0.492190731	0.021492793	0.470697938	0.982757086	0.117969571	1.129675052	0.241389884	1.489034508
MB-29	3.710076522	0.62065718	0.07204838	0.5486088	3.089419342	0.371321818	1.31666112	0.986033904	2.674016841
MB-37	3.185813143	0.593844704	0.018206163	0.575638542	2.591968439	0.197234561	1.3815325	0.229219231	1.807986291
MB-38	42.7795713	11.83610402	0.618514659	11.21758936	30.94346728	4.975651315	26.92221447	7.8139627	39.71182848
MB-39	0.606857443	0.126910885	0.004272065	0.12263882	0.479946558	0.089702451	0.294333168	0.054495839	0.438531458
MB-4	59.97725891	2.609457577	0.038676822	2.570780755	57.36780133	8.259080831	6.169873813	0.494465666	14.92342031

**Phosphorus loading and types of area per catchment**

Catchment ID	Total Area (acres)	Total Impervious Area (acres)	DCIA (acres)	Disconnected IA (acres)	Pervious Area (acres)	Pervious Area Nutrient Load (lbs/year)	Disconnected Area Nutrient Load (lbs/year)	DCIA Nutrient Load (lbs/year)	Nutrient Load in (lbs/year)
MB-40	33.41669635	2.940562617	0.111317143	2.829245474	30.47613373	7.538444295	6.790189138	1.472698584	15.80133202
MB-41	54.59578872	13.92868178	0.490219216	13.43846257	40.66710694	11.65697632	32.25231017	6.893721608	50.8030081
MB-43	4.742738659	1.490031033	0.058733524	1.431297509	3.252707626	0.665371066	3.435114021	0.731288551	4.831773639
MB-44	0.923628247	0.530504107	0.044241853	0.486262254	0.39312414	0.118467473	1.167029409	0.648303442	1.933800324
MB-46	4.035027436	0.375775971	0.010943255	0.364832716	3.659251465	0.669551546	0.875598518	0.15402735	1.699177414
MB-47	0.144654332	0.083810711	0.004972844	0.078837867	0.060843622	0.00743977	0.189210881	0.054933399	0.251584049
MB-48	1.0007957	0.657819432	0.050586461	0.607232971	0.342976268	0.066660188	1.457359129	0.653047744	2.177067062
MB-49	2.673660834	0.36825113	0.011126435	0.357124695	2.305409704	0.467462435	0.857099269	0.120722497	1.445284201
MB-50	15.18723742	6.611929442	0.340483709	6.271445733	8.575307982	2.041709133	15.05146976	3.683614122	20.77679301
MB-52	8.13292274	1.146800902	0.028159062	1.118641839	6.986121838	1.435748198	2.684740414	0.36516191	4.485650522
MB-60	12.14959583	1.244186147	0.028154572	1.216031574	10.90540968	2.761486634	2.918475778	0.345432772	6.025395184
MB-61	72.17916794	6.8194019	0.163089406	6.656312494	65.35976604	16.21705458	15.97514999	2.012485885	34.20469045
MB-62	47.76326535	1.942292088	0.034901281	1.907390807	45.82097327	10.07581751	4.577737938	0.45193866	15.10549411
MB-63	2.915873451	0.415518314	0.01587582	0.399642493	2.500355138	0.079492092	0.959141984	0.182923164	1.22155724
MB-64	37.50819364	2.084584267	0.028737358	2.055846909	35.42360937	7.960664682	4.934032581	0.368910322	13.26360759
MB-65	29.86626882	2.040212497	0.067536123	1.972676374	27.82605633	5.136919906	4.734423298	0.866569647	10.73791285
MB-67	32.56594449	0.673517051	0.007067926	0.666449125	31.89242744	7.200978862	1.599477901	0.081570265	8.882027028
MB-69	12.02943758	1.083266787	0.021029683	1.062237104	10.94617079	1.75667671	2.549369049	0.266149548	4.572195307
MB-7	8.347263771	1.514542906	0.045639075	1.468903831	6.832720865	1.324583927	3.525369194	0.565693435	5.415646557
MB-71	24.46872431	3.353349246	0.080121296	3.27322795	21.11537507	3.662592338	7.855747081	0.918415274	12.43675469
MB-73	0.490582257	0.117875081	0.005635042	0.112240039	0.372707177	0.015176115	0.269376094	0.059219078	0.343771287
MB-8	1.364293055	0.466300488	0.022485869	0.443814619	0.897992567	0.187029383	1.065155087	0.243063522	1.495247992
MR	19.27232136	2.195045084	0.052801935	2.142243148	17.07727627	0.518109657	5.141383556	0.670107351	6.329600565
MR-03	4.459737206	0.597700647	0.015490822	0.582209825	3.862036559	0.342640033	1.397303579	0.188179784	1.928123396
MR-04	6.901255498	0.852490986	0.021375798	0.831115188	6.048764512	0.184699444	1.994676451	0.271740725	2.45111662
MR-05	3.191493849	0.448939718	0.012129967	0.436809751	2.742554131	0.088058732	1.048343402	0.142027042	1.278429176
MR-06	11.70166426	0.896076074	0.017635262	0.878440811	10.80558819	0.871517627	2.108257947	0.222785079	3.202560654
MR-07	11.97120169	1.325760923	0.031494265	1.294266658	10.64544077	0.862698923	3.106239979	0.373979282	4.342918185
MR-08	7.068903909	0.534958371	0.010535723	0.524422649	6.533945538	0.707791638	1.258614357	0.134697229	2.101103223
MR-10	6.607371871	1.102379847	0.08573892	1.016640927	5.504992024	0.661900776	2.439938224	1.144970003	4.246809003
MR-11	1.196037312	0.243268253	0.007875693	0.23539256	0.952769059	0.114408253	0.564942145	0.09266765	0.772018047
MR-12	6.612517266	1.421750456	0.056117647	1.365632809	5.19076681	0.213043479	3.277518741	0.601457147	4.092019367
MR-13	8.491086097	1.986091735	0.067979846	1.918111889	6.504994362	0.210710313	4.603468534	0.844985599	5.659164445
MR-14	11.77657226	2.277694604	0.070866654	2.206827949	9.498877656	0.320435728	5.296387078	0.878738905	6.495561711



**Phosphorus loading and types of area per catchment**

Catchment ID	Total Area (acres)	Total Impervious Area (acres)	DCIA (acres)	Disconnected IA (acres)	Pervious Area (acres)	Pervious Area Nutrient Load (lbs/year)	Disconnected Area Nutrient Load (lbs/year)	DCIA Nutrient Load (lbs/year)	Nutrient Load in (lbs/year)
MR-15	10.05299182	1.208862478	0.029770845	1.179091633	8.844129341	0.651028697	2.82981992	0.357311635	3.838160253
MR-16	5.983726412	1.221500665	0.03943477	1.182065895	4.762225747	0.456217283	2.836958149	0.467446183	3.760621615
MR-17	28.56468173	3.172898693	0.074719579	3.098179114	25.39178303	0.871783602	7.435629874	0.917448603	9.22486208
MR-18	0.688642512	0.272417415	0.01429331	0.258124105	0.416225097	0.108060208	0.619497853	0.154188373	0.881746434
MR-19	20.46781168	9.668777782	0.372500263	9.296277518	10.7990339	1.378669622	22.31106604	5.165814763	28.85555043
MR-20	41.87236611	5.047162505	0.115496305	4.931666201	36.8252036	6.109125704	11.83599888	1.414078014	19.3592026
MR-23	4.588265694	0.902122349	0.028594044	0.873528305	3.686143345	0.870123764	2.096467932	0.364711056	3.331302752
MR-24	0.047670995	0.011594035	0.000571775	0.011022261	0.03607696	0.004395372	0.026453426	0.006003633	0.036852431
MR-25	24.32708569	3.343875109	0.088356595	3.255518514	20.98321058	4.416893691	7.813244433	1.121119757	13.35125788
MR-26	3.536120903	0.719758985	0.023072189	0.696686796	2.816361918	0.311134787	1.67204831	0.276768468	2.259951565
MR-27	8.329663635	1.06190484	0.028787509	1.033117331	7.267758795	1.183881652	2.479481595	0.385715652	4.049078899
MR-28	8.43056889	1.239832945	0.033629055	1.20620389	7.190735945	0.233807861	2.894889336	0.416032135	3.544729332
NP-02	6.928063155	0.844700282	0.019746347	0.824953935	6.083362873	0.948227313	1.979889444	0.244298179	3.172414937
NP-03	13.47554331	1.644448811	0.059653771	1.58479504	11.8310945	2.168740981	3.803508095	0.724227447	6.696476523
NP-04	1.10875692	0.265564205	0.012410582	0.253153623	0.843192715	0.164795366	0.607568694	0.130613243	0.902977303
NP-05	0.367457172	0.034602582	0.000970798	0.033631784	0.33285459	0.061058351	0.080716281	0.013615827	0.155390459
NP-06	11.7860245	0.84082512	0.022611596	0.818213524	10.94519938	2.617545117	1.963712457	0.303164676	4.88442225
NP-07	8.091434104	1.360247182	0.042918391	1.317328791	6.731186922	1.412492851	3.161589098	0.578645023	5.152726972
NP-08	26.63245847	18.6688771	1.178652473	17.49022463	7.963581368	1.667224229	41.97653911	17.21246896	60.8562323
OB-1	25.75617892	3.248902556	0.139042065	3.109860491	22.50727636	3.09743946	7.463665179	1.793409203	12.35451384
OB-3	27.25655459	2.694642178	0.060321601	2.634320577	24.56191241	4.746277478	6.322369385	0.695739034	11.7643859
OB-4	11.3297237	1.987058786	0.118550026	1.86850876	9.342664919	1.947183646	4.484421024	1.544937725	7.976542395
OF_14	31.54941954	4.153966872	0.138064324	4.015902548	27.39545267	5.15617324	9.638166114	1.856052728	16.65039208
OF_15	25.89584979	3.964792363	0.158201029	3.806591334	21.93105743	7.132360226	9.135819201	2.110124121	18.37830355
RB	18.31500626	0.604381931	0.007850602	0.596531329	17.71062433	2.962417058	1.431675189	0.100183398	4.494275645
RB-01	21.42989172	3.149667216	0.08012203	3.069545186	18.28022451	3.91977782	7.366908446	0.99101482	12.27770109
RB-03	10.3116475	0.902213817	0.026687026	0.875526791	9.409433688	1.919162654	2.101264297	0.376287069	4.39671402
RB-25	1.465550165	0.943895794	0.056302924	0.88759287	0.521654371	0.10923729	2.130222888	0.647444576	2.886904755
RB-34	0.469441362	0.204623815	0.009773709	0.194850106	0.264817547	0.031811501	0.467640254	0.113840002	0.613291757
RB-43	0.002515069	0.002270913	0.000167695	0.002103219	0.000244156	5.12727E-05	0.005047725	0.00185517	0.006954167
RMB-03	3.765424041	0.471860932	0.011979757	0.459881175	3.293563109	0.392653046	1.10371482	0.153552298	1.649920163
RMB-05	3.765920176	0.499053477	0.013193348	0.485860128	3.2668667	0.230420959	1.166064308	0.152732054	1.549217321
SP-06	6.92548866	0.885758517	0.022411866	0.863346651	6.039730143	0.929200507	2.072031963	0.273319142	3.274551612
SP-07	54.78935318	5.510082582	0.139515155	5.370567426	49.2792706	6.295693421	12.88936182	1.723986445	20.90904169

**Phosphorus loading and types of area per catchment**

Catchment ID	Total Area (acres)	Total Impervious Area (acres)	DCIA (acres)	Disconnected IA (acres)	Pervious Area (acres)	Pervious Area Nutrient Load (lbs/year)	Disconnected Area Nutrient Load (lbs/year)	DCIA Nutrient Load (lbs/year)	Nutrient Load in (lbs/year)
SP-1	8.376948491	1.757615988	0.057399034	1.700216954	6.619332503	0.795138183	4.08052069	0.683220037	5.55887891
SP-2	0.723249242	0.120357202	0.004897206	0.115459996	0.60289204	0.073064056	0.27710399	0.05142197	0.401590015
SP-5	5.193043238	1.030200193	0.032456726	0.997743468	4.162843045	0.500689904	2.394584322	0.396574775	3.291849001

**Phosphorus loading per land use type per catchment**

Catchment ID	Land/Soils Category	Total Impervious Area (acres)	%IA	%DCIA	DCIA (acres)	Disconnected IA	DCIA export Rate (lbs/acre/yr)	Disconnected Export Rate (lbs/acre/yr)	Annual Disconnected Area Nutrient Load (lbs/yr)	Annual DCIA Nutrient Load (lbs/yr)
1_OF	Com_IndTIA	0.006214656	0.000411985	8.36222E-07	1.26141E-05	0.006202042	15	2.4	0.014884901	0.000189212
1_OF	HWYTIA	0.512446307	0.033971319	0.000626136	0.009445057	0.50300125	10.5	2.4	1.207203	0.099173095
1_OF	LDRTIA	0.453074755	0.030035433	0.000520536	0.007852118	0.445222637	14.1	2.4	1.068534328	0.110714863
12_OF	HWYTIA	2.053826181	0.033695772	0.000618533	0.037700871	2.016125309	10.5	2.4	4.838700743	0.39585915
12_OF	LDRTIA	3.021719104	0.049575353	0.001103821	0.067280157	2.954438947	14.1	2.4	7.090653473	0.948650213
13_OF	HWYTIA	0.197169369	0.041069617	0.000832302	0.003995763	0.193173606	10.5	2.4	0.463616653	0.041955516
13_OF	LDRTIA	0.247169997	0.051484554	0.001168195	0.005608339	0.241561659	14.1	2.4	0.57974798	0.079077575
2_OF	HWYTIA	0.236049354	0.081037377	0.002306896	0.006719632	0.229329721	10.5	2.4	0.550391331	0.070556138
2_OF	LDRTIA	0.144440879	0.049587554	0.001104229	0.003216447	0.141224432	14.1	2.4	0.338938636	0.04535191
3_OF	HWYTIA	0.502538568	0.088245432	0.002621431	0.014928477	0.487610091	10.5	2.4	1.170264218	0.156749013
3_OF	LDRTIA	0.467719255	0.082131185	0.00235376	0.01340415	0.454315104	14.1	2.4	1.09035625	0.188998521
4_OF	HWYTIA	0.514801707	0.185121785	0.007965009	0.022149746	0.492651961	10.5	2.4	1.182364707	0.232572329
4_OF	LDRTIA	0.007068428	0.002541794	1.28148E-05	3.56363E-05	0.007032792	14.1	2.4	0.016878701	0.000502472
5_OF	HWYTIA	0.074178099	0.052917492	0.001217304	0.001706378	0.072471721	10.5	2.4	0.17393213	0.017916972
5_OF	LDRTIA	0.038700788	0.027608535	0.000458738	0.000643045	0.038057743	14.1	2.4	0.091338583	0.009066937
5_OF	MFR_HDRTIA	0.064613637	0.046094355	0.009964082	0.013967341	0.050646296	14.1	2.4	0.121551111	0.196939503
6_OF	Com_IndTIA	0.985748136	0.013771347	0.000161609	0.011567891	0.974180245	15	2.4	2.338032589	0.173518358
6_OF	HWYTIA	1.305342318	0.018236222	0.000246265	0.017627546	1.287714772	10.5	2.4	3.090515454	0.185089231
6_OF	LDRTIA	0.260408739	0.003638028	2.19432E-05	0.001570683	0.258838056	14.1	2.4	0.621211335	0.022146631
6_OF	OpenTIA	0.000729912	1.01972E-05	3.25628E-09	2.33083E-07	0.000729679	11.3	2.4	0.001751229	2.63384E-06
7_OF	Com_IndTIA	0.849016634	0.056086723	0.001328281	0.020106952	0.828909683	15	2.4	1.989383239	0.301604273
7_OF	HWYTIA	0.267348558	0.017661261	0.000234711	0.003552947	0.263795612	10.5	2.4	0.633109468	0.037305941
7_OF	OpenTIA	0.910959138	0.060178694	0.001476264	0.022347054	0.888612084	11.3	2.4	2.132669002	0.252521709
8_OF	HWYTIA	0.344044554	0.088659335	0.002639895	0.010244173	0.33380038	10.5	2.4	0.801120913	0.107563821
8_OF	LDRTIA	0.313637783	0.080823594	0.002297774	0.008916562	0.30472122	14.1	2.4	0.731330929	0.12572353
9_OF	HWYTIA	0.166856498	0.145536375	0.005552101	0.006365447	0.160491051	10.5	2.4	0.385178522	0.066837193
9_OF	LDRTIA	0.064004836	0.055826606	0.001319052	0.001512284	0.062492552	14.1	2.4	0.149982125	0.021323207
MB	HWYTIA	2.427970116	0.027985897	0.000468176	0.040617478	2.387352638	10.5	2.4	5.729646331	0.426483521
MB	LDRTIA	2.245929109	0.025887609	0.000416522	0.036136161	2.209792947	14.1	2.4	5.303503074	0.509519875
MB	MFR_HDRTIA	0.354840849	0.004090058	0.000544672	0.047254101	0.307586748	14.1	2.4	0.738208196	0.666282821
MB	OpenTIA	0.004897091	5.64461E-05	4.24083E-08	3.67921E-06	0.004893411	11.3	2.4	0.011744187	4.15751E-05
MB-03	HWYTIA	0.059642982	0.003822431	2.36325E-05	0.000368748	0.059274235	10.5	2.4	0.142258164	0.00387185
MB-03	LDRTIA	0.481373632	0.03085053	0.000541869	0.008455	0.472918632	14.1	2.4	1.135004717	0.1192155
MB-09	HWYTIA	0.120774646	0.235927456	0.011459554	0.00586631	0.114908336	10.5	2.4	0.275780005	0.061596256
MB-09	LDRTIA	0.011652051	0.022761721	0.000343406	0.000175794	0.011476257	14.1	2.4	0.027543016	0.0024787
MB-09	OpenTIA	0.000248243	0.000484931	1.06787E-06	5.4666E-07	0.000247697	11.3	2.4	0.000594472	6.17726E-06
MB-1	HWYTIA	0.161474151	0.022758134	0.000343325	0.002435967	0.159038185	10.5	2.4	0.381691644	0.02557765
MB-1	LDRTIA	0.350315926	0.049373456	0.001097085	0.007784068	0.342531857	14.1	2.4	0.822076458	0.109755365

**Phosphorus loading per land use type per catchment**

Catchment ID	Land/Soils Category	Total Impervious Area (acres)	%IA	%DCIA	DCIA (acres)	Disconnected IA	DCIA export Rate (lbs/acre/yr)	Disconnected Export Rate (lbs/acre/yr)	Annual Disconnected Area Nutrient Load (lbs/yr)	Annual DCIA Nutrient Load (lbs/yr)
MB-1	MFR_HDRTIA	0.076736835	0.010815274	0.001749464	0.012412846	0.064323989	14.1	2.4	0.154377573	0.175021134
MB-10	HWYTIA	0.682606109	0.054968626	0.001288761	0.016003966	0.666602143	10.5	2.4	1.599845144	0.16804164
MB-10	LDRTIA	0.488162505	0.039310551	0.000779406	0.009678744	0.478483761	14.1	2.4	1.148361027	0.136470285
MB-10	MFR_HDRTIA	0.171935534	0.013845555	0.002353057	0.029220504	0.14271503	14.1	2.4	0.342516071	0.412009107
MB-10	OpenTIA	0.016824767	0.001354858	4.98701E-06	6.19293E-05	0.016762838	11.3	2.4	0.04023081	0.000699801
MB-12	Com_IndTIA	0.155068657	0.009235915	8.87605E-05	0.001490267	0.15357839	15	2.4	0.368588136	0.022354
MB-12	HWYTIA	1.141412163	0.067982696	0.001772546	0.0297606	1.111651562	10.5	2.4	2.66796375	0.312486303
MB-12	LDRTIA	0.650584453	0.038748917	0.000762763	0.012806589	0.637777864	14.1	2.4	1.530666874	0.180572902
MB-13	HWYTIA	1.269506697	0.010384435	0.000105822	0.012936787	1.25656991	10.5	2.4	3.015767785	0.135836263
MB-13	LDRTIA	3.879678994	0.031735376	0.000565348	0.069114253	3.810564741	14.1	2.4	9.145355378	0.974510972
MB-14	HWYTIA	0.451590693	0.043454241	0.000905833	0.009413715	0.442176977	10.5	2.4	1.061224746	0.098844013
MB-14	LDRTIA	0.715574175	0.068856009	0.001806811	0.018776973	0.696797202	14.1	2.4	1.672313286	0.26475532
MB-15	HWYTIA	0.55093164	0.047849661	0.001046691	0.01205139	0.53888025	10.5	2.4	1.293312599	0.126539597
MB-15	LDRTIA	0.364563671	0.031663181	0.000563419	0.006487101	0.35807657	14.1	2.4	0.859383768	0.091468124
MB-15	MDRTIA	0.045555932	0.003956636	2.4888E-05	0.000286555	0.045269377	14.1	2.4	0.108646505	0.004040425
MB-15	MFR_HDRTIA	0.000312675	2.71566E-05	1.32651E-06	1.52732E-05	0.000297402	14.1	2.4	0.000713765	0.000215351
MB-16	HWYTIA	2.536792157	0.050477186	0.001134077	0.056994435	2.479797722	10.5	2.4	5.951514533	0.59844157
MB-16	LDRTIA	3.017085286	0.060034077	0.001470946	0.073924178	2.943161108	14.1	2.4	7.063586659	1.042330912
MB-16	MFR_HDRTIA	0.530645474	0.010558804	0.001699799	0.085425474	0.44522	14.1	2.4	1.068528	1.204499188
MB-16	OpenTIA	0.324464151	0.0064562	5.18759E-05	0.002607085	0.321857066	11.3	2.4	0.772456959	0.029460061
MB-18	HWYTIA	0.936797934	0.162731334	0.006564577	0.037790402	0.899007532	10.5	2.4	2.157618076	0.396799225
MB-18	LDRTIA	0.338713708	0.058838018	0.001427207	0.008216026	0.330497683	14.1	2.4	0.793194438	0.115845963
MB-19	HWYTIA	0.561614018	0.034745788	0.000647669	0.01046861	0.551145408	10.5	2.4	1.322748979	0.109920406
MB-19	LDRTIA	0.470951106	0.029136679	0.000497348	0.008038886	0.462912221	14.1	2.4	1.110989329	0.113348287
MB-20	HWYTIA	0.280488337	0.051307962	0.00116219	0.006353414	0.274134922	10.5	2.4	0.657923813	0.066710852
MB-20	LDRTIA	0.126825748	0.023199434	0.000353359	0.001931729	0.124894019	14.1	2.4	0.299745647	0.027237374
MB-21	HWYTIA	0.306738484	0.07129736	0.001903751	0.008190398	0.298548086	10.5	2.4	0.716515406	0.085999176
MB-21	LDRTIA	0.245452603	0.057052256	0.001362728	0.005862786	0.239589816	14.1	2.4	0.575015559	0.082665285
MB-22	HWYTIA	0.289713404	0.073433259	0.001989936	0.007850819	0.281862585	10.5	2.4	0.676470204	0.082433604
MB-22	LDRTIA	0.448203846	0.113605614	0.003829126	0.015106904	0.433096941	14.1	2.4	1.039432659	0.213007349
MB-24	HWYTIA	0.13425445	0.139229499	0.005195136	0.005009499	0.129244951	10.5	2.4	0.310187882	0.052599743
MB-24	LDRTIA	0.090047398	0.093384273	0.002853715	0.002751744	0.087295654	14.1	2.4	0.20950957	0.038799591
MB-26	HWYTIA	1.591966379	0.076397538	0.002111636	0.044002117	1.547964262	10.5	2.4	3.715114229	0.462022231
MB-26	LDRTIA	1.359752266	0.065253718	0.001666894	0.03473461	1.325017656	14.1	2.4	3.180042374	0.489757996
MB29	HWYTIA	0.351063632	0.238017663	0.011612181	0.01712736	0.333936272	10.5	2.4	0.801447053	0.179837284
MB29	LDRTIA	0.141127099	0.095682774	0.00295972	0.004365433	0.136761666	14.1	2.4	0.328227999	0.061552601
MB-29	HWYTIA	0.294355311	0.079339418	0.002234774	0.008291181	0.286064131	10.5	2.4	0.686553914	0.087057398
MB-29	LDRTIA	0.05963387	0.016073488	0.000203782	0.000756046	0.058877824	14.1	2.4	0.141306777	0.010660245

**Phosphorus loading per land use type per catchment**

Catchment ID	Land/Soils Category	Total Impervious Area (acres)	%IA	%DCIA	DCIA (acres)	Disconnected IA	DCIA export Rate (lbs/acre/yr)	Disconnected Export Rate (lbs/acre/yr)	Annual Disconnected Area Nutrient Load (lbs/yr)	Annual DCIA Nutrient Load (lbs/yr)
MB-29	MFR_HDRTIA	0.266667999	0.071876684	0.016981093	0.063001153	0.203666845	14.1	2.4	0.488800429	0.888316261
MB-37	HWYTIA	0.264827418	0.083127103	0.002396702	0.007635444	0.257191974	10.5	2.4	0.617260738	0.080172157
MB-37	LDRTIA	0.328959516	0.10325763	0.003318052	0.010570695	0.318388821	14.1	2.4	0.764133171	0.149046796
MB-37	OpenTIA	5.77709E-05	1.81338E-05	7.72206E-09	2.4601E-08	5.77463E-05	11.3	2.4	0.000138591	2.77992E-07
MB-38	Com_IndTIA	1.521998623	0.035577697	0.000671068	0.028708016	1.493290608	15	2.4	3.583897459	0.430620236
MB-38	HWYTIA	6.596244238	0.154191453	0.00605467	0.25901617	6.337228068	10.5	2.4	15.20934736	2.719669787
MB-38	LDRTIA	1.742760663	0.040738152	0.000822246	0.035175348	1.707585314	14.1	2.4	4.098204755	0.495972414
MB-38	MDRTIA	0.494457765	0.011558268	0.000124262	0.005315885	0.48914188	14.1	2.4	1.173940511	0.07495398
MB-38	MFR_HDRTIA	1.431035252	0.03345137	0.006781983	0.290130312	1.14090494	14.1	2.4	2.738171856	4.090837392
MB-38	OpenTIA	0.049607481	0.001159607	3.94881E-06	0.000168928	0.049438553	11.3	2.4	0.118652526	0.00190889
MB-39	HWYTIA	0.053635112	0.088381732	0.002627506	0.001594522	0.05204059	10.5	2.4	0.124897416	0.016742478
MB-39	LDRTIA	0.071478094	0.117783994	0.004042308	0.002453105	0.069024989	14.1	2.4	0.165659973	0.034588778
MB-39	MFR_HDRTIA	0.00179768	0.002962277	0.000369837	0.000224439	0.001573241	14.1	2.4	0.003775779	0.003164583
MB-4	HWYTIA	1.026504396	0.017114893	0.000223904	0.013429131	1.013075265	10.5	2.4	2.431380635	0.141005876
MB-4	LDRTIA	1.374580224	0.022918357	0.000346957	0.020809509	1.353770715	14.1	2.4	3.249049717	0.293414075
MB-4	MFR_HDRTIA	0.038441669	0.000640937	5.89167E-05	0.003533665	0.034908004	14.1	2.4	0.083779209	0.049824673
MB-4	OpenTIA	0.169931288	0.002833262	1.5081E-05	0.000904517	0.169026771	11.3	2.4	0.405664251	0.010221042
MB-40	HWYTIA	1.342289368	0.040168225	0.000805052	0.02690218	1.315387188	10.5	2.4	3.156929252	0.282472887
MB-40	LDRTIA	1.216323374	0.036398672	0.00069443	0.023205548	1.193117826	14.1	2.4	2.863482783	0.327198222
MB-40	MFR_HDRTIA	0.375467541	0.011235926	0.001831431	0.061200387	0.314267154	14.1	2.4	0.754241169	0.862925453
MB-40	OpenTIA	0.006482334	0.000193985	2.70179E-07	9.02849E-06	0.006473305	11.3	2.4	0.015535933	0.000102022
MB-41	Com_IndTIA	8.618999897	0.157869317	0.006272586	0.342456758	8.276543139	15	2.4	19.86370353	5.136851371
MB-41	HWYTIA	3.550955129	0.065040825	0.001658743	0.090560373	3.460394756	10.5	2.4	8.304947414	0.950883921
MB-41	LDRTIA	1.452906271	0.026612058	0.000434128	0.023701554	1.429204716	14.1	2.4	3.430091319	0.334191914
MB-41	MFR_HDRTIA	0.245380796	0.0044945	0.000609927	0.033299434	0.212081363	14.1	2.4	0.50899527	0.469522016
MB-41	OpenTIA	0.060439692	0.001107039	3.68336E-06	0.000201096	0.060238596	11.3	2.4	0.14457263	0.002272387
MB-43	Com_IndTIA	0.20587071	0.043407559	0.000904374	0.004289209	0.201581501	15	2.4	0.483795602	0.064338141
MB-43	HWYTIA	0.7186805	0.151532807	0.00589875	0.02797623	0.69070427	10.5	2.4	1.657690248	0.293750419
MB-43	LDRTIA	0.505802133	0.106647692	0.003482789	0.016517959	0.489284174	14.1	2.4	1.174282017	0.232903224
MB-43	MFR_HDRTIA	0.05967769	0.01258296	0.00209797	0.009950125	0.049727564	14.1	2.4	0.119346154	0.140296768
MB-44	Com_IndTIA	0.436294957	0.472370738	0.032465678	0.029986217	0.406308739	15	2.4	0.975140974	0.449793262
MB-44	HWYTIA	0.035393879	0.038320481	0.000750147	0.000692857	0.034701022	10.5	2.4	0.083282452	0.007274999
MB-44	MFR_HDRTIA	0.058815272	0.063678511	0.01468424	0.013562779	0.045252493	14.1	2.4	0.108605983	0.191235181
MB-46	HWYTIA	0.013224334	0.003277384	1.87625E-05	7.57072E-05	0.013148626	10.5	2.4	0.031556703	0.000794926
MB-46	LDRTIA	0.362551637	0.089851096	0.002693302	0.010867548	0.351684089	14.1	2.4	0.844041814	0.153232424
MB-47	HWYTIA	0.063605372	0.439705964	0.029157047	0.004217693	0.059387679	10.5	2.4	0.14253043	0.044285778
MB-47	LDRTIA	0.020205338	0.139680145	0.005220379	0.00075515	0.019450188	14.1	2.4	0.04668045	0.010647621
MB-48	Com_IndTIA	0.238823895	0.238634014	0.011657315	0.01166659	0.227157304	15	2.4	0.545177531	0.174998856

**Phosphorus loading per land use type per catchment**

Catchment ID	Land/Soils Category	Total Impervious Area (acres)	%IA	%DCIA	DCIA (acres)	Disconnected IA	DCIA export Rate (lbs/acre/yr)	Disconnected Export Rate (lbs/acre/yr)	Annual Disconnected Area Nutrient Load (lbs/yr)	Annual DCIA Nutrient Load (lbs/yr)
MB-48	HWYTIA	0.338023514	0.337754762	0.019629183	0.019644802	0.318378712	10.5	2.4	0.764108909	0.20627042
MB-48	LDRTIA	0.001092322	0.001091454	3.60585E-06	3.60872E-06	0.001088714	14.1	2.4	0.002612913	5.0883E-05
MB-48	MFR_HDRTIA	0.0798797	0.079816191	0.019256138	0.01927146	0.06060824	14.1	2.4	0.145459777	0.271727586
MB-49	HWYTIA	0.299898436	0.112167719	0.003756659	0.010044033	0.289854403	10.5	2.4	0.695650567	0.10546235
MB-49	LDRTIA	0.067888691	0.025391662	0.00040461	0.00108179	0.066806901	14.1	2.4	0.160336563	0.01525324
MB-49	OpenTIA	0.000464003	0.000173546	2.28624E-07	6.11262E-07	0.000463391	11.3	2.4	0.001112139	6.90726E-06
MB-50	AgTIA	0.017341187	0.001141826	1.30377E-08	1.98006E-07	0.017340989	11.3	2.4	0.041618375	2.23747E-06
MB-50	Com_IndTIA	0.531100084	0.034970157	0.000653953	0.009931736	0.521168348	15	2.4	1.250804035	0.148976039
MB-50	HWYTIA	5.296885595	0.34877216	0.020597415	0.312817829	4.984067765	10.5	2.4	11.96176264	3.284587208
MB-50	LDRTIA	0.757620695	0.049885353	0.001114191	0.01692148	0.740699215	14.1	2.4	1.777678115	0.238592872
MB-50	MFR_HDRTIA	0.008981881	0.00059141	5.34966E-05	0.000812466	0.008169415	14.1	2.4	0.019606596	0.011455765
MB-52	HWYTIA	0.366600867	0.045076153	0.000957018	0.007783356	0.35881751	10.5	2.4	0.861162025	0.08172524
MB-52	LDRTIA	0.664563788	0.081712788	0.002335797	0.018996854	0.645566934	14.1	2.4	1.549360642	0.267855642
MB-52	OpenTIA	0.115636247	0.014218289	0.00016954	0.001378852	0.114257395	11.3	2.4	0.274217747	0.015581028
MB-60	HWYTIA	0.629196326	0.051787429	0.001178519	0.014318527	0.614877799	10.5	2.4	1.475706717	0.150344537
MB-60	LDRTIA	0.6149813	0.050617429	0.001138807	0.013836044	0.601145255	14.1	2.4	1.442748612	0.195088227
MB-60	OpenTIA	8.52115E-06	7.01352E-07	5.8736E-11	7.13619E-10	8.52044E-06	11.3	2.4	2.0449E-05	8.06389E-09
MB-61	Com_IndTIA	1.195646551	0.016564981	0.0002132	0.015388571	1.18025798	15	2.4	2.832619152	0.230828562
MB-61	HWYTIA	3.655479911	0.050644528	0.001139722	0.08226416	3.573215751	10.5	2.4	8.575717802	0.863773678
MB-61	LDRTIA	1.361942939	0.01886892	0.000259191	0.018708218	1.343234721	14.1	2.4	3.22376333	0.263785881
MB-61	MFR_HDRTIA	0.330536325	0.004579387	0.000623776	0.045023645	0.28551268	14.1	2.4	0.685230432	0.634833392
MB-61	OpenTIA	0.275796174	0.003820994	2.36192E-05	0.001704812	0.274091362	11.3	2.4	0.65781927	0.019264372
MB-62	HWYTIA	0.834898748	0.017479934	0.000231105	0.011038339	0.82386041	10.5	2.4	1.977264983	0.115902555
MB-62	LDRTIA	0.972101585	0.020352494	0.000290353	0.013868212	0.958233373	14.1	2.4	2.299760096	0.195541789
MB-62	MFR_HDRTIA	0.086893261	0.001819249	0.00020603	0.009840666	0.077052595	14.1	2.4	0.184926227	0.138753395
MB-62	OpenTIA	0.048398494	0.0010133	3.22557E-06	0.000154064	0.04824443	11.3	2.4	0.115786632	0.001740922
MB-63	HWYTIA	0.335263854	0.114978877	0.003898765	0.011368306	0.323895548	10.5	2.4	0.777349316	0.119367216
MB-63	LDRTIA	0.055946367	0.01918683	0.000265769	0.00077495	0.055171417	14.1	2.4	0.132411402	0.01092679
MB-63	MFR_HDRTIA	0.024308092	0.00833647	0.001280084	0.003732564	0.020575528	14.1	2.4	0.049381267	0.052629158
MB-64	Com_IndTIA	0.723158028	0.019280001	0.000267708	0.010041226	0.713116802	15	2.4	1.711480325	0.15061839
MB-64	HWYTIA	0.840858322	0.02241799	0.000335656	0.012589868	0.828268454	10.5	2.4	1.98784429	0.132193611
MB-64	LDRTIA	0.50799708	0.01354363	0.000157617	0.005911923	0.502085157	14.1	2.4	1.205004376	0.08335811
MB-64	MDRTIA	0.009611051	0.000256239	4.10173E-07	1.53849E-05	0.009595667	14.1	2.4	0.0230296	0.000216926
MB-64	MFR_HDRTIA	0.002959786	7.89104E-05	4.77113E-06	0.000178956	0.002780829	14.1	2.4	0.006673991	0.002523284
MB-65	HWYTIA	1.191543927	0.039895975	0.000796881	0.023799871	1.167744056	10.5	2.4	2.802585735	0.249898645
MB-65	LDRTIA	0.614393495	0.020571485	0.000295052	0.0088121	0.605581395	14.1	2.4	1.453395348	0.124250613
MB-65	MFR_HDRTIA	0.230877084	0.007730362	0.00116923	0.034920527	0.195956557	14.1	2.4	0.470295736	0.492379433
MB-65	OpenTIA	0.003397991	0.000113774	1.21356E-07	3.62446E-06	0.003394366	11.3	2.4	0.008146479	4.09564E-05

**Phosphorus loading per land use type per catchment**

Catchment ID	Land/Soils Category	Total Impervious Area (acres)	%IA	%DCIA	DCIA (acres)	Disconnected IA	DCIA export Rate (lbs/acre/yr)	Disconnected Export Rate (lbs/acre/yr)	Annual Disconnected Area Nutrient Load (lbs/yr)	Annual DCIA Nutrient Load (lbs/yr)
MB-67	HWYTIA	0.434815579	0.013351849	0.000154281	0.005024303	0.429791277	10.5	2.4	1.031499064	0.052755179
MB-67	LDRTIA	0.238701472	0.007329788	6.27534E-05	0.002043623	0.236657849	14.1	2.4	0.567978837	0.028815086
MB-69	Com_IndTIA	0.490802903	0.040800154	0.000824124	0.009913751	0.480889152	15	2.4	1.154133965	0.148706271
MB-69	HWYTIA	0.515290714	0.042835811	0.000886565	0.010664876	0.504625838	10.5	2.4	1.211102011	0.111981199
MB-69	LDRTIA	0.02735006	0.002273594	1.0841E-05	0.000130411	0.027219649	14.1	2.4	0.065327158	0.001838797
MB-69	OpenTIA	0.049823109	0.004141765	2.6655E-05	0.000320644	0.049502465	11.3	2.4	0.118805915	0.003623281
MB-7	HWYTIA	0.730630795	0.087529377	0.002589588	0.021615978	0.709014817	10.5	2.4	1.701635561	0.22696777
MB-7	LDRTIA	0.78391211	0.093912464	0.002877961	0.024023097	0.759889014	14.1	2.4	1.823733633	0.338725666
MB-71	Com_IndTIA	0.421186225	0.017213248	0.000225837	0.005525932	0.415660292	15	2.4	0.997584701	0.082888987
MB-71	HWYTIA	2.059731016	0.084178112	0.002442299	0.059759933	1.999971083	10.5	2.4	4.799930599	0.627479292
MB-71	LDRTIA	0.798730282	0.032642907	0.000589771	0.014430938	0.784299344	14.1	2.4	1.882318425	0.203476226
MB-71	OpenTIA	0.073701724	0.003012079	1.6531E-05	0.000404493	0.073297231	11.3	2.4	0.175913355	0.004570769
MB-73	HWYTIA	0.115727851	0.235898975	0.011457479	0.005620836	0.110107015	10.5	2.4	0.264256837	0.059018778
MB-73	LDRTIA	0.002147229	0.0043769	2.89568E-05	1.42057E-05	0.002133024	14.1	2.4	0.005119257	0.0002003
MB-8	HWYTIA	0.386251746	0.28311494	0.015064134	0.020551894	0.365699852	10.5	2.4	0.877679646	0.215794886
MB-8	LDRTIA	0.079906351	0.058569785	0.001417459	0.001933829	0.077972522	14.1	2.4	0.187134053	0.027266992
MB-8	OpenTIA	0.00014239	0.000104369	1.06625E-07	1.45468E-07	0.000142245	11.3	2.4	0.000341388	1.64379E-06
MR	HWYTIA	0.93718367	0.048628479	0.001072349	0.020666649	0.916517022	10.5	2.4	2.199640852	0.21699981
MR	LDRTIA	1.257861413	0.065267769	0.001667432	0.032135287	1.225726127	14.1	2.4	2.941742704	0.453107541
MR-03	HWYTIA	0.315716319	0.070792584	0.001883569	0.008400225	0.307316094	10.5	2.4	0.737558626	0.088202361
MR-03	LDRTIA	0.281984328	0.063228911	0.001589914	0.007090597	0.274893731	14.1	2.4	0.659744953	0.099977423
MR-04	HWYTIA	0.36047004	0.052232531	0.001193745	0.00823834	0.3522317	10.5	2.4	0.84535608	0.086502569
MR-04	LDRTIA	0.492020946	0.071294411	0.001903633	0.013137458	0.478883488	14.1	2.4	1.149320371	0.185238155
MR-05	HWYTIA	0.274652228	0.086057577	0.002524548	0.00805708	0.266595148	10.5	2.4	0.639828355	0.084599342
MR-05	LDRTIA	0.174287489	0.054610003	0.001276169	0.004072887	0.170214603	14.1	2.4	0.408515047	0.057427701
MR-06	HWYTIA	0.392436062	0.033536773	0.000614161	0.007186701	0.385249362	10.5	2.4	0.924598468	0.075460355
MR-06	LDRTIA	0.503640011	0.043040033	0.000892912	0.010448562	0.49319145	14.1	2.4	1.183659479	0.147324723
MR-07	HWYTIA	0.768447779	0.064191365	0.001626353	0.019469404	0.748978374	10.5	2.4	1.797548098	0.204428746
MR-07	LDRTIA	0.557313145	0.046554486	0.001004482	0.012024861	0.545288284	14.1	2.4	1.308691881	0.169550536
MR-08	HWYTIA	0.218784846	0.030950321	0.0005445	0.003849017	0.214935829	10.5	2.4	0.515845991	0.040414677
MR-08	LDRTIA	0.316173525	0.044727376	0.000945932	0.006686706	0.309486819	14.1	2.4	0.742768366	0.094282551
MR-10	HWYTIA	0.592965458	0.089743013	0.002688444	0.017763548	0.57520191	10.5	2.4	1.380484585	0.186517256
MR-10	LDRTIA	0.211172831	0.031960185	0.000571365	0.003775224	0.207397607	14.1	2.4	0.497754257	0.053230654
MR-10	MFR_HDRTIA	0.298241558	0.045137698	0.009716442	0.064200148	0.234041409	14.1	2.4	0.561699383	0.905222093
MR-11	HWYTIA	0.146084559	0.12214047	0.004268639	0.005105451	0.140979108	10.5	2.4	0.33834986	0.053607235
MR-11	LDRTIA	0.097183694	0.081254734	0.002316184	0.002770242	0.094413452	14.1	2.4	0.226592285	0.039060415
MR-12	HWYTIA	1.224956423	0.185248125	0.007973165	0.052722689	1.172233734	10.5	2.4	2.813360962	0.553588231
MR-12	LDRTIA	0.196794033	0.029760835	0.000513414	0.003394959	0.193399075	14.1	2.4	0.464157779	0.047868916



**Phosphorus loading per land use type per catchment**

Catchment ID	Land/Soils Category	Total Impervious Area (acres)	%IA	%DCIA	DCIA (acres)	Disconnected IA	DCIA export Rate (lbs/acre/yr)	Disconnected Export Rate (lbs/acre/yr)	Annual Disconnected Area Nutrient Load (lbs/yr)	Annual DCIA Nutrient Load (lbs/yr)
MR-13	HWYTIA	0.945207337	0.111317601	0.003714033	0.031536174	0.913671163	10.5	2.4	2.192810792	0.331129828
MR-13	LDRTIA	1.040884397	0.122585543	0.004291992	0.036443672	1.004440726	14.1	2.4	2.410657742	0.513855771
MR-14	HWYTIA	1.096689002	0.093124636	0.002841822	0.033466923	1.063222079	10.5	2.4	2.55173299	0.351402689
MR-14	LDRTIA	1.181005602	0.100284325	0.003175774	0.037399732	1.14360587	14.1	2.4	2.744654088	0.527336216
MR-15	HWYTIA	0.671352913	0.066781404	0.001725772	0.017349168	0.654003745	10.5	2.4	1.569608988	0.182166264
MR-15	LDRTIA	0.537299393	0.053446715	0.00123561	0.012421581	0.524877812	14.1	2.4	1.259706749	0.175144286
MR-15	OpenTIA	0.000210172	2.09065E-05	9.55918E-09	9.60983E-08	0.000210076	11.3	2.4	0.000504183	1.08591E-06
MR-16	HWYTIA	0.712895712	0.119139089	0.004112268	0.024606687	0.688289026	10.5	2.4	1.651893661	0.25837021
MR-16	LDRTIA	0.508604953	0.084998029	0.002478068	0.014828083	0.49377687	14.1	2.4	1.185064487	0.209075973
MR-17	HWYTIA	1.598210725	0.055950588	0.001323448	0.037803879	1.560406846	10.5	2.4	3.744976431	0.396940731
MR-17	LDRTIA	1.573043552	0.055069528	0.001292311	0.036914452	1.5361291	14.1	2.4	3.68670984	0.520493773
MR-17	OpenTIA	0.001644416	5.75681E-05	4.36791E-08	1.24768E-06	0.001643168	11.3	2.4	0.003943603	1.40988E-05
MR-18	Com_IndTIA	0.038029321	0.055223603	0.001297738	0.000893678	0.037135643	15	2.4	0.089125543	0.013405166
MR-18	HWYTIA	0.230959996	0.335384459	0.019422915	0.013375445	0.217584552	10.5	2.4	0.522202924	0.14044217
MR-18	MDRTIA	0.003428098	0.004978051	3.51228E-05	2.4187E-05	0.003403911	14.1	2.4	0.008169385	0.000341037
MR-19	Com_IndTIA	4.002416265	0.195546858	0.008647215	0.176989571	3.825426695	15	2.4	9.181024067	2.654843561
MR-19	HWYTIA	1.999588865	0.097694316	0.003053542	0.06249933	1.937089536	10.5	2.4	4.649014886	0.65624296
MR-19	LDRTIA	3.184441163	0.155582884	0.006136811	0.125607085	3.058834078	14.1	2.4	7.341201787	1.771059901
MR-19	OpenTIA	0.482331488	0.023565367	0.000361752	0.007404278	0.47492721	11.3	2.4	1.139825303	0.083668341
MR-20	HWYTIA	2.372120261	0.056651211	0.001348385	0.056460056	2.315660205	10.5	2.4	5.557584492	0.592830586
MR-20	LDRTIA	2.234428971	0.053362854	0.001232703	0.051616206	2.182812765	14.1	2.4	5.238750637	0.727788505
MR-20	MFR_HDRTIA	0.035345511	0.000844125	8.19876E-05	0.003433014	0.031912497	14.1	2.4	0.076589993	0.048405501
MR-20	OpenTIA	0.405267762	0.009678645	9.52186E-05	0.003987028	0.401280734	11.3	2.4	0.963073761	0.045053422
MR-23	HWYTIA	0.374160631	0.08154729	0.002328704	0.010684713	0.363475918	10.5	2.4	0.872342203	0.112189485
MR-23	LDRTIA	0.527961718	0.115067817	0.00390329	0.017909331	0.510052387	14.1	2.4	1.224125728	0.252521572
MR-24	HWYTIA	0.011594035	0.243209427	0.011994181	0.000571775	0.011022261	10.5	2.4	0.026453426	0.006003633
MR-25	HWYTIA	1.429195969	0.058749165	0.001423976	0.034641176	1.394554793	10.5	2.4	3.346931503	0.363732352
MR-25	LDRTIA	1.914679139	0.078705652	0.00220805	0.053715419	1.86096372	14.1	2.4	4.466312929	0.757387405
MR-26	HWYTIA	0.400648278	0.113301634	0.003813768	0.013485944	0.387162333	10.5	2.4	0.9291896	0.141602417
MR-26	LDRTIA	0.319110707	0.090243155	0.002710949	0.009586245	0.309524462	14.1	2.4	0.742858709	0.13516605
MR-27	HWYTIA	0.296988423	0.035654312	0.000673237	0.005607839	0.291380584	10.5	2.4	0.699313402	0.058882311
MR-27	LDRTIA	0.764916416	0.091830409	0.002782786	0.02317967	0.741736747	14.1	2.4	1.780168193	0.326833341
MR-28	HWYTIA	0.603561779	0.071592058	0.001915567	0.016149317	0.587412462	10.5	2.4	1.409789908	0.169567826
MR-28	LDRTIA	0.636271166	0.075471914	0.002073376	0.017479738	0.618791428	14.1	2.4	1.485099428	0.246464309
NP-02	HWYTIA	0.256616057	0.037040086	0.000712866	0.004938782	0.251677275	10.5	2.4	0.604025461	0.051857207
NP-02	LDRTIA	0.274565157	0.039630868	0.000788952	0.005465907	0.26909925	14.1	2.4	0.645838201	0.077069285
NP-02	MFR_HDRTIA	0.026638685	0.003845041	0.000505756	0.00350391	0.023134775	14.1	2.4	0.055523459	0.049405133
NP-02	OpenTIA	0.286880383	0.041408454	0.000842623	0.005837748	0.281042635	11.3	2.4	0.674502323	0.065966555



**Phosphorus loading per land use type per catchment**

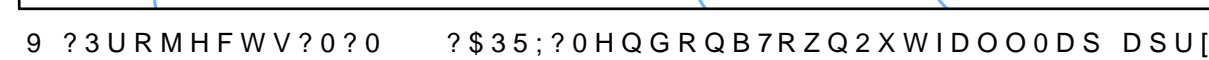
Catchment ID	Land/Soils Category	Total Impervious Area (acres)	%IA	%DCIA	DCIA (acres)	Disconnected IA	DCIA export Rate (lbs/acre/yr)	Disconnected Export Rate (lbs/acre/yr)	Annual Disconnected Area Nutrient Load (lbs/yr)	Annual DCIA Nutrient Load (lbs/yr)
NP-03	HWYTIA	1.124174669	0.083423328	0.002409524	0.032469646	1.091705023	10.5	2.4	2.620092055	0.34093128
NP-03	LDRTIA	0.390340933	0.028966619	0.000493	0.00664344	0.383697493	14.1	2.4	0.920873983	0.093672501
NP-03	MFR_HDRTIA	0.129933209	0.00964215	0.001524294	0.020540686	0.109392524	14.1	2.4	0.262542057	0.289623666
NP-04	HWYTIA	0.256355309	0.231209659	0.011117547	0.012326657	0.244028652	10.5	2.4	0.585668766	0.129429896
NP-04	LDRTIA	0.009208896	0.008305604	7.56932E-05	8.39253E-05	0.00912497	14.1	2.4	0.021899929	0.001183347
NP-05	HWYTIA	0.002459178	0.006692421	5.47488E-05	2.01179E-05	0.00243906	10.5	2.4	0.005853745	0.000211237
NP-05	LDRTIA	0.032143403	0.087475237	0.002587186	0.00095068	0.031192723	14.1	2.4	0.074862536	0.01340459
NP-06	HWYTIA	0.253303391	0.021491843	0.000315072	0.003713452	0.249589939	10.5	2.4	0.599015854	0.038991248
NP-06	LDRTIA	0.425396789	0.036093323	0.00068571	0.008081791	0.417314998	14.1	2.4	1.001555995	0.11395326
NP-06	MFR_HDRTIA	0.069735135	0.005916765	0.000848323	0.009998354	0.059736781	14.1	2.4	0.143368274	0.140976787
NP-06	OpenTIA	0.092389804	0.007838929	6.94041E-05	0.000817998	0.091571806	11.3	2.4	0.219772334	0.009243381
NP-07	HWYTIA	0.352655688	0.04358383	0.000909888	0.007362301	0.345293387	10.5	2.4	0.828704128	0.077304164
NP-07	LDRTIA	1.007591494	0.1245257	0.004394288	0.035556089	0.972035404	14.1	2.4	2.33288497	0.501340859
NP-08	Com_IndTIA	14.3707138	0.539593963	0.039636986	1.055630382	13.31508342	15	2.4	31.9562002	15.83445573
NP-08	HWYTIA	1.118587995	0.042000929	0.000860772	0.022924486	1.09566351	10.5	2.4	2.629592423	0.2407071
NP-08	LDRTIA	0.235563767	0.008844988	8.31852E-05	0.002215425	0.233348341	14.1	2.4	0.560036019	0.031237496
NP-08	OpenTIA	2.944011543	0.110542237	0.003675296	0.09788218	2.846129363	11.3	2.4	6.83071047	1.106068634
OB-1	HWYTIA	1.770267913	0.068731776	0.001801923	0.046410664	1.723857249	10.5	2.4	4.137257397	0.487311969
OB-1	LDRTIA	1.070520284	0.04156363	0.000847364	0.021824868	1.048695416	14.1	2.4	2.516868997	0.307730645
OB-1	MFR_HDRTIA	0.405958154	0.015761583	0.002749032	0.07080456	0.335153594	14.1	2.4	0.804368627	0.998344295
OB-1	OpenTIA	0.002156205	8.3716E-05	7.65972E-08	1.97285E-06	0.002154232	11.3	2.4	0.005170158	2.22932E-05
OB-3	AgTIA	0.212109579	0.007781966	6.0559E-07	1.65063E-05	0.212093073	11.3	2.4	0.509023375	0.000186521
OB-3	HWYTIA	1.713959193	0.06288246	0.001576864	0.042979884	1.670979309	10.5	2.4	4.010350341	0.451288781
OB-3	LDRTIA	0.700467123	0.025699034	0.000411979	0.011229131	0.689237992	14.1	2.4	1.65417118	0.15833075
OB-3	MDRTIA	0.00972273	0.000356712	6.73714E-07	1.83631E-05	0.009704367	14.1	2.4	0.02329048	0.00025892
OB-3	MFR_HDRTIA	0.052907389	0.001941089	0.000222697	0.006069954	0.046837435	14.1	2.4	0.112409844	0.085586351
OB-3	OpenTIA	0.005476164	0.000200912	2.84779E-07	7.7621E-06	0.005468402	11.3	2.4	0.013124164	8.77117E-05
OB-4	HWYTIA	1.119095586	0.098775188	0.003104358	0.035171518	1.083924068	10.5	2.4	2.601417763	0.369300941
OB-4	LDRTIA	0.505949185	0.044656798	0.000943694	0.010691797	0.495257388	14.1	2.4	1.188617732	0.150754333
OB-4	MFR_HDRTIA	0.36185294	0.031938373	0.006415571	0.07268665	0.28916629	14.1	2.4	0.693999095	1.024881765
OB-4	OpenTIA	0.000161075	1.4217E-05	5.36061E-09	6.07342E-08	0.000161014	11.3	2.4	0.000386435	6.86297E-07
OF_14	Com_IndTIA	0.550594146	0.0174518	0.000230547	0.007273638	0.543320508	15	2.4	1.303969219	0.109104574
OF_14	HWYTIA	1.320001786	0.041839178	0.000855805	0.027000145	1.293001641	10.5	2.4	3.103203939	0.283501519
OF_14	LDRTIA	1.939551595	0.061476617	0.001524281	0.048090171	1.891461425	14.1	2.4	4.539507419	0.678071407
OF_14	MFR_HDRTIA	0.343819344	0.010897803	0.001765496	0.055700371	0.288118974	14.1	2.4	0.691485537	0.785375228
OF_15	Com_IndTIA	1.067155925	0.041209535	0.000836559	0.021663406	1.045492519	15	2.4	2.509182045	0.324951088
OF_15	HWYTIA	1.575760623	0.060849929	0.001501033	0.038870514	1.536890109	10.5	2.4	3.688536263	0.408140395
OF_15	LDRTIA	0.849327175	0.032797811	0.000593974	0.015381456	0.833945719	14.1	2.4	2.001469726	0.216878529

**Phosphorus loading per land use type per catchment**

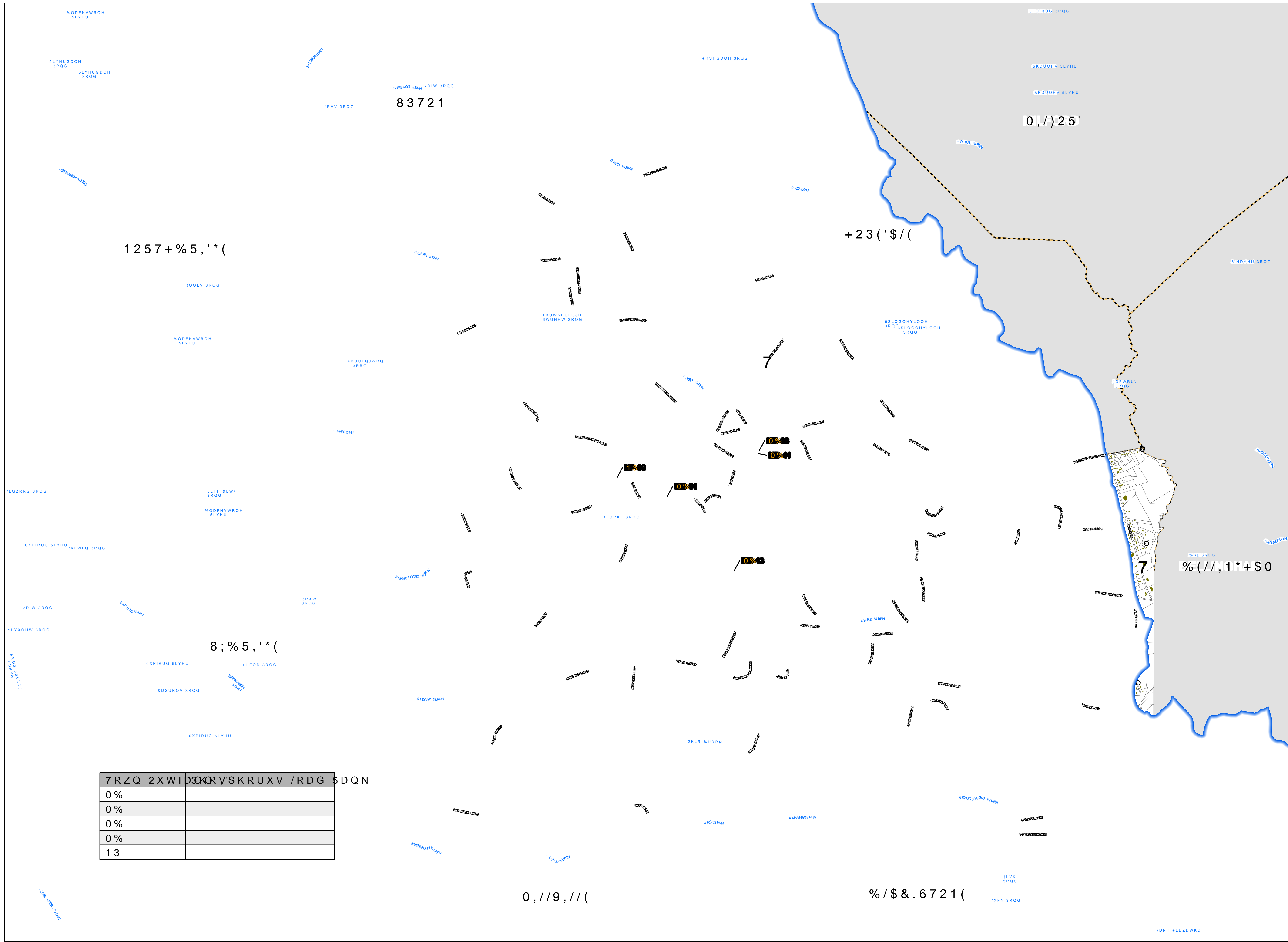
Catchment ID	Land/Soils Category	Total Impervious Area (acres)	%IA	%DCIA	DCIA (acres)	Disconnected IA	DCIA export Rate (lbs/acre/yr)	Disconnected Export Rate (lbs/acre/yr)	Annual Disconnected Area Nutrient Load (lbs/yr)	Annual DCIA Nutrient Load (lbs/yr)
OF_15	MFR_HDRTIA	0.46040797	0.017779218	0.003176546	0.082259366	0.378148604	14.1	2.4	0.90755665	1.15985706
OF_15	OpenTIA	0.01214067	0.000468827	1.01512E-06	2.62875E-05	0.012114382	11.3	2.4	0.029074517	0.000297048
RB	HWYTIA	0.249922272	0.013645765	0.000159403	0.002919469	0.247002803	10.5	2.4	0.592806727	0.030654427
RB	LDRTIA	0.354459659	0.01935351	0.00026924	0.004931133	0.349528526	14.1	2.4	0.838868463	0.069528971
RB-01	HWYTIA	1.47072698	0.068629697	0.001797911	0.038529032	1.432197947	10.5	2.4	3.437275074	0.404554838
RB-01	LDRTIA	1.51076207	0.070497886	0.00187182	0.040112906	1.470649165	14.1	2.4	3.529557995	0.565591968
RB-01	MDRTIA	0.167407753	0.00781188	6.90452E-05	0.001479631	0.165928122	14.1	2.4	0.398227493	0.020862794
RB-01	OpenTIA	0.000770414	3.59504E-05	2.15554E-08	4.6193E-07	0.000769952	11.3	2.4	0.001847884	5.21981E-06
RB-03	LDRTIA	0.902213817	0.087494633	0.002588047	0.026687026	0.875526791	14.1	2.4	2.101264297	0.376287069
RB-25	Com_IndTIA	0.283641546	0.193539295	0.008514394	0.012478271	0.271163275	15	2.4	0.65079186	0.187174069
RB-25	HWYTIA	0.655049683	0.446965037	0.029882046	0.043793637	0.611256046	10.5	2.4	1.467014511	0.459833192
RB-25	LDRTIA	0.005204564	0.00355127	2.11629E-05	3.10153E-05	0.005173549	14.1	2.4	0.012416518	0.000437316
RB-34	HWYTIA	0.127671981	0.27196577	0.014183107	0.006658137	0.121013845	10.5	2.4	0.290433227	0.069910438
RB-34	LDRTIA	0.076951833	0.163922141	0.006636765	0.003115572	0.073836261	14.1	2.4	0.177207027	0.043929564
RB-43	HWYTIA	0.001713876	0.681443126	0.056252836	0.00014148	0.001572397	10.5	2.4	0.003773752	0.001485538
RB-43	LDRTIA	0.000557037	0.221479783	0.010423202	2.62151E-05	0.000530822	14.1	2.4	0.001273972	0.000369633
RMB-03	HWYTIA	0.189979481	0.050453675	0.001133285	0.004267299	0.185712182	10.5	2.4	0.445709236	0.044806642
RMB-03	LDRTIA	0.281881451	0.07486048	0.002048231	0.007712458	0.274168993	14.1	2.4	0.658005584	0.108745655
RMB-05	HWYTIA	0.31816246	0.084484653	0.002455652	0.009247788	0.308914673	10.5	2.4	0.741395214	0.09710177
RMB-05	LDRTIA	0.18029095	0.047874342	0.0010475	0.003944803	0.176346147	14.1	2.4	0.423230752	0.055621724
RMB-05	OpenTIA	0.000600066	0.000159341	2.01137E-07	7.57466E-07	0.000599309	11.3	2.4	0.001438341	8.55937E-06
SP-06	HWYTIA	0.460065997	0.066430835	0.0017122	0.011857824	0.448208174	10.5	2.4	1.075699616	0.12450715
SP-06	LDRTIA	0.42569252	0.061467507	0.001523942	0.010554042	0.415138478	14.1	2.4	0.996332346	0.148811992
SP-07	Com_IndTIA	0.158810394	0.002898563	1.56054E-05	0.000855008	0.157955385	15	2.4	0.379092925	0.012825123
SP-07	HWYTIA	2.928402836	0.053448392	0.001235668	0.067701477	2.86070136	10.5	2.4	6.865683263	0.710865505
SP-07	LDRTIA	2.182123434	0.039827509	0.000794831	0.043548268	2.138575166	14.1	2.4	5.132580399	0.614030574
SP-07	MFR_HDRTIA	0.208265109	0.003801197	0.000498844	0.027331318	0.180933791	14.1	2.4	0.434241098	0.385371587
SP-07	OpenTIA	0.032480809	0.000592831	1.44343E-06	7.90846E-05	0.032401724	11.3	2.4	0.077764137	0.000893656
SP-1	HWYTIA	1.009217805	0.120475589	0.004181659	0.03502954	0.974188265	10.5	2.4	2.338051836	0.367810169
SP-1	LDRTIA	0.748398183	0.089340192	0.002670363	0.022369494	0.726028689	14.1	2.4	1.742468854	0.315409868
SP-2	HWYTIA	0.120145306	0.166118814	0.006770617	0.004896843	0.115248463	10.5	2.4	0.27659631	0.051416856
SP-2	LDRTIA	0.000211896	0.000292978	5.01478E-07	3.62693E-07	0.000211533	14.1	2.4	0.00050768	5.11398E-06
SP-5	HWYTIA	0.530641018	0.102183054	0.003266392	0.016962515	0.513678503	10.5	2.4	1.232828406	0.178106413
SP-5	LDRTIA	0.499559175	0.096197769	0.002983647	0.01549421	0.484064965	14.1	2.4	1.161755916	0.218468362











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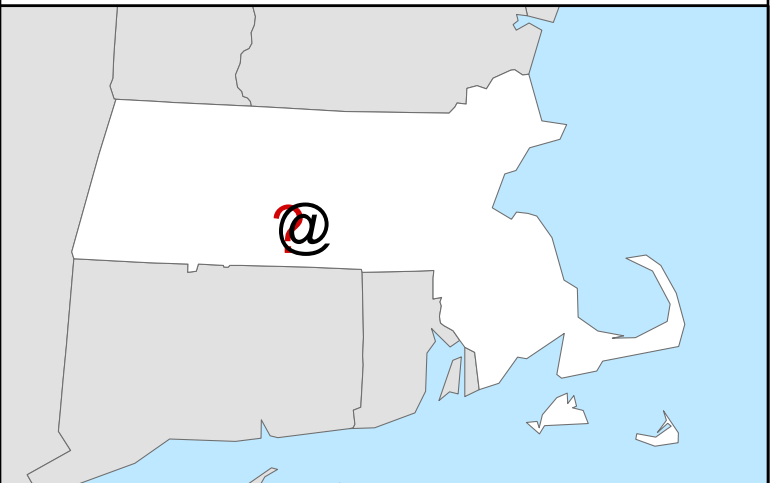
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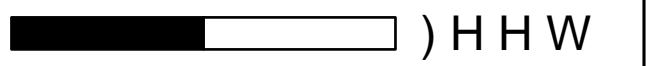
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**General Information**

Date of Inspection: 7-16-21 Time of Inspection: 10:00 AM

Name and Title of Inspector(s): Alan Tetraault Highway Surveyor

Contact Information of Inspector: ALAN Tetraault Mendon Highway 508-473-0737

Signature of Inspector:

Alan D. Tetraault

**Inspection Period:** Inspections shall be conducted at least once each calendar quarter. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring.

- ☒ 1<sup>st</sup> Quarter (July - September) ☐ 3<sup>rd</sup> Quarter (January - March)  
☐ 2<sup>nd</sup> Quarter (October - December) ☐ 4<sup>th</sup> Quarter (April - June)

**Weather Information**

**Weather at time of this inspection:**

- ☒ Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snow ☐ High Winds  
☐ Other:

Temperature: 87°

**Discharge Information**

Have any previously unidentified discharges of pollutants from the site occurred since the last inspection? ☐ Yes ☒ No

If yes, describe:

Are there any discharges occurring at the time of inspection? ☐ Yes ☒ No

If yes, describe:

# QUARTERLY INSPECTION FORM

Tighe & Bond

## Control Measures Needing Maintenance or Repairs

Structural Control Measure	Specific Inspection Notes	Control Measure is Operating Effectively?	If No, In Need of Maintenance, Repair, or Replacement?	Corrective Action Needed and Notes (Identify needed maintenance and repairs, or any failed control measures that need replacement) <i>Indicate CBs requiring corrective action on Site Plan.</i>
Catch Basins (0)	<p>Are any more than 50% full (approx.) of material? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>If yes, clean ASAP.</i></p> <p>Are any of the follow present?</p> <ul style="list-style-type: none"> <li>Sewage odor <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> <li>Suds <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> <li>Bulk material/trash <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> </ul> <p>Any structural issues? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Maintenance <input type="checkbox"/> Repair <input type="checkbox"/> Replacement	<p>Some Frames needed to be re cemented nothing structural</p>

## Areas of Industrial Materials or Activities Exposed to Stormwater

Area/Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Material loading/unloading and stockpile areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Equipment storage areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Solid waste handling and disposal areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	



# QUARTERLY INSPECTION FORM

Tighe & Bond

Area / Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Fueling areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Traces of fuel on the ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Fuel tank needs to be repainted
Equipment operations and maintenance areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Traces of fuel on the ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Salt Storage Sheds	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Salt on ground outside shed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

## Overall Site Walkthrough

Any signs of spill or leaks ☐ Yes ☒ No  
 Any erosion problems ☐ Yes ☒ No  
 Any housekeeping problems ☐ Yes ☒ No  
 Comments:

**Additional Control Measures**

Describe any additional control measures needed to reduce potential for pollution or improve good housekeeping:

Paint Fuel tank and were good

**Other Notes**

Use this space and the Site Plan for any additional notes or observations from the inspection:

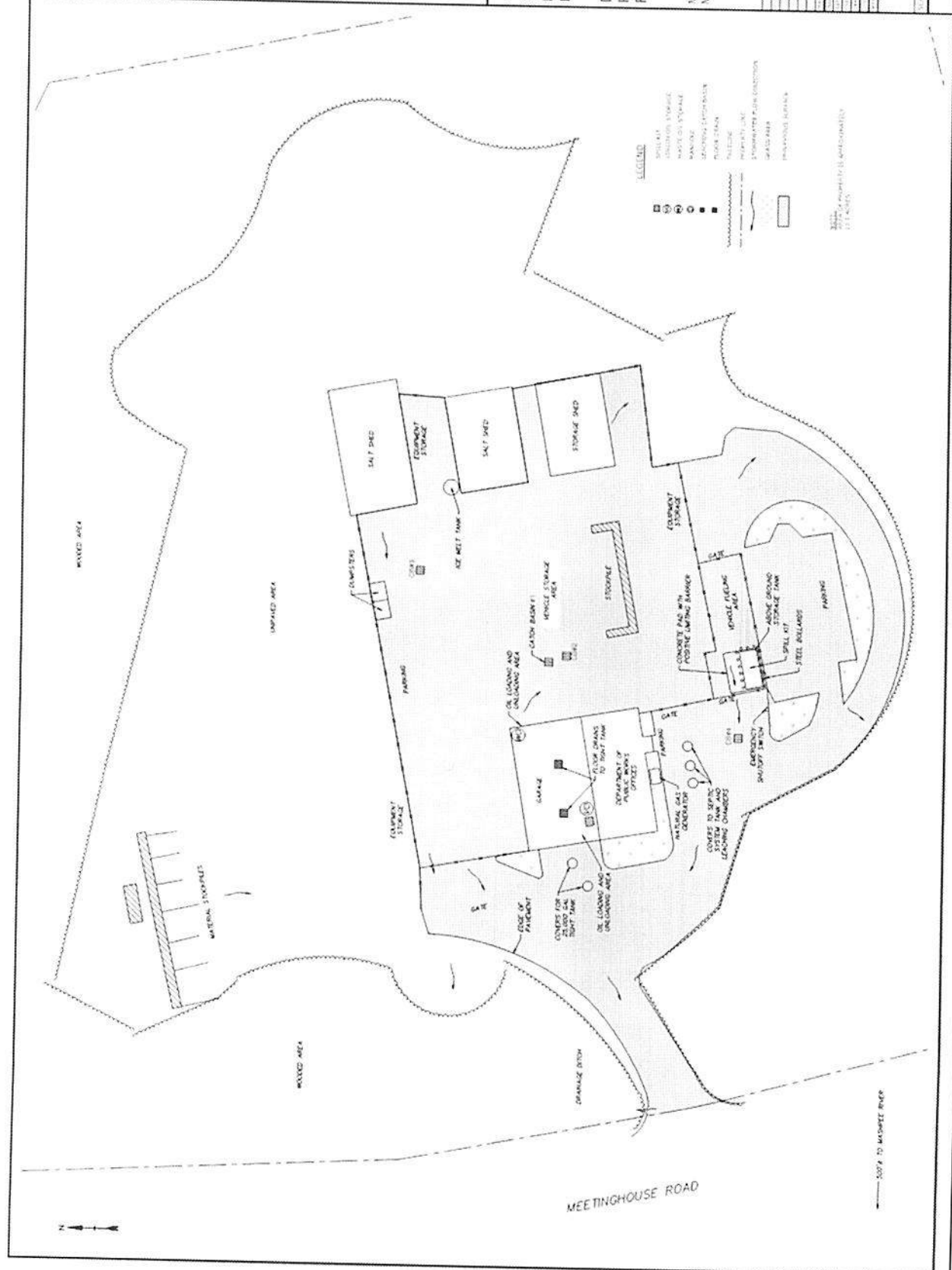
Town of Mashpee  
Stormwater  
Pollution  
Preventative Plan

Department of  
Public Works  
Facility

Massachusetts

FILE 4  
FILE 6

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General Information

Date of Inspection:

10-14-21

Time of Inspection:

2:00 PM

Name and Title of Inspector(s):

Highway Surveyor ALAN Tetreault

Contact Information of Inspector:

ALAN Tetreault Mendon Highway 508-473-0737

Signature of Inspector:

Alan P. Tetreault

**Inspection Period:** Inspections shall be conducted at least once each calendar quarter. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring.

☐ 1<sup>st</sup> Quarter (July - September)

☐ 3<sup>rd</sup> Quarter (January - March)

☒ 2<sup>nd</sup> Quarter (October - December)

☐ 4<sup>th</sup> Quarter (April - June)

Weather Information

Weather at time of this inspection:

☐ Clear ☒ Cloudy ☒ Rain ☐ Sleet ☐ Fog ☐ Snow ☐ High Winds

☐ Other:

Temperature: 73°

Discharge Information

Have any previously unidentified discharges of pollutants from the site occurred since the last inspection? ☐ Yes ☒ No

If yes, describe:

Are there any discharges occurring at the time of inspection? ☐ Yes ☒ No

If yes, describe:

Control Measures Needing Maintenance or Repairs

Structural Control Measure	Specific Inspection Notes	Control Measure is Operating Effectively?	If No, In Need of Maintenance, Repair, or Replacement?	Corrective Action Needed and Notes (Identify needed maintenance and repairs, or any failed control measures that need replacement) <i>Indicate CBs requiring corrective action on Site Plan.</i>
Catch Basins (0)	<p>Are any more than 50% full (approx.) of material? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes, clean ASAP.</i></p> <p>Are any of the follow present?</p> <ul style="list-style-type: none"> <li>• Sewage odor <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> <li>• Suds <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> <li>• Bulk material/trash <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> </ul> <p>Any structural issues? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Maintenance <input type="checkbox"/> Repair <input type="checkbox"/> Replacement	

Areas of Industrial Materials or Activities Exposed to Stormwater

Area/Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Material loading/unloading and stockpile areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>General cleanliness <input type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Equipment storage areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Solid waste handling and disposal areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

# QUARTERLY INSPECTION FORM

Tighe & Bond

Area / Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Fueling areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Traces of fuel on the ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Fuel tank needs to be reprinted
Equipment operations and maintenance areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Traces of fuel on the ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Salt Storage Sheds	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Salt on ground outside shed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

## Overall Site Walkthrough

Any signs of spill or leaks ☐ Yes ☒ No  
 Any erosion problems ☐ Yes ☒ No  
 Any housekeeping problems ☐ Yes ☒ No  
 Comments:

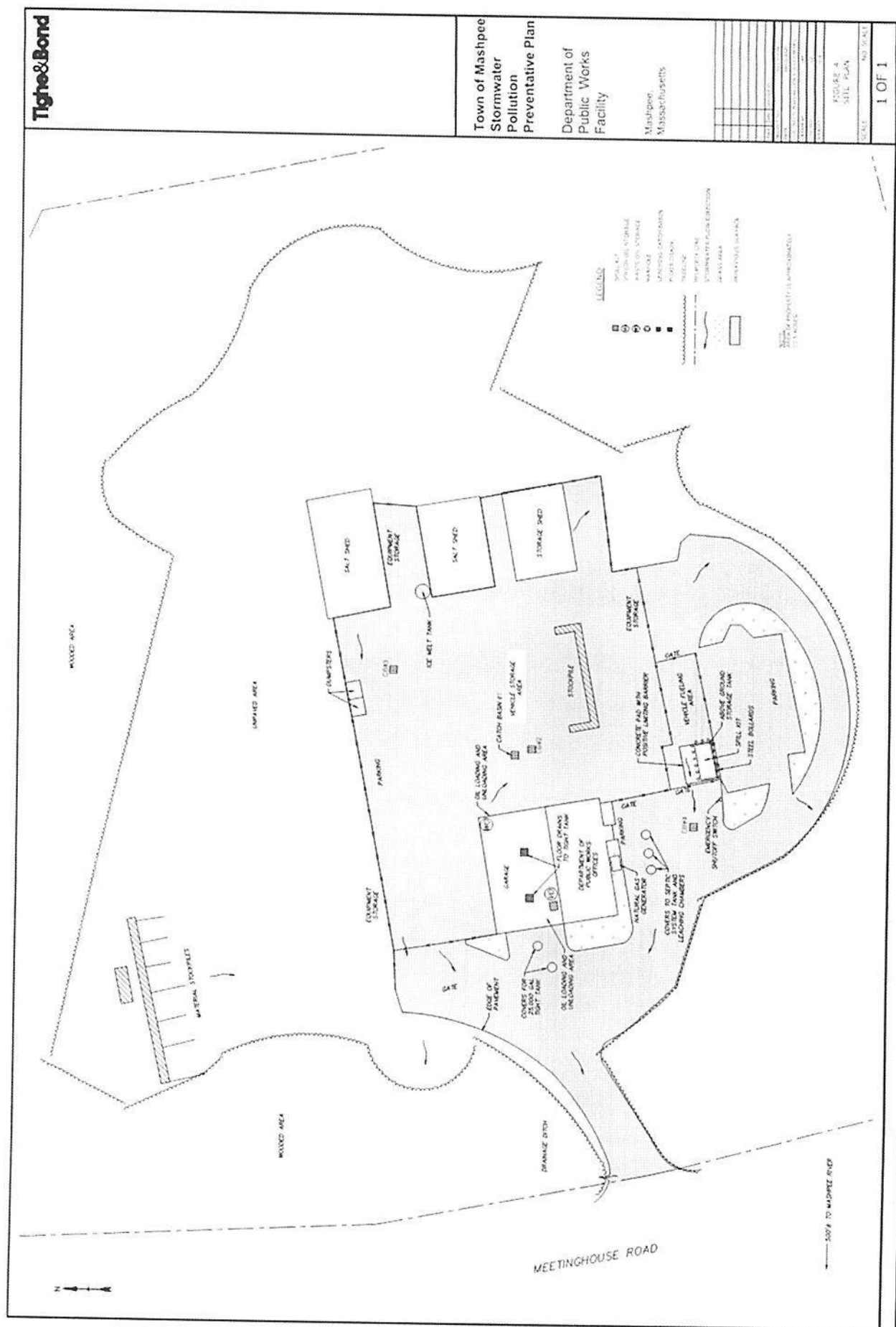
**Additional Control Measures**

Describe any additional control measures needed to reduce potential for pollution or improve good housekeeping:

All Good

**Other Notes**

Use this space and the Site Plan for any additional notes or observations from the inspection:





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General Information

Date of Inspection:

2-3-22

Time of Inspection:

11:00 AM

Name and Title of Inspector(s):

Alan Tetreault Highway Surveyor

Contact Information of Inspector:

Alan Tetreault Mendon Highway 508-473-0737

Signature of Inspector:

Alan D. Tetreault

**Inspection Period:** Inspections shall be conducted at least once each calendar quarter. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring.

☐ 1<sup>st</sup> Quarter (July - September)

☒ 3<sup>rd</sup> Quarter (January - March)

☐ 2<sup>nd</sup> Quarter (October - December)

☐ 4<sup>th</sup> Quarter (April - June)

Weather Information

Weather at time of this inspection:

☐ Clear ☒ Cloudy ☒ Rain ☐ Sleet ☐ Fog ☐ Snow ☐ High Winds

☐ Other:

Temperature: 45°

Discharge Information

Have any previously unidentified discharges of pollutants from the site occurred since the last inspection? ☐ Yes ☒ No

If yes, describe:

Are there any discharges occurring at the time of inspection? ☐ Yes ☒ No

If yes, describe:

Control Measures Needing Maintenance or Repairs

Structural Control Measure	Specific Inspection Notes	Control Measure is Operating Effectively?	If No, In Need of Maintenance, Repair, or Replacement?	Corrective Action Needed and Notes (Identify needed maintenance and repairs, or any failed control measures that need replacement) <i>Indicate CBs requiring corrective action on Site Plan.</i>
Catch Basins (0)	<p>Are any more than 50% full (approx.) of material? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>If yes, clean ASAP.</i></p> <p>Are any of the following present?</p> <ul style="list-style-type: none"> <li>• Sewage odor <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> <li>• Suds <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> <li>• Bulk material/trash <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> </ul> <p>Any structural issues? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Maintenance <input type="checkbox"/> Repair <input type="checkbox"/> Replacement	

Areas of Industrial Materials or Activities Exposed to Stormwater

Area/Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Material loading/unloading and stockpile areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Equipment storage areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Solid waste handling and disposal areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

# QUARTERLY INSPECTION FORM

Tighe & Bond

Area/Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Fueling areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Traces of fuel on the ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Equipment operations and maintenance areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Traces of fuel on the ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Salt Storage Sheds	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Salt on ground outside shed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

## Overall Site Walkthrough

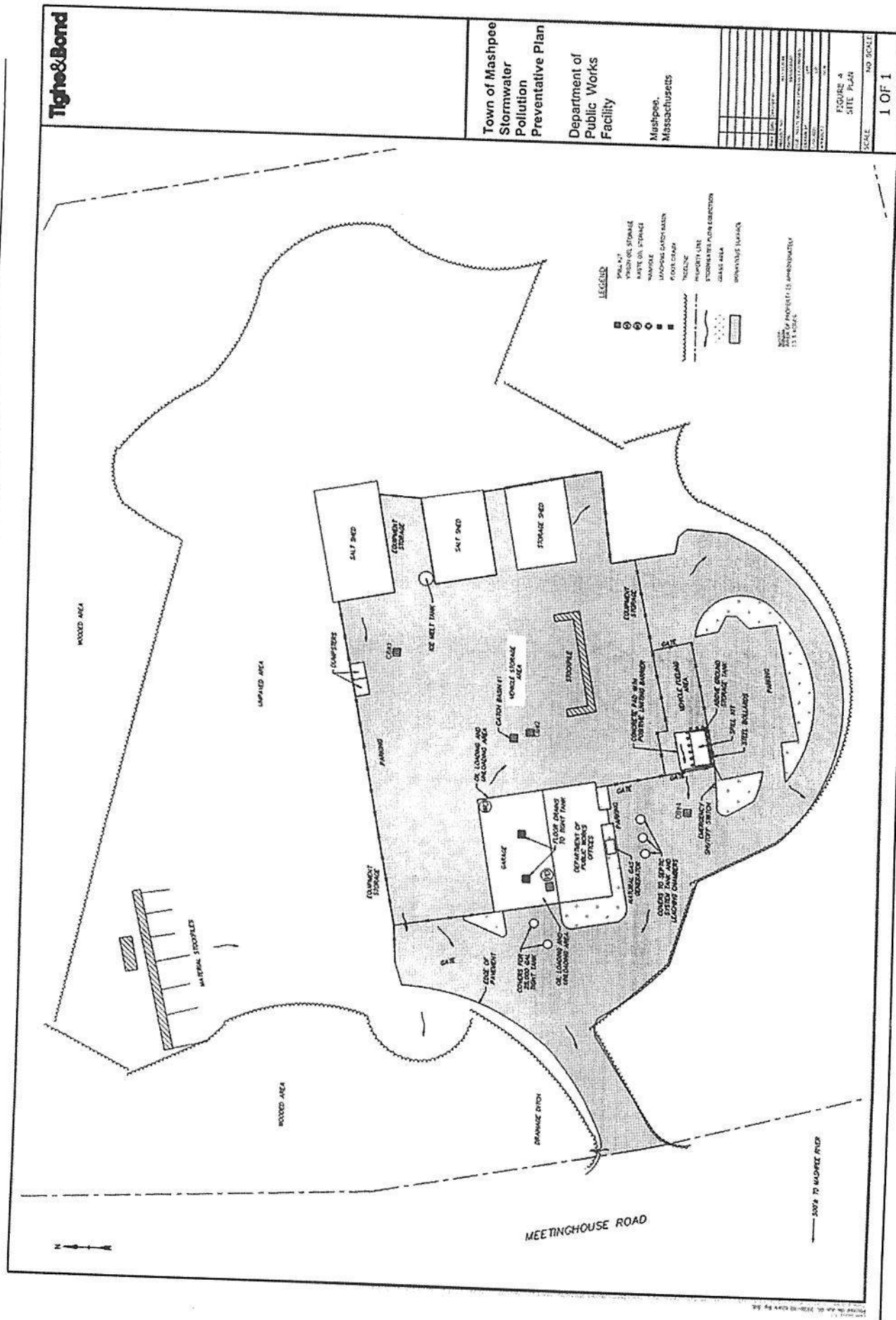
Any signs of spill or leaks ☐ Yes ☒ No  
 Any erosion problems ☐ Yes ☒ No  
 Any housekeeping problems ☐ Yes ☒ No  
 Comments:

**Additional Control Measures**

Describe any additional control measures needed to reduce potential for pollution or improve good housekeeping:

**Other Notes**

Use this space and the Site Plan for any additional notes or observations from the inspection:



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**General Information**

Date of Inspection:

4-20-22

Time of Inspection:

Name and Title of Inspector(s):

ALAN Tetreault Highway Surveyor 508-473-0737

Contact Information of Inspector:

ALAN Tetreault Mendon Highway 508-473-0737

Signature of Inspector:

**Inspection Period:** *Inspections shall be conducted at least once each calendar quarter. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring.*

☐ 1<sup>st</sup> Quarter (July - September)

☐ 3<sup>rd</sup> Quarter (January - March)

☐ 2<sup>nd</sup> Quarter (October - December)

☒ 4<sup>th</sup> Quarter (April - June)

**Weather Information**

**Weather at time of this inspection:**

☐ Clear ☒ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snow ☐ High Winds

☐ Other:

Temperature: 52°

**Discharge Information**

**Have any previously unidentified discharges of pollutants from the site occurred since the last inspection?** ☐ Yes ☒ No

If yes, describe:

**Are there any discharges occurring at the time of inspection?** ☐ Yes ☒ No

If yes, describe:

# QUARTERLY INSPECTION FORM

**Tighe & Bond**

## Control Measures Needing Maintenance or Repairs

Structural Control Measure	Specific Inspection Notes	Control Measure is Operating Effectively?	If No, In Need of Maintenance, Repair, or Replacement?	Corrective Action Needed and Notes (Identify needed maintenance and repairs, or any failed control measures that need replacement) Indicate CBs requiring corrective action on Site Plan.
Catch Basins (0)	<p>Are any more than 50% full (approx.) of material? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, clean ASAP.</p> <p>Are any of the follow present?</p> <ul style="list-style-type: none"> <li>Sewage odor <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> <li>Suds <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> <li>Bulk material/trash <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</li> </ul> <p>Any structural issues? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Maintenance <input type="checkbox"/> Repair <input type="checkbox"/> Replacement	<p>Some loose bricks</p> <p>nothing structural</p>

## Areas of Industrial Materials or Activities Exposed to Stormwater

Area/Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Material loading/unloading and stockpile areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Equipment storage areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Solid waste handling and disposal areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	



# QUARTERLY INSPECTION FORM

**Tighe & Bond**

Area/Activity	Inspected?	Specific Inspection Notes	Controls Adequate?	Corrective Action Needed and Notes
Fueling areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Traces of fuel on the ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Equipment operations and maintenance areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Traces of fuel on the ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Waste, debris on ground <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Salt Storage Sheds	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Salt on ground outside shed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No General cleanliness <input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

## Overall Site Walkthrough

Any signs of spill or leaks ☐ Yes ☒ No  
 Any erosion problems ☐ Yes ☒ No  
 Any housekeeping problems ☐ Yes ☒ No  
 Comments:



QUARTERLY INSPECTION FORM

**Tighe & Bond**

**Additional Control Measures**

Describe any additional control measures needed to reduce potential for pollution or improve good housekeeping:

**Other Notes**

Use this space and the Site Plan for any additional notes or observations from the inspection:

