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STORMWATER MANAGEMENT PLAN

MS4 GENERAL PERMIT COMPLIANCE
JUNE 2019
UPDATED JUNE 2022



Devens
MASSACHUSETTS

swmp

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STORMWATER MANAGEMENT PLAN 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 gathered and evaluated 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, 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.”

Printed Name _____

Signature _____

Date _____

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1.0 INTRODUCTION / OVERVIEW

1.1 Regulatory Summary and Purpose

The Federal Water Pollution Control Act (WPCA), initially enacted in 1948, established ambient water quality standards to specify acceptable levels of pollution in lieu of preventing the causes of water pollution. The 1972 amendments to the WPCA, referred to as the Clean Water Act (CWA), implemented measures which were focused on establishing effluent limitations on point sources, or ‘any discernable, confined, and discrete conveyance... from which pollutants are or may be discharged.’”

The 1972 CWA introduced the National Pollutant Discharge Elimination System (NPDES). The NPDES program was established as the fundamental regulatory mechanism of the CWA, requiring direct dischargers of pollutants into waters of the United States to obtain a NPDES permit. Between 1972 and 1987, the NPDES permit program focused on improving surface water quality by reducing pollutants of industrial process wastewater and municipal sewage. During this period, several nationwide studies on water quality, most notably the United States Environmental Protection Agency (EPA) National Urban Runoff Plan (NURP), identified stormwater discharges as a significant source of water pollution.

The results of the NURP and similar studies, resulted in the reauthorization of the CWA in 1987 with the passage of the Water Quality Act (WQA). The WQA established a legal framework and required EPA to develop a comprehensive phased program for regulating municipal and industrial stormwater discharges under the NPDES permit program.

The NPDES Phase 1 Rule, which was issued in November 1990, addressed stormwater dischargers from medium to large municipal separate storm sewer systems (MS4s), which were communities serving a population of at least 100,000 people, as well as stormwater discharges from 11 categories of industrial activity.

The NPDES Phase 2 Rule, which was promulgated in December 1999, addressed small MS4s serving a population of less than 100,000 people in urbanized areas. The Phase 2 Rule requires nationwide coverage of all operators of small MS4s that are located within the boundaries of the Bureau of the Census-defined “urbanized area” (UA) based on the latest decennial census. The Phase 2 rule requires that all MS4s located within “urbanized areas” automatically comply with the Phase 2 stormwater regulations. In the Commonwealth of Massachusetts, the EPA retains primacy as the Phase 2 permitting authority. On May 1, 2003, the EPA and the Massachusetts Department of Environmental Protection (MADEP) jointly issued the NPDES General Permit for Discharges from Small MS4s. At that time, the Devens REGIONAL Enterprise Zone (hereafter, referred to as “Devens”) was not considered to be a regulated area based on the 2000 Census data and was therefore not required to submit a Notice of Intent (NOI) to apply for coverage under this General Permit.

The 2003 NPDES Phase 2 MS4 General Permit (2003 MS4 Permit) required regulated communities to develop, implement, and enforce a Stormwater Management Program (SWMP). The objectives of the SWMP were to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the CWA.

The 2003 MS4 Permit expired on May 1, 2008 but was administratively continued for covered permittees until a new MS4 Permit was issued on April 4th, 2016 and became effective on July 1, 2018. Based on the 2010 census data, and due to the amount of development that has occurred in Devens since 2000, a majority of Devens has now been designated as urbanized area, and therefore Devens is subject to the requirements of the 2016 MS4 Permit. Appendix B of this report provides maps of the Phase II stormwater “permit compliance area” for Devens as determined by the USEPA using the latest decennial census. Urbanized area within the Devens Regional Enterprise Zone is displayed on regulated area maps available for the Towns of Shirley, Harvard, and Ayer.

A copy of the 2016 MS4 Permit is included in Appendix C. On March 22, 2018, Devens submitted a Notice of Intent (NOI) to EPA to obtain coverage under the 2016 MS4 Permit. An amendment was later filed on June 29, 2018 to amend the original NOI submission. A copy of the original Notice of Intent, including the Amendment, is included in Appendix D. EPA posted Devens’ Notice of Intent for public comment on October 5, 2018 for a 30-day period. Devens received authorization from EPA to discharge under the 2016 MS4 Permit on March 6, 2019. A copy of Devens’ Authorization to Discharge is included in Appendix D.

This Stormwater Management Plan will specifically satisfy the requirements set forth by the NPDES Phase 2 regulations which expanded Phase 1’s efforts to preserve, protect, and improve the nation’s water resources from polluted stormwater runoff to include additional operators of “traditional” (i.e. cities and towns) and “non-traditional” (i.e. Federal and state agencies) MS4s. This plan will incorporate any existing practices, policies, and guidelines and expand their reach to encompass the goals of the 2016 MS4 Permit all while providing a framework for stormwater management at Devens to ensure that stormwater is managed and treated to the maximum extent possible. The stormwater management approach at Devens is grounded in the following goals: to advance stormwater management, exceed regulatory requirements, and to serve as an example community demonstrating through actions that new approaches and techniques to stormwater management can be implemented to support continued growth while improving receiving water quality.

The plan outlines a program of best management practices (BMPs) and measurable goals for the following six minimum control measures as identified in the 2016 MS4 Permit.

- Public education and outreach
- Public involvement / participation
- Illicit discharge detection and elimination
- Construction site stormwater runoff control
- Post-construction stormwater management in new development or redevelopment
- Pollution prevention/good housekeeping

Devens’ efforts to comply with these BMPs, as outlined in their Notice of Intent, are included in Section 2.0.

1.2 Governance and Structure

In 1996, the US Army post, which resided at Devens, officially closed. At that time, the land was distributed among various federal and state entities, with the Massachusetts Development Finance Agency acquiring the largest share. A comprehensive disposition process has been occurring since 2003 to determine the future governance of Devens, which includes the potential for creation of a new

independent town, reversion to the original jurisdictional boundaries or other alternatives. A final recommendation for governance is to be made by 2033. The Devens Enterprise Commission (DEC) acts as the regulatory and permitting authority for the Devens Regional Enterprise Zone (Devens) administering and enforcing all zoning bylaws and development regulations. It essentially operates as Board of Health, Conservation Commission, Zoning Board of Appeals, Historic District Commission and Planning Board. There are twelve DEC Commissioners, all of whom are appointed by the Governor. MassDevelopment is responsible for providing municipal administration and services, including DPW, fire, police and other typical activities. MassDevelopment also operates a municipal utility at Devens which provides natural gas, water, electric and sanitary sewer utilities. Operation and management of the stormwater system is provided by the Devens DPW with assistance from the MassDevelopment engineering department.

Specific representatives from those departments that are responsible for implementation of the SWMP are outlined in the table below:

Name	Title	Affiliation
John Marc-Aurele, PE	Director of Engineering	MassDevelopment
Shane Melone	Director of Public Works and Recreation	MassDevelopment
Joseph Bisceglia	Project Engineer	MassDevelopment
Neil Angus	Environmental Planner	Devens Enterprise Commission
Peter Lowitt	Director/Land Use Administrator	Devens Enterprise Commission

1.3 Demographic Information

Devens is located in both Middlesex and Worcester Counties. It spans 6.8 square miles (17.7 square kilometers) in which only 0.08 square miles (1.2%) of Devens is water. As of the 2010 census, the population was 1,840 people.

Devens is comprised of predominantly urbanized area, based on the 2010 census data, and includes parts of Ayer, Harvard and Shirley.

Climate within the boundaries of Devens ranges from January average minimum temperature of 15 degrees Fahrenheit (°F) to July Average Maximum temperature of 84°F. The average annual precipitation of 47.9 inches, distributed throughout the year. The rainiest month is October, with approximately 4.4 inches of rain.

1.4 Water Resources

Devens is located within the boundaries of the Nashua River Watershed. Eight miles of rivers and streams flow through Devens, including the main stem of the Nashua River. Other water resources

include abundant aquifers, wetlands, and approximately 51 acres of open waters. In addition to its location in the Main Stem subbasin of the Nashua, Devens also lies in the Catacoonamug Brook and Bowers/Nonacoicus Brook subbasins. Robbins Pond, Grove Pond, Plow Shop Pond, and Willow Branch are some of the major waterbodies within these subbasins. Some water bodies are considered impaired according to the Final 2014 303(d) list of Impaired Waters. All impairments and outfalls discharging to these water bodies are summarized in Table 1.2 below:

Table 1.2
RECEIVING WATERS AND IMPAIRMENTS

Waterbody	Impairment	Number of Outfalls Discharging to Receiving Water
Nashua River (Segment MA81-05) (Class B Water)	Aquatic Macroinvertebrate Bioassessments, Escherichia coli, Phosphorus (Total), Sediment Bioassays – Acute Toxicity Freshwater	11
Wetlands Area near the Nashua River	-	4
Wetlands Area off MacPherson Road	-	1
Unnamed Stream & Wetlands Near Rte. 2A	-	2
Outfalls to Detention Basins to Swales to Plow Shop Pond	Non-Native Aquatic Plants*, Aquatic Plants (Macrophytes), Arsenic, Chromium (total), Mercury in Fish Tissue, Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems), Sediment Bioassays - Chronic Toxicity Freshwater	3
Willow Branch	-	30
Wetlands Area Off Lake George Street	-	3
Bowers Brook	-	2
Bowers Brook Wetland	-	1
Cold Spring Brook	-	16
Cold Spring Brook Wetland	-	1
Unnamed Water Body Off Saratoga Street	-	2
Unnamed Stream/Wetlands area Off Queenstown Street	-	1
Unnamed Stream/Wetlands off Elm Road	-	3
Unnamed Stream off Spruce Street	-	5
Catacoonamug Brook	Escherichia Coli	5

Table 1.2
RECEIVING WATERS AND IMPAIRMENTS

Waterbody	Impairment	Number of Outfalls Discharging to Receiving Water
(MA81-74)		
Trout Brook	-	1
Near Unnamed Stream Tributary to Mirror Lake	Mercury in Fish Tissue	1
Unnamed Stream on Shepley's Hill Landfill Site	-	1
Detention Area near Hospital Road	-	2
Detention Area near Jackson Road	-	2
Detention Area near Saratoga Blvd	-	1
Detention Area near Spruce Street	-	1
Overland to Unnamed Wetland Area	-	4

*TMDL not required, non-pollutant.

1.5 Interconnections and Impairments

MassDevelopment has begun the process of identifying interconnections with neighboring MS4s. Interconnections are those locations where Devens' MS4 discharges to a MS4 under another entity's jurisdiction. MassDevelopment will finish identifying these interconnections within five years of the permit effective date as required by the permit, and delineate the contributing catchment areas. They will also be summarized, along with any related impairments, in a table to be included in this section.

1.5.1 Interconnections and Impairments (Permit Year 2 Update)

Devens is in the process of identifying the ownership of all drainage infrastructure within the boundaries of the Devens Enterprise Zone. Due to its history as a military base and the amount of development that has occurred since 2000, a significant portion of the drainage in Devens is owned by the Army or by private entities. Significant progress has been made in determining the ownership of drainage in Devens during Permit Year 2. The interconnections identified during Permit Year 2 are included in Table 1.3 below.

1.5.2 Interconnections and Impairments (Permit Year 3 Update)

Devens continued to update its drainage mapping during Permit Year 3, including infrastructure ownership updates. All updates made to the list of regulated outfalls under Devens' jurisdiction are reflected in the SWMP. The list of interconnections included in Table 1.3 has also been updated to reflect ownership updates.

1.5.3 *Interconnection and Impairments (Permit Year 4 Update)*

Devens continues to update its drainage mapping during Permit Year 4, focusing primarily on outfalls that have been abandoned due to recent development. Table 1.2 reflects the updated list of outfalls. No updates were made to the list of interconnections included in Table 1.3 during Permit Year 4.

Table 1.3 INTERCONNECTIONS			
Interconnection and/or Drainage Area ID	Connecting Entity	Receiving Water	Impairment
OF-79	Army	Unnamed Stream/Wetland off Queenstown Street	-
51010/OF-106	Army	Cold Spring Brook Wetland	-
53004/AOF-6010	Army	Willow Branch	-
53005/OF-73	Army	Unnamed stream/wetlands area off Queenstown St	-
53007/AOF-6010	Army	Willow Branch	-
53009/OF-73	Army	Unnamed stream/wetlands area off Queenstown St	-
53010/OF-69	Army	Unnamed stream/wetlands area off Queenstown St	-
53011/AOF-6013	Army	Willow Branch	-
60011/AOF-6064	Army	Willow Branch	-
60012/OF-49	Army	Willow Branch	-
60028/OF-79	Army	Unnamed stream/wetlands area off Queenstown St	-
60029/OF-75	Army	Unnamed stream/wetlands area off Queenstown St	-
60030/AOF-6012	Army	Unnamed stream/wetlands area off Queenstown St	-
60056/OF-73	Army	Unnamed stream/wetlands area off Queenstown St	-

1.6 **Endangered Species and Historic Properties Determination**

The 2016 MS4 Permit requires Devens to demonstrate that all activities regulated under this permit will not adversely affect endangered and threatened species or critical habitat, or impact federal historic properties on the National Register of Historic Properties (NRHP). Devens must demonstrate that there is no critical habitat for any endangered species within its boundaries, and if such a habitat exists, that no best management practice shall interfere with that habitat. Devens must also certify that no discharge will affect a property that is listed or eligible for listing on the NRHP; that any such effects have written acknowledgements from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other representative that such effects shall be mitigated; and written proof that any

best management practices constructed under this permit will include measures to minimize harmful effects on these properties.

Through consultation with the US Fish & Wildlife Service (USFWS), it was determined that threatened species within Devens include both the northern long-eared bat and the small whorled pagonia. Correspondence with USFWS is appended to Devens' Notice of Intent included in Appendix D. Actions currently included in this SWMP will not affect this species. Therefore, Devens has determined that it can certify eligibility under USFWS Criterion C for coverage under the permit. Prior to construction of any structural BMPs, Devens will consult with USFWS to confirm that the proposed project will not impact the northern long-eared bat, the small whorled pagonia or any other endangered or threatened species that may be identified in the future.

The Devens Historic District is a historic district roughly bounded by El Caney Street, Antietam Street, Sherman Avenue, MacArthur Avenue, and Buena Vista Street, and includes land area within the underlying towns of Ayer and Harvard. The district encompasses a portion of the former Fort Devens, and includes several historical buildings. It has been determined to be very unlikely that any disturbance due to installing BMPs in the future would impact any of the historic properties located in this district. Devens can certify eligibility under Criterion A under the Historic Properties Preservation Act because Devens is a new permittee that is not undertaking any activity involving subsurface land disturbance less than one acre. Prior to construction of any structural BMPs, Devens will consult with the State Historic Preservation Officer by submitting a completed Project Notification Form to confirm that the proposed project will not impact any federal historic properties.

1.7 Increased Discharges

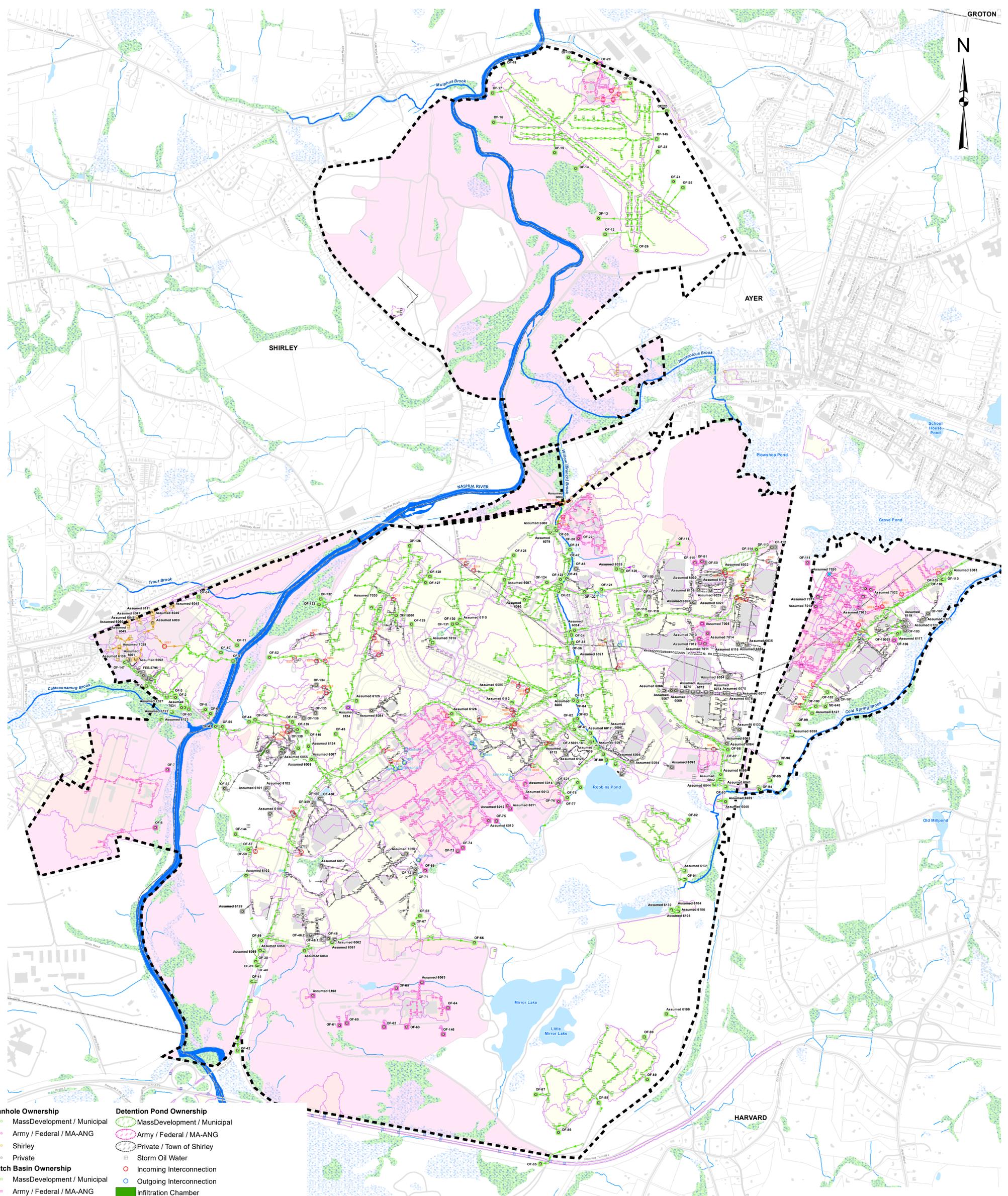
Any increased discharges (including increased pollutant loadings) through the MS4 to waters of the United States are subject to Massachusetts antidegradation regulations at 314 CMR 4.04. Section 2.1.2 of the 2016 MS4 Permit requires the Devens to comply with the provisions of 314 CMR 4.04 including information submittal requirements and obtaining authorization for increased discharges where appropriate. Any authorization by MassDEP for an increased discharge is required to be incorporated into this SWMP.

Devens understands that there shall be no increased discharges, including increased pollutant loadings from the MS4 to impaired waters listed in categories 5 or 4b on the most recent Massachusetts Integrated Report of Waters listed pursuant to Clean Water Act section 303(d) and 305(b) unless it can be demonstrated that there is no net increase in loading from the MS4 to the impaired water of the pollutant(s) for which the waterbody is impaired. If necessary, Devens will demonstrate compliance with this provision by either:

- Documenting that the pollutant(s) for which the waterbody is impaired is not present in the MS4's discharge and retaining documentation of this finding with the SWMP; or
- Documenting that the total load of the pollutant(s) of concern from the MS4 to any impaired portion of the receiving water will not increase as a result of the activity and retain documentation of this finding in the SWMP. Unless otherwise determined by the Permittee, USEPA or by MADEP that additional demonstration is necessary, compliance with the requirements of Part 2.2.2 and Part 2.3.6 of this permit, including all reporting and documentation requirements, shall be considered as demonstrating no net increase as required by this part.

1.8 Surface Water Drinking Supplies

Section 3.0 of the MS4 Permit requires permittees to prioritize discharges to public drinking water supply sources in implementation of the SWMP. Devens does not have any direct discharges to surface drinking water supply sources or their tributaries.



- Manhole Ownership**
 - MassDevelopment / Municipal
 - Army / Federal / MA-ANG
 - Shirley
 - Private
- Catch Basin Ownership**
 - MassDevelopment / Municipal
 - Army / Federal / MA-ANG
 - Shirley / Ayer
 - Mass Highway / State
 - Private
 - Other / Unknown
- Outfall Ownership**
 - ⊠ MassDevelopment / Municipal
 - ⊠ Army / Federal / MA-ANG; 3
 - ⊠ Private
 - ⊠ Shirley / Ayer
 - ⊠ Other / Unknown
- Storm Main Ownership**
 - MassDevelopment / Municipal
 - Army / Federal / MA-ANG
 - Shirley / Ayer
 - Private
 - Unknown
- Detention Pond Ownership**
 - MassDevelopment / Municipal
 - Army / Federal / MA-ANG
 - Private / Town of Shirley
 - Storm Oil Water
- Basemap**
 - Streams / Hydrologic Connection
 - Marsh/Bog
 - Wooded marsh
 - Open Water
 - Parcels
 - Town Boundary
 - Federal/State Property
 - Property within DREZ Owned by Town of Shirley
 - Devens Regional Enterprise Zone Boundary (DREZ)
 - Stormwater Catchments

Rev	Date	Description
1	12/17/2019	Updated to show proper infrastructure ownership and to highlight streams
2	5/25/2020	Updated ownership of several outfall features.
3	9/24/2020	Added interconnection layer to map.
4	2/25/2021	Updated ownership of several outfall features.
5	6/17/2021	Updated system-wide ownership/connectivity for pipes, DMs, inlets, and outfalls.
6	8/28/2021	Updated for additional system-wide ownership based on modified GIS schema



FIGURE 1
MASSACHUSETTS DEVELOPMENT FINANCE AGENCY
MS4 COMPLIANCE

DEVENS DRAINAGE SYSTEM MAP

MARCH 2018 SCALE: NOTED

2.0 MINIMUM CONTROL MEASURES

2.1 Introduction

This section of the report provides a summary of the regulatory requirements for each of the six minimum control measures as defined under the MS4 General Permit by the EPA. It also provides a summary of those stormwater management practices that Devens currently employs. As part of the requirements of the Notice of Intent submitted to EPA, as included in Appendix D, Devens established a list of the Best Management Practices (BMPs) that it plans to implement in order to comply with each of the six minimum control measures. These BMPs will be implemented over the next five years (i.e. the permit term). However, Devens will have up to 10 years to implement some of the permit requirements as indicated. Devens' progress with respect to implementation of these BMPs, and other stormwater related activities, will be summarized in annual reports submitted to EPA in accordance with the MS4 Permit. These reports will be included in Appendix I.

The BMPs selected for each minimum control measure are summarized and briefly described in this section. Specific details for each BMP including measurable goals, implementation dates and individuals responsible for implementation are stated in each of the respective sections for each control measure in this plan. The Devens Enterprise Commission (DEC) and/or representatives from MassDevelopment will be responsible for implementation of each of the BMPs for the six minimum control measures.

Compliance with requirements of the permit related to water quality limited waters and approved TMDLs is included in Section 6.

Checklists outlining requirements for Permit Years 1 through 5 are included in Appendix E.

2.2 Permit Requirements and Implementation Timeframes

Based on the 2000 census, Devens was not considered an urbanized area and therefore was not regulated under the 2003 MS4 Permit. Although not required to apply for coverage under the 2003 MS4 Permit, Devens is already in compliance with many of the 2003 MS4 Permit requirements.

2.2.1 *Public Education and Outreach*

The public education and outreach minimum control measure requires Devens to make educational information available to the public and other stakeholders specified by the permit.

Regulatory Requirement:

Section 2.3.2 of the 2016 MS4 General Permit requires permittees to “implement an education program that includes educational goals based on stormwater issues of significance within the MS4 area. The ultimate objective of a public education program is to increase knowledge and change behavior of the public so that pollutants in stormwater are reduced.”

Existing Practices:

Devens currently has a progressive public education program that is currently under the jurisdiction of MassDevelopment and the DEC. Both the “Devens Community” website maintained by MassDevelopment and the DEC website provide information to residents and businesses on “Living Green” including how to reduce water use and reduce waste generated. Information is also available to developers on green infrastructure guidelines for construction projects. For operators of industrial facilities, information is provided on Best Management Practices for stormwater pollution prevention. MassDevelopment and the DEC also continue to work with the Nashua River Watershed Association on supporting the federal designation of the Nashua River as a Wild and Scenic River as authorized and signed into law, and the development and distribution of materials to educate the public on protecting and improving the water quality within the Nashua River. As a result, the Nashua River Watershed Association’s Wild and Scenic River Study cites the DEC Rules and Regulations as best practices for stormwater management in numerous sections of the report.

In addition to all the work being performed by Devens at present, the 2016 MS4 Permit requires a few extra measures. Devens must now distribute two rounds of information within three years to the following relevant stakeholders:

1. Residents
2. Businesses, Institutions and Commercial Facilities
3. Developers (Construction)
4. Industrial Facilities

In order to accomplish this, Devens will implement the following BMPs:

BMP: Brochures/Pamphlets/Web Page

Description: Provide general stormwater educational pamphlets as well as topic specific pamphlets addressing lawn care, pet waste, etc. Provide new/updated Devens website to provide public access to stormwater-related materials, documentation and procedures.

Targeted Audiences: Residents

Responsible Department/Parties: MassDevelopment (Engineering)

Measurable Goals: Distribute 2 pamphlets per year to residents, either with hard copies or online. Publish the updated stormwater webpage and track interactions with the materials.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: Brochures/Pamphlets/Web Page

Description: Provide general stormwater educational pamphlets as well as topic specific pamphlets addressing lawn/grounds maintenance, use of salt/de-icing materials and other facility specific materials, etc. Provide new/updated Devens website to provide public access to stormwater-related materials, documentation and procedures.

Targeted Audiences: Businesses, Institutions, and Commercial Facilities

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment (Engineering)

Measurable Goals: Distribute 2 pamphlets per year to businesses, institutions, and commercial facilities, either with hard copies or online. Release the updated stormwater webpage to the public and track interactions with the materials.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: Brochures/Pamphlets/Web Page

Description: Distribute brochures to prospective developers and contractors providing general information on stormwater management and summary information on Devens Rules and Regulations. Provide new/updated Devens website and update Devens Enterprise Commission website to provide public access to stormwater-related materials, documentation, regulations and procedures.

Targeted Audiences: Developers/Contractors (construction)

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment (Engineering)

Measurable Goals: Distribute brochure with hard copies or online throughout the permit term and maintain a list of all recipients. Publish the updated stormwater webpage and track interactions with the materials.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: Brochures/Pamphlets

Description: Distribute brochures to industrial facilities providing general information on stormwater management and summary information on Devens Rules and Regulations. Provide new/updated Devens website and update Devens Enterprise Commission website to provide public access to stormwater-related materials, documentation, regulations and procedures.

Targeted Audiences: Industrial Facilities

Responsible Department/Parties: Devens Enterprise Commission (DEC), MassDevelopment

Measurable Goals: Distribute brochure with hard copies or online throughout the permit and maintain a list of all recipients. Publish the updated stormwater website and track interactions with the materials.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: School Curricula/Programs

Description: Work with the Nashua River Watershed Association to develop/distribute stormwater-related educational materials, posters, etc., to local schools for use in classrooms and for general use. These materials will be appropriate for either in person or remote learning.

Targeted Audiences: Students

Responsible Department/Parties: MassDevelopment Operations/Engineering

Measurable Goals: Distribute materials to local schools annually.

Implementation Timeframe: Devens developed educational materials during Permit Year 3 as part of its MVP work with Bolton and Harvard, MA. These materials will continue to be distributed in future permit years.

BMP: Meeting

Description: Meet with businesses and institutions to review facilities and discuss specific discharge conditions.

Targeted Audiences: Businesses, Institutions, Commercial Facilities

Responsible Department/Parties: MassDevelopment Engineering/DPW, Devens Enterprise Commission

Measurable Goals: Meet with local businesses and institutions annually and tailor discussions to site specific stormwater information. A list of all facilities that have participated in the meetings shall be kept.

Implementation Timeframe: Devens collected and reviewed inspection reports from facilities with on-site stormwater management systems during Permit Year 3. They will continue this practice, as well as meet with businesses and institutions to discuss stormwater concerns in future permit years.

BMP: Meetings and Public Education Materials

Description: Continue to meet and work with the Nashua River Watershed Association to develop and implement a curriculum to educate the public on protecting the water quality of the Nashua River.

Targeted Audiences: General Public

Responsible Department/Parties: MassDevelopment Engineering, Devens Enterprise Commission

Measurable Goals: Meet and collaborate with the Nashua River Watershed Association annually to educate the general public.

Implementation Timeframe: To be completed during Permit Years 3-5 (FY2021-FY2023).

BMP: Presentation

Description: Conduct a presentation on Stormwater Operation & Maintenance Plan Requirements.

Targeted Audiences: Businesses, Institutions, and Commercial Facilities

Responsible Department/Parties: MassDevelopment Engineering, Devens Enterprise Commission

Measurable Goals: Make a presentation annually and track the number of commercial entities that attend the presentation.

Implementation Timeframe: This presentation was not held in Permit Year 3 due to the impacts of COVID-19. The presentation will be conducted in future permit years (-FY2023).

BMP: Web Page

Description: Continue to provide information to residents via the MassDevelopment "Devens Community" website and the Devens Enterprise Commission website on "Living Green" including how to reduce water use and reduce waste generated.

Targeted Audiences: Residents

Responsible Department/Parties: MassDevelopment, Devens Enterprise Commission

Measurable Goals: Send link to website where information is posted to residents and track number of residents contacted and the number of visits to the website.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: Web Page

Description: Continue to provide information to residents via the MassDevelopment "Devens Community" website and the Devens Enterprise Commission website on "Living Green" including how to reduce water use and reduce waste generated.

Targeted Audiences: Businesses, Institutions and Commercial Facilities

Responsible Department/Parties: MassDevelopment, Devens Enterprise Commission

Measurable Goals: Send link to website where information is posted to local businesses and track number of businesses contacted and the number of visits to the website.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: Brochures/Pamphlets

Description: Continue to make information available to developers on green infrastructure guidelines for construction projects in Devens.

Targeted Audiences: Developers (Construction)

Responsible Department/Parties: MassDevelopment, Devens Enterprise Commission

Measurable Goals: Post information on the Devens Enterprise Commission website and handout information to developers as new development projects are introduced to the Commission – keep a list of developers to which the information is distributed.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: Web Page

Description: Continue to make available to operators of industrial facilities information on Best Management Practices focused on stormwater pollution prevention

Targeted Audiences: Industrial Facilities

Responsible Department/Parties: MassDevelopment, Devens Enterprise Commission

Measurable Goals: Post information on the Devens Enterprise Commission website and e-mail a link to the information to owners/operators of industrial facilities within Devens. Track the number of owners/operators e-mailed and the number of visits to the website.

Implementation Timeframe: Implemented during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

Public education materials utilized for MS4 Compliance are included in Appendix F.

2.2.2 Public Involvement / Participation

Regulatory Requirement:

Section 2.3.3 of the 2016 MS4 Permit requires the permittee to “provide opportunities to engage the public to participate in the review and implementation of the permittee’s SWMP.” Public participation benefits the program by increasing public support, including additional expertise and involving community groups/organizations.

Existing Practices:

MassDevelopment and the Devens Enterprise Commission continue to work with the Nashua River Watershed Association. The Nashua River Watershed Association holds meetings annually with communities located in the watershed. They also hold informational sessions and assist communities in implementing low impact development and green infrastructure practices. Devens is also an active participant in the Devens Household Hazardous Products Collection Program.

In addition to continuing the above practices, Devens plans to implement the following BMPs to meet the public involvement and participation requirements of the permit, and engage the public in the implementation of the SWMP.

BMP: Public Review

Description: Provide for Public Review of Stormwater Management Plan and Annual Reports

Responsible Department/Parties: MassDevelopment (Engineering), Devens Enterprise Commission

Measurable Goals: Make SWMP and annual reports available to public at MassDevelopment Offices & on Devens website.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit as the SWMP is updated annually.

BMP: Public Participation

Description: Provide Public Opportunity to Participate in SWMP Development

Responsible Department/Parties: MassDevelopment (Engineering), Devens Enterprise Commission

Measurable Goals: Allow public to comment on stormwater management plan annually.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit as the SWMP is updated annually.

BMP: Public Participation

Description: Continue to provide public access to Recycling Drop-Off

Responsible Department/Parties: MassDevelopment (DPW)

Measurable Goals: Continue to provide public access to the recycling drop off at the DPW facility annually.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: Public Participation

Description: Continue public access to Regional Household Hazardous Waste Collection Center

Responsible Department/Parties: MassDevelopment

Measurable Goals: Continue participation in Devens Regional Household Hazardous Products Collection Center.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

BMP: Public Participation

Description: Continue participation in the Nashua River Watershed Association

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment

Measurable Goals: Attend or participate in at least one meeting or event annually of the Nashua River Watershed Association.

Implementation Timeframe: Completed during Permit Years 3 & 4 (FY2021 & FY2022) and to be continued for the duration of the permit.

BMP: Public Participation

Description: Provide community access to clean-up days, tree plantings, etc.

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment

Measurable Goals: Sponsor one activity annually for public involvement.

Implementation Timeframe: This could not be completed during Permit Year 3 (FY2021) due to the impacts of COVID-19. Complete in Permit Year 4 (FY2022) and to be continued for the duration of the permit term.

BMP: Public Participation

Description: Continue participation in the Devens Eco-Efficiency Center

Responsible Department/Parties: Devens Enterprise Commission (DEC)

Measurable Goals: Provide at least one program/service annually to assist local businesses in reducing the amount of waste they generate and disposal costs.

Implementation Timeframe: Completed during Permit Years 1-4 (FY2019-FY2022) and to be continued for the duration of the permit.

2.2.3 *Illicit Discharge Detection and Elimination*

Regulatory Requirement:

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Section 2.3.4 of the 2016 MS4 General Permit requires the permittee to develop a written Illicit Discharge Detection and Elimination (IDDE) program. The IDDE program is designed to “systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges.”

Existing Practices:

Devens already has a comprehensive GIS map of their drainage system, which needs only minor updating to be fully compliant with the mapping requirements of the 2016 MS4 Permit. Devens will continue to further develop their drainage mapping under the permit by identifying interconnections, or those locations where Devens’s MS4 discharges to a neighboring MS4’s jurisdiction, and delineating tributary catchment areas for all outfalls and interconnections. Devens already has identified drainage infrastructure located within the Devens Regional Enterprise Zone that is under the jurisdiction of other federal, state and municipal entities.

As a new permittee not previously covered under the 2003 MS4 Permit, Devens must establish legal authority to prohibit illicit discharges, investigate suspected illicit discharges, eliminate illicit discharges, and implement enforcement procedures through adoption of a new or modification of an existing regulatory mechanism. Devens must also develop a written IDDE plan, continue to maintain an inventory of all known Sanitary System Overflows (SSOs) and begin implementation of their illicit discharge detection and elimination program, including dry and wet weather outfall screening and sampling. These permit requirements can be achieved by implementing the following BMPs:

BMP: Illicit Discharge Detection and Elimination Regulations

Description: Review existing regulatory prohibitions and update as needed to provide required legal authority to prohibit, investigate, and eliminate illicit discharges. The general provisions of 974 CMR 4.08(2) currently require all projects to comply with MA DEP Stormwater Management Standards and submit a completed and endorsed stormwater management form which includes a signed Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the site. Failure to prevent illicit discharges constitutes a violation of the Unified Permits issued for development at Devens and is subject to enforcement procedures outlined in 974 CMR 1.14.

Responsible Department/Parties: MassDevelopment (Engineering and Utilities), Devens Enterprise Commission

Measurable Goals: Review existing authority and prohibitions. Amend existing Devens regulations for enforcement as needed. Report on progress in Annual Reports.

Implementation Timeframe: To be completed within three years of the permit effective date, but begin review during Permit Year 1 (Start FY2019, Complete FY2021). A draft IDDE regulation was drafted by both MassDevelopment and the Devens Enterprise Commission during Permit Years 2 and 3. The regulations were adopted by the Devens Enterprise Commission at a public hearing held on May 25, 2021, and are in the process of being adopted by MassDevelopment.

BMP: SSO Inventory

Description: Develop inventory of where Sanitary Sewer Overflows (SSOs) have discharged in the five years prior to the permit effective date and since the permit became effective.

Responsible Department/Parties: MassDevelopment (Utilities), Devens Enterprise Commission (BOH)

Measurable Goals: Continue to maintain and update existing SSO inventory annually and provide updates in annual MS4 reports.

Implementation Timeframe: Completed within 1 year of the permit effective date (FY2019) and to be updated annually.

BMP: Storm Sewer System Map

Description: Review and update existing drainage map to include catchment delineations, interconnections, and impaired waters. Update annually thereafter to incorporate drainage improvements, including drainage from new developments and re-developments, and findings during IDDE Program Implementation.

Responsible Department/Parties: MassDevelopment (Engineering)

Measurable Goals: Update Devens' existing drainage map to include the following within 2 years of the permit effective date:

- all outfalls and receiving waters),
- open channel conveyances,
- interconnections with other MS4s),
- municipally-owned stormwater treatment structures,
- impaired waterbodies, *and*
- initial catchment delineations.

Within 10 years of the permit effective date, this map shall also include:

- location of outfalls with an accuracy of +/- 30 feet,
- all pipes,
- manholes,
- catch basins,
- refined catchment delineations, and
- sanitary sewer system.

In addition, EPA suggests adding, but does not require, the following information, some of which Devens is actively working to incorporate:

- storm and sanitary sewer material, size and age,
- privately-owned stormwater treatment structures,
- septic systems and areas likely to be affected by septic leaching,
- seasonal high-water table elevations,
- topography,
- orthography,
- alignments, dates and representation of illicit discharge remediation, and
- locations of suspected, confirmed and corrected illicit discharges.

Implementation Timeframe: Complete initial mapping updates within 3 years of the permit effective date and complete full system map within 13 years of permit effective date (Start FY2021, Complete FY2031). The drainage map was completed in Year 1, and will continue to be updated over the course of the permit term as existing data is confirmed through field investigations and as new projects are incorporated into the MS4.

BMP: Written IDDE Program

Description: Create written IDDE plan to meet permit conditions

Responsible Department/Parties: MassDevelopment (Engineering/DPW Operations)

Measurable Goals: Develop written IDDE plan and follow the guidelines and practices in the program in implementation of the illicit discharge detection and elimination investigation program.

Implementation Timeframe: To be completed within four years of the permit effective date, but begin development during Permit Year 3 (Start FY2021, Complete FY2022). Devens began developing a written IDDE Plan during Permit Year 2 and completed a draft version of the plan during Permit Year 3. The plan was finalized in Permit Year 4 (FY2022).

BMP: Outfall and Interconnection Inventory

Description: All outfalls and interconnections have been mapped. Update outfall and interconnection inventory as needed to incorporate condition information.

Responsible Department/Parties: MassDevelopment (Engineering/DPW Operations)

Measurable Goals: Review existing GIS and update inventory as needed

Implementation Timeframe: Updates to the outfall and interconnection inventory are ongoing.

BMP: Priority Ranking

Description: Assess and rank the potential for all catchments to have illicit discharges.

Responsible Department/Parties: MassDevelopment (Engineering/DPW Operations)

Measurable Goals: Devens will assess within existing catchments the potential for illicit discharges by obtaining data about:

- past complaints
- poor receiving water quality
- density of generating sites
- age of surrounding infrastructure
- previous sewer conversion
- presence of historically combined sewer systems
- surrounding septic systems
- presence of culverted streams
- approved TMDLs or known impairments of the receiving water body
- and any other relevant characteristics.

Using this and any other available data, Devens will rank each outfall in each catchment into one of four categories:

1. Problem outfalls – that have known discharges
2. High Priority outfalls – that discharge to an area of concern (drinking water, public beaches, recreational areas, shellfish beds, or other)
3. Low Priority outfalls – that do not fit into the other categories but require sampling
4. Excluded outfalls – that have no potential for illicit discharges and are exempt from the IDDE program.

Implementation Timeframe: To be completed within four years of the permit effective date, but begin during Permit Year 1 (Start FY2019, Complete FY2022). Devens developed a draft catchment assessment and priority ranking during Permit Year 1, which was further updated during Permit Years 2 & 3 based on mapping updates. The document was finalized along with the IDDE Plan during Permit Year 4.

BMP: Conduct Dry Weather Screening

Description: Conduct Dry Weather Screening in accordance with outfall screening procedure and permit conditions.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Complete all dry weather screening and sampling within 6 years of the permit effective. Track number of outfalls that are screened annually.

Implementation Timeframe: To be completed within six years of the permit effective date, but begin during Permit Year 5 (Start FY2023, Complete FY2024).

BMP: Follow-up Ranking

Description: Update catchment prioritization and ranking as additional dry weather screening information becomes available.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: The outfall ranking described above shall be amended by Devens as dry weather and sampling information becomes available.

Implementation Timeframe: To be completed within six years of the permit effective date, but begin after the completion of dry-weather outfall screening.

BMP: Conduct Wet Weather Screening

Description: Conduct wet weather screening and sampling at outfalls/interconnections in catchments where System Vulnerability Factors are present in accordance with permit conditions.

Responsible Department/Parties: MassDevelopment (Engineering, DPW, Operations)

Measurable Goals: Complete all wet weather screening and sampling within 13 years of permit effective date. Track number of outfalls that are screened and sampled annually.

Implementation Timeframe: Begin after results from dry weather screening are obtained and before IDDE Investigations are complete within 13 years of the permit effective date (Start FY2023, Complete FY2031).

BMP: Employee Training

Description: Train employees on IDDE implementation.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Complete annual training in accordance with the IDDE plan developed. Track the number of employees that receive training.

Implementation Timeframe: Begin after IDDE plan is written and continue annually for duration of permit (FY2023).

BMP: Implement IDDE Program

Description: Implement catchment investigations according to program and permit conditions, including TV inspection, smoke testing and dye testing as needed to identify illicit connections.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Implement and enforce practices set forth in written IDDE plan and IDDE regulations. Track the number of illicit connections that are identified and removed annually.

Implementation Timeframe: Begin after IDDE plan is written, at most 5 years after the permit effective date and complete 13 years after the permit effective date (Start FY2023, Complete FY2031).

BMP: Ongoing Screening

Description: Conduct Dry and Wet weather screening (as necessary).

Responsible Department/Parties: MassDevelopment (Engineering, DPW, Operations)

Measurable Goals: Complete ongoing outfall screening upon completion of IDDE program in year 13 after the permit effective date.

Implementation Timeframe: To begin after completion of IDDE investigations as needed (FY2031).

2.2.4 Construction Site Stormwater Runoff Control

Regulatory Requirement:

Section 2.3.5 of the 2016 MS4 Permit requires the permittee to create a program to “minimize or eliminate erosion and maintain sediment on site so that it is not transported in stormwater and allowed to discharge to a water of the US through the permittee’s MS4.” The permittee will conduct site plan reviews, site inspections and include procedures for public involvement.

Existing Practices:

Under the Massachusetts Code of Regulations (974 CMR 1.00 – 10.00), The Devens Enterprise Commission (DEC) has promulgated regulations that address stormwater management controls, and erosion and sediment controls for new development and re-development. The DEC has existing Green Infrastructure Guidelines for new development and re-development which require adherence to the following sections of the Massachusetts Code of Regulations: 4.09 – Water Resource Protection, 4.11 – Greenhouse Gas Mitigation, 4.07 – Earth Removal, 3.04(4) – Stormwater Management, 3.02(3)(e) – Erosion and Sedimentation Controls During Construction, and 3.06 – Steep Slope Protection.

Devens also currently has zoning bylaws that require site-specific sediment and erosion control plans and development of a stormwater pollution prevention plan. This is included in the level one and level two permits, which should cover all new and re-development that disturbs more than one acre of land. In addition, the DEC has Rules and Regulations which include their own enforceable system for granting permits, subdivision laws, and site plan regulations.

To attain compliance with the 2016 MS4 Permit, Devens will implement the following BMPs to supplement the guidelines set forth in their zoning bylaws and rules and regulations.

BMP: Construction Site Stormwater Runoff Control (ESC) Regulations

Description: Continue compliance with Devens Enterprise Commission regulatory requirements for Erosion & Sediment Control (ESC) Plan under 974 CMR 3.02(3)(e).

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment

Measurable Goals: Continue to enforce the ESC measures and report on the number of site inspections and trainings that occur annually in the annual reports.

Implementation Timeframe: Continue to enforce throughout the permit term (FY2019).

BMP: Site Inspection and Enforcement of Erosion and Sediment Control (ESC) measures

Description: Continue implementation of 974 CMR 3.02(3)(e) and conditions of all site development approvals that require an ESC plan and DEC inspection of all controls prior to commencement of construction. Standard conditions of approval also require Applicant maintain an ESC log for all controls that is to be made available for inspection by DEC. Document existing inspection procedures.

Responsible Department/Parties: Devens Enterprise Commission (DEC), MassDevelopment

Measurable Goals: Continue existing site inspection and enforcement procedures. Document inspection and enforcement procedures. Procedures must be in written format within three years of permit effective date or by July 2021.

Implementation Timeframe: Continue to enforce throughout the permit term and document existing procedures within three years of the permit effective date (FY2021). A Standard Operating Procedure (SOP) for Site Plan Review, Inspection, and Enforcement was drafted during Permit Year 2 and finalized in Permit Year 3.

BMP: Site Plan Review

Description: Continue compliance with DEC regulatory requirements for ESC plan under 974 CMR 3.02(3)(e), protection of steep slopes 974 CMR 3.06, earth removal 974 CMR 4.07 and stormwater management 974 CMR 4.08. Document existing site plan review procedures.

Responsible Department/Parties: Devens Enterprise Commission, Engineering

Measurable Goals: Continue existing site plan review procedures. Document existing site plan review procedures. Procedures must be in written format within three years of permit effective date or by July 2021.

Implementation Timeframe: Continue to enforce throughout the permit term and create a written set of procedures within three years of the permit effective permit date (FY2021). A Standard Operating Procedure (SOP) for Site Plan Review, Inspection, and Enforcement was drafted during Permit Year 2 and finalized in Permit Year 3.

BMP: Erosion and Sediment Control

Description: Continue compliance with DEC regulatory requirements for ESC Plan under 974 CMR 3.02(3)(e) and 974 CMR 3.06.

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment

Measurable Goals: Continue compliance with existing requirements for erosion and sediment control at construction sites. Ensure BMPs are appropriate for site conditions.

Implementation Timeframe: Continue to enforce throughout permit term (FY2019).

BMP: Waste Control

Description: Continue requiring waste disposal and recycling affidavits as part of building permit process: http://www.devensec.com/forms/Building_Permit_2016.pdf (see page 2). DEC Determination of Completeness requirements also require applicants to identify waste disposal methods as part of site plan review (recycling, composting, reuse): http://www.devensec.com/forms/DOC_Form_2012.pdf (see page 3).

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment

Measurable Goals: Continue to require compliance with existing requirements for waste control.

Implementation Timeframe: Continue to enforce throughout the permit term (FY2019).

2.2.5 Post-Construction Stormwater Management

Regulatory Requirement:

Section 2.3.6 of the 2016 MS4 Permit requires the permittee to require developers to “reduce the discharge of pollutants found in stormwater through the retention or treatment of stormwater after construction on new or redeveloped sites.”

In this case, a site is defined as the “area extent of construction activities which includes but is not limited to the creation of new impervious cover and improvement of existing impervious cover.”

New Development is defined as construction activity that results in a total earth disturbance area equal to or greater than one acre on land that did not have any impervious area before work began.

Redevelopment is defined as any construction activity that disturbs greater than or equal to one acre and does not meet the requirements to be designated as new development.

Existing Practices:

Devens has incorporated post construction stormwater management control measures in the DEC Development Rules and Regulations promulgated in 1996 and last revised in 2013, the Devens By-Laws promulgated in 1994 and last revised in 2015, and the Devens Stormwater Pollution Prevention Plan promulgated in 1995. Since 1997, these regulations have required all stormwater management systems to be designed with pre-development areas modeled as “green field”, requiring developments to pre-treat and infiltrate more runoff directly on-site than what would have been required for redevelopment projects under the Massachusetts Stormwater Management Standards. The DEC requires that all projects comply with the MADEP Stormwater Management Standards regardless of whether the project is subject to the Wetlands Protection Act. Since 2011, Devens has required Low Impact Development (LID) for all new and redevelopment projects. 974 CMR 4.08 includes requirements to promote the use of LID stormwater management techniques to the maximum extent feasible to mimic the predevelopment hydrology of the site. Since 2011, Devens has also developed comprehensive green infrastructure guidelines and regulatory requirements for large building projects, and updated its stormwater operations and maintenance plan requirements for all private development.

Devens shall continue to build on these existing practices and meet the requirements of the 2016 MS4 Permit through implementation of the following:

BMP: Post Construction Stormwater Management Regulations

Description: Continue to require compliance with Devens Enterprise Commission (DEC) regulatory requirements for post-construction runoff from new development and re-development as included in 974 CMR 4.08 and 4.09.

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment (Engineering, Operations)

Measurable Goals: Continue to enforce existing regulations.

Implementation Timeframe: Continue to enforce regulations throughout the permit term (FY2019).

BMP: Target Properties to Reduce Impervious Areas

Description: Identify and priority rank at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious cover and update annually.

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment (Engineering, DPW Operations)

Measurable Goals: This goal can be achieved through disconnecting impervious surfaces, introducing low impact development and green infrastructure practices, or re-defining zoning regulations to change maximum sizes of parking lots and lane widths. Report annually on progress and retrofitted properties targeted by this effort.

Implementation Timeframe: Complete within 6 years of the permit effective date and report annually on retrofitted properties (FY2024).

BMP: Allow for Green Infrastructure

Description: Continue to require LID practices for all stormwater management projects where feasible: 974 CMR 3.04(4)(a)1. & 974 CMR 4.08. Continue to utilize and improve on green infrastructure guidelines to guide, regulate and incentivize green infrastructure on all development and redevelopment projects: http://www.devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf . Continue to monitor impervious surface reductions in Devens Sustainable Indicators Reports.

Responsible Department/Parties: Devens Enterprise Commission (DEC)

Measurable Goals: Continue to require LID practices as well as monitor and track sustainable indicators including impervious surface reductions resulting from incorporation of LID.

Implementation Timeframe: Continue to enforce throughout the duration of the permit (FY2019).

BMP: Street Design and Parking Lot Guidelines

Description: Encourage the use of reduced pavement widths and variable street standards and types, shortened roads through cluster development and alternative surfaces such as porous pavement, pavers, or reinforced turf. Develop a report assessing requirements that affect the creation of impervious cover to determine if design standards for streets and parking lots can be modified to support low impact design options. Continue to require LID practices for all street and permittee-owned parking lot projects where feasible: 974 CMR 3.04(4)(a)1. & 974 CMR 4.08. Continue to monitor impervious surface reductions in Devens Sustainable Indicators Reports.

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment (Engineering)

Measurable Goals: Continue to require LID practices as well as monitor and track sustainable indicators including impervious surface reductions resulting from incorporation of LID.

Implementation Timeframe: Continue to enforce and track throughout the duration of the permit (FY2019). Complete report within 6 years of the permit effective date and implement recommendations of report as warranted and where feasible.

BMP: Ensure the Requirements of the MA Stormwater Handbook are met

Description: Ensure any stormwater controls and management practices for new development and redevelopment meet the retention and treatment requirements of the MS4 Permit and all applicable requirements of the Massachusetts Stormwater Handbook. Review existing regulatory requirements and amend requirements as needed to meet permit conditions.

Responsible Department/Parties: Devens Enterprise Commission (DEC)

Measurable Goals: Modify existing regulatory mechanism to meet permit requirements.

Implementation Timeframe: The DEC regulations were reviewed and updated during permit years 2 & 3 to meet this requirement. The new regulations were adopted at a public hearing held on May 25, 2021.

BMP: As-Built Plans for Stormwater Control/Long-term Operation and Maintenance of BMPs

Description: Continue current procedures which require the development of O&M Plans as part of the permitting process and as a condition of occupancy. Continue to require property owners to file annual reports regarding system maintenance to the DEC. Continue to require the submission of as-builts prior to occupancy.

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment (Engineering)

Measurable Goals: Continue current procedures as they relate to development of O&M Plans and submission of as-built plans.

Implementation Timeframe: Continue to enforce throughout the duration of the permit (FY2019).

BMP: Inspection of Private Detention Basins

Description: Continue to require annual inspection of private detention basins to ensure compliance with existing O&M requirements. This inspection should be conducted by the owner/operator of the detention basin, and inspection reports should be submitted to the DEC and MassDevelopment.

Responsible Department/Parties: Devens Enterprise Commission (DEC), MassDevelopment (Engineering)

Measurable Goals: Continue to inspect annually to ensure compliance with existing O&M Plans. Report on the number of properties inspected annually and status of compliance.

Implementation Timeframe: Continue to enforce throughout the duration of the permit term (FY2019).

2.2.6 Pollution Prevention / Good Housekeeping

Regulatory Requirement:

Section 2.3.7 of the 2016 MS4 Permit requires the permittee to “implement an operations and maintenance program for permittee-owned operations that has a goal of preventing or reducing pollutant runoff and protecting water quality from all permittee-owned operations.”

This minimum control measure includes a training component and has the ultimate goal of preventing or reducing stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance.

Existing Practices:

The DPW's current procedures for maintaining existing infrastructure are based on computer generated tasks, programmed for specific equipment or duties for a specific time. Devens does have a written O&M plan/schedule that covers street sweeping, catch basin cleaning, and maintenance of BMPs. Devens currently sweeps all public streets and municipal parking lots in the early spring, and then on average every 4 weeks, as needed. Devens cleans approximately 50% of catch basins per year. Catch basin cleanings and street sweepings are stock piled in a self-contained erosion-free area at the DPW Yard, which are then transported to a landfill.

To be in compliance with the 2016 permit, catch basins must be no more than 50% full at any one time. To achieve this, all structures must be cleaned, measured, logged and monitored to develop an optimization plan. Devens shall continue to build on these existing practices and meet the requirements of the 2016 MS4 Permit through implementation of the following:

BMP: Inventory all Permittee-Owned Property

Description: Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment and update annually.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Create Inventory and update annually.

Implementation Timeframe: Completed within 4 years of the permit effective date and to be updated as needed (FY2022).

BMP: O&M Practices

Description: Review existing operation and maintenance (O&M) procedures addressing proper storage of materials, lawn maintenance and landscaping activities, protective practices, use and storage of petroleum products, waste management procedures for buildings and facilities, location of fueling areas, evaluation of possible leaks, and storage locations of vehicles and equipment. Modify as necessary to ensure compliance with Section 2.3.7.a(ii) of the 2016 MS4 Permit.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Review and update standard operation and maintenance procedures for all municipal activities and facilities as necessary.

Implementation Timeframe: Complete within 4 years of the permit effective date and update as needed (FY2022). The O&M Plan was drafted in Permit Year 4.

BMP: Infrastructure O&M

Description: Establish and implement a program for repair and rehabilitation of MS4 infrastructure.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Create and implement the operation and maintenance plan.

Implementation Timeframe: Complete within 4 years of the permit effective date and update as needed (FY2022). Infrastructure O&M is addressed in the O&M Plan drafted in Permit Year 4.

BMP: Catch Basin Cleaning Optimization

Description: Continue current practice of inspecting all catch basins annually and quantifying the amount of sediment removed from each basin. Continue to utilize information collected to optimize existing cleaning practices.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Continue to track sediment removed and optimize catch basin cleaning operations. Complete optimization plan within 4 years of permit effective date.

Implementation Timeframe: Began collection of data in Permit Year 1. Optimization will be complete within 4 years of the permit effective date and updated as needed (Start FY2019, Complete FY2022). Data collection is ongoing, and the optimization plan was not completed in Permit Year 4. Devens will include a schedule for collecting the remainder of the data required to develop the optimization plan in the Year 4 annual report.

BMP: Catch Basin Cleaning

Description: Continue to target areas where catch basins fill up with sediment more quickly to ensure that each catch basin is no more than 50% full. Modify cleaning schedule and frequency as needed.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Clean catch basins on established schedule and report number of catch basins cleaned and total volume of material removed annually.

Implementation Timeframe: Completed and implemented within one year of the permit effective date (FY2019).

BMP: Street Sweeping Program

Description: Continue to sweep all streets and permittee-owned parking lots at least annually in accordance with permit conditions.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Sweep all streets and permittee-owned parking lots at least once per year in the spring and report.

Implementation Timeframe: Complete within 1 year of permit effective date and implement annually (FY2019).

BMP: Road Salt Use Optimization Program

Description: Continue to calibrate equipment annually. Continue to review and enhance existing practices to minimize the use of road salt.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Continue current efforts and modify existing practices where feasible for further optimization of road salt use. Complete optimization plan within 4 years of permit effective date.

Implementation Timeframe: Complete optimization plan within 4 years of permit effective date (FY2022). This plan was included in the Standard Operating Procedure for Winter Road Maintenance that was developed in Permit Year 3.

BMP: Inspections and Maintenance of Stormwater Treatment Structures

Description: Continue to inspect detention ponds annually and clean as needed. Establish and implement inspection and maintenance procedures and frequencies for other stormwater treatment structures.

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment (Engineering, DPW Operations)

Measurable Goals: Review existing procedures and optimize. Inspect and maintain treatment structures at least annually. Begin annual inspections within 4 years of permit effective date.

Implementation Timeframe: Begin annual inspections within 4 years of permit effective date (FY2022). The DPW inspected all Devens-owned stormwater treatment structures during Permit Year 4.

BMP: Stormwater Pollution Prevention Plan (SWPPP)

Description: Create SWPPPs for waste-handling facilities not already covered under the Multi-Sector General Permit.

Responsible Department/Parties: MassDevelopment (Engineering, DPW Operations), Devens Enterprise Commission

Measurable Goals: Develop SWPPPs within 4 years of permit effective date and complete inspections and training annually thereafter.

Implementation Timeframe: A draft SWPPP for the DPW facility was completed during Permit Year 3 (FY2021). The SWPPP was finalized in Year 4, and implementation will begin in Permit Year 5 (FY2023).

3.0 REGULATORY STANDARDS

3.1 Introduction

In order to prevent pollutants from entering the drainage system and being discharged to the environment with stormwater, Devens plans to continue existing practices and implement a wide variety of Best Management Practices (BMPs) categorized under the six minimum control measures as discussed earlier in this document. The control measures for Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, and Post-Construction Stormwater Management are focused on improving stormwater pollution prevention into the future through implementation of the following:

- Regulatory mechanisms establishing legal authority, prohibitions and requirements
- Design and construction standards governing stormwater infrastructure
- Requirements for long-term Operation and Maintenance (O&M) of structural BMPs.

Additional information regarding Devens' current regulatory mechanisms, as well as the status of compliance with the 2016 MS4 Permit regulatory requirements are included in this section.

3.2 Existing Stormwater Regulatory Mechanisms

3.2.1 *Devens Enterprise Commission Development Rules and Regulations*

Under the Massachusetts Code of Regulations (974 CMR 1.00 – 10.00), The Devens Enterprise Commission (DEC) has promulgated regulations that address stormwater management controls, and erosion and sediment controls for new development and re-development. The DEC Rules and Regulations were developed in August 1996 and most recently revised in November 2013. Outlined in these regulations is the process for reviewing submissions in Devens which is called Unified Permitting. The purpose of Unified Permitting, which is administered by the DEC, is to provide for expeditious permitting of land development to promote the orderly conversion and redevelopment of Devens. The major components of this system are zoning, site plan review and subdivision of land.

There are two levels of application review as part of the development permitting process. Level One is applicable to relatively simple submissions and Level Two is reserved for more complicated or higher impact submissions. An application for a Development Permit shall be deemed Level One in the following cases:

- a. issuance of building or occupancy permit, wherein no other Commission action or site plan review is required;
- b. issuance of a permit for alteration or creation of a lot for any of the following purposes: revision of lot lines, division of a lot containing two (2) buildings into two (2) lots with separate buildings, and division of a single lot unimproved by a building into two (2) or more smaller lots; provided, however, that in any event all resultant lots shall comply with the frontage requirements in Article VIII and said frontage shall be on a way which the Commission certifies is used and maintained as a public way;
- c. approval of minor modifications to an already approved site plan consistent in scope with the following examples: a change to a more desirable variety of landscape material; a shift of less than eight (8) feet in building placement on the lot, for siting reasons; a shift in site

- utility connections, in order to provide improved hookup to the public system or to avoid a natural constraint; an adjustment of not more than three (3) feet in the width or location of a driveway entrance, in order to improve sight distance or to avoid a natural constraint; and similar adjustments required to facilitate a more functional site plan;
- d. approval of minor architectural modifications of a structure within an historic district;
 - e. issuance of a certificate of compliance under an order of conditions.

An application for a Development Permit shall be deemed Level Two in all other circumstances.

974 CMR 4.08 presents the Stormwater Management requirements in the Industrial Performance Standards. Since 1997, these regulations have required all project stormwater management systems to be designed with pre-development areas all being modeled as “green field”, requiring developments to pre-treat and infiltrate more runoff directly on-site than what would have been required for redevelopment projects under the Massachusetts Stormwater Management Standards. 974 CMR 4.08 also includes requirements to promote the use of Low Impact Development (LID) stormwater management techniques to the maximum extent feasible to mimic the predevelopment hydrology of the site. The existing Green Infrastructure Guidelines encompass 974 CMR Sections 3.04(4) – Stormwater Management, 3.02(3)(e) – E&S Controls, and 3.06 – Steep Slope Protection, all of which outline necessary controls to regulate the quality of water entering the MS4.

3.2.2 *Zoning Bylaws of the Devens Regional Enterprise Zone*

The Zoning Bylaws of the Devens Regional Enterprise Zone, which govern land development in Devens, were adopted on November 14, 1994 and last revised in July 2015. They identify when site plan review is triggered as a part of or as a sole component of a Level Two Development Permit application, which includes:

- (i) construction of any new building, regardless of land use;
- (ii) extension or increase in the area of a nonconforming use in an existing building;
- (iii) construction or expansion of a parking lot, structure, or loading dock;
- (iv) construction of an ancillary building on-site (denoting use for storage of equipment, maintenance supplies, and similar items, or housing building systems equipment), if the building contains more than eight hundred (800) square feet of gross floor area; and/or
- (v) construction of a project that will result in changes to the existing grade of ten (10) percent or more of the lot size.

Devens Zoning Bylaws require that applications for development permits include a site-specific sediment and erosion control plan, and a stormwater pollution prevention plan.

3.2.3 Stormwater Pollution Prevention Plan

In 1995, Devens created a Stormwater Pollution Protection Plan to foster responsible stormwater management and further protect water resources in Devens. The Stormwater Pollution Prevention is utilized as a guide for the Devens Enterprise Commission, for site developers and site occupants at Devens to preserve natural resources by following and implementing proper stormwater management procedures.

3.2.4 Water Resource Protection Report

The protection of water resources in the Devens region has been a priority since the base closure in 1993, one which has been emphasized throughout the planning and redevelopment process at Devens. In 1994, as part of the Devens Reuse planning process, a Water Resource Protection Report was created to identify and protect the ground and surface water resources while allowing redevelopment. This led to the development of a Water Resources Protection Overlay Zone in the Devens Bylaws and DEC Rules and Regulations (974 CMR 4.09 – Water Resource Protection). Incorporating water resource protection efforts early on in the redevelopment process has allowed Devens to steer development away from wetlands, floodplains, and other sensitive resource areas to both protect and improve surface and groundwater resources.

3.3 Review of Regulatory Mechanisms for Compliance with the 2016 MS4 Permit

A comprehensive review was conducted to evaluate whether Devens' existing regulatory mechanisms for illicit discharge detection and elimination, as well as construction and post-construction stormwater management, comply with the 2016 MS4 Permit requirements, and identify what modifications, if any, are needed to bring Devens into compliance.

3.3.1 Illicit Discharge Detection and Elimination

Permit Requirement: The 2016 MS4 Permit requires the Devens Enterprise Commission to prohibit non-stormwater discharges into the MS4 and implement enforcement procedures within three years of the permit effective date. A regulatory mechanism must be implemented to provide the DEC with adequate legal authority to accomplish the following tasks:

- Prohibit illicit discharges;
- Investigate suspected illicit discharges;
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system; and
- Implement appropriate enforcement procedures and actions.

Excerpts from Devens' Regulations that Support Permit Requirement: The general provisions of 974 CMR 4.08(2) currently require all projects to comply with MA DEP Stormwater Management Standards and submit a completed and endorsed stormwater management form which includes a signed Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the site. Failure to prevent illicit discharges constitutes a violation of the Unified Permits issued for development at Devens and is subject to enforcement procedures outlined in 974 CMR 1.14.

The Devens Enterprise Commission will need to supplement these regulations to provide the DEC with adequate legal authority to prohibit illicit discharges associated with existing development, to

investigate suspected illicit discharges, to eliminate illicit discharges from private property; and implement enforcement procedures.

3.3.1.1 Illicit Discharge Detection and Elimination – Permit Year 2 Update

Devens drafted an IDDE regulatory mechanism during Permit Year 2 based on the template provided to Massachusetts communities by the Attorney General's office, which gives the DEC the authority to prohibit illicit discharges, investigate suspected illicit discharges, eliminate illicit discharges – including discharged from properties not owned or controlled by MassDevelopment, and implement appropriate enforcement procedures and actions. The proposed language was under review by the DEC and MassDevelopment at the end of Year 2, and will be amended to the appropriate section of 974 CMR by the end of Permit Year 3. Once enacted, the IDDE regulatory mechanism will be included in Appendix G.

3.3.1.2 Illicit Discharge Detection and Elimination – Permit Year 3 Update

In Permit Year 3, Devens decided that the IDDE regulatory mechanism would be most effective if it gave both MassDevelopment and the DEC the authority to prohibit illicit discharges, investigate suspected illicit discharges, eliminate illicit discharges, and implement appropriate enforcement procedures and actions. In order to ensure dual authority, the draft regulatory mechanism was amended to both the DEC regulations (974 CMR) and the MassDevelopment regulations (946 CMR). The IDDE regulatory mechanism was adopted by the DEC as 974 CMR 8.10 on May 25, 2021, and will be adopted by MassDevelopment at a public hearing during Permit Year 4. Both regulatory mechanisms are included in Appendix G.

3.3.2 *Construction Site Stormwater Runoff Control*

The 2016 MS4 Permit requires the following:

Regulate Construction Runoff from Properties Disturbing Greater than One Acre

Permit Requirement: Devens is required to develop, implement and enforce a program to address stormwater runoff from construction activities that disturb greater than one acre and discharge into the MS4. The program shall also include projects that disturb less than one acre if the project is part of a larger common plan of development which disturbs greater than one acre. As part of that program, Devens is required to develop an ordinance or other regulatory mechanism to address construction runoff from properties that disturb greater than one acre and discharge to the MS4 by requiring the use of sediment and erosion control practices at construction sites. This regulatory mechanism is required to be developed within three years of the permit effective date.

Excerpts from Devens' Regulations that Support Permit Requirement: Per 974 CMR 2.04(1)(r), Level Two Definitive Subdivision Plans require a Stormwater Pollution Prevention Plan including erosion, siltation, and dust control measures before and during construction, and appropriate ground cover, seeding, and sweeping of adjacent public ways. Under 974 CMR 3.02(2)(p), site plan submission requirements include submittal of "an erosion and sedimentation control plan as per 974 CMR 3.04(4) and the Devens Stormwater Pollution Prevention Plan." 974 CMR 3.02(3)(e) states that "All site plan submissions shall include an Erosion and Sediment Control Plan containing sufficient information to describe the nature and purpose of the proposed development, pertinent conditions of the site and the adjacent areas, and proposed erosion and sedimentation controls. The plan shall include such detail as is necessary to demonstrate that the proposed development will comply with Massachusetts Department of Environmental Protection Stormwater Management Standards, the

Devens Stormwater Pollution Prevention Plan and 974 CMR 3.04 design standards. The Erosion and Sediment Control Plan shall also include the following:

- Location and description of Resource Areas...
- Existing soils and volume and nature of any imported materials
- Drainage patterns, watershed and sub-watersheds, with calculations of proposed land disturbance within each sub-watershed and areas of soil to be disturbed in each watershed throughout the duration of the proposed land disturbance activity.
- A description of construction and waste materials expected to be stored onsite. The Plan shall include a description and details of controls to reduce pollutants from these materials, including storage practices to minimize exposure of the materials to stormwater, and spill prevention response.
- Location and details of all erosion and sediment control measures with a narrative of the construction sequence/phasing of the project, including both Operation and Maintenance for structural and non-structural control measures and best management practices, interim grading, and material stockpiling areas in accordance with the Devens Stormwater Pollution Prevention Plan and Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas. Such narrative and Operation and Maintenance Plan for temporary and permanent erosion control measures during Construction, shall be included on the erosion and sediment control plan and include but not be limited to, the following requirements:
 - a. Prior to any land disturbance activities commencing on the site, the Applicant/contractor shall be responsible for physically marking the limits of construction on the site with tape, signs, or orange construction fence, so that workers understand the areas to be protected. The physical markers shall be inspected daily and repaired as necessary throughout the duration of the project.
 - b. Perimeter sediment control system shall be installed prior to soil disturbance and maintained to contain soils on-site. Areas outside of the perimeter sediment control system must not be disturbed unless the Applicant has obtained prior approval from the DEC.
 - c. Measures shall be taken to control erosion within the project area. Sediment in runoff water shall be trapped and retained within the project area and street sweeping of adjacent Streets and Roads shall be included where necessary.
 - d. All Resource Areas shall be protected from sediment.
 - e. Monitoring and maintenance of erosion and sediment control measures throughout the course of construction shall be required. Sediment shall be removed once the volume reaches $\frac{1}{4}$ to $\frac{1}{2}$ the height of the erosion control.
 - f. Divert runoff from offsite and undisturbed areas away from construction to minimize soil erosion and sedimentation on and off-site. Temporarily stabilize all highly erodible soils and slopes immediately.
 - g. Land disturbance activities exceeding two acres in size shall not be disturbed without a sequencing plan that requires stormwater controls to be installed and exposed soils stabilized, as disturbance beyond the two acres continues. A construction

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phasing plan, including erosion and sediment control plan for each phase, shall be submitted to the DEC prior to any construction on the site. Mass clearings and grading of the entire site shall be avoided.

- h. Soil stockpiles must be stabilized or covered at the end of each workday. Stockpile side slopes shall not be greater than 2:1. All stockpiles shall be surrounded by sediment controls.
 - i. Disturbed areas remaining idle for more than 14 days shall be temporarily or permanently stabilized.
 - j. Permanent seeding shall be undertaken in the spring from March through May, and in late summer and early fall from August to October 15. During the peak summer months and in the fall after October 15, when seeding is found to be impractical, an appropriate temporary mulch and/or non-asphaltic soil tackifier with winter rye shall be applied. Permanent seeding may be undertaken during the summer if plans provide for adequate mulching and watering.
 - k. Anti-tracking pad(s) shall be constructed at all entrance/exit points of the site to reduce the amount of soil carried onto roadways and off the site. Dust shall also be controlled at the site.
 - l. All slopes steeper than 3:1 (h:v, 33.3%), as well as perimeter dikes, sediment basins or traps, and embankments must, upon completion, be immediately stabilized with sod, seed and anchored straw mulch, or other approved stabilization measures.
 - m. Temporary sediment trapping devices must not be removed until permanent stabilization is established in all construction areas associated with the project. Similarly, stabilization must be established prior to converting temporary sediment traps/basins into permanent (post-construction) stormwater management facilities. All facilities used for temporary measures shall be cleaned and re-stabilized prior to being put into final operation.
 - n. All temporary erosion and sediment control measures shall be removed after final site stabilization. Disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized within 30 days of removal.
- o Other applicable controls and/or information as may be required by the DEC.
 - o All plans, reports and calculations required as part of the erosion and sediment control plan must be stamped and certified by a professional engineer.
 - o Projects disturbing one acre or more are required to obtain a Construction General Permit (CGP) from the US EPA. A copy of the CGP must be filed with the DEC prior to issuance of a building permit for all applicable projects.”

Per 974 CMR 3.02.3.e.5.g “Land disturbance activities exceeding two acres in size shall not be disturbed without a sequencing plan that requires stormwater controls to be installed and exposed soils stabilized, as disturbance beyond the two acres continues. A construction phasing plan,

including erosion and sediment control plan for each phase, shall be submitted to the DEC prior to any construction on the site. Mass clearings and grading of the entire site shall be avoided.”

Recommended Modification: Consider possibly lowering this two-acre threshold to one acre to better align with the permit requirements.

Adopted Updates to Meet Permit Requirement:

974 CMR 3.02.3.e.5.g. was updated to lower the referenced two-acre threshold to one acre. Clarifying language was also added to 974 CMR 3.02.1.e. to require site plan review when a proposed project involves disturbances of one acre or more, or disturbances of less than one acre that are part of a larger common plan of development that will disturb one acre or more. The updated 974 CMR 3.02 is included in Appendix G.

Site Inspection & Enforcement

Permit Requirement: Development of written procedures for site inspections and enforcement of sediment and erosion control measures. These procedures shall clearly define who is responsible for site inspections as well as who has authority to implement enforcement procedures. The program shall provide that the permittee may, to the extent authorized by law, impose sanctions to ensure compliance with the local program. These procedures and regulatory authorities shall be documented in the SWMP.

Excerpts from Devens’ Regulations that Support Permit Requirement: Devens shall continue implementation of 974 CMR 3.02(3)(e) and conditions of all site development approvals that require ESC plan and DEC inspection of all controls prior to commencement of construction. Standard conditions of approval also require Applicant maintain an ESC log for all controls that is to be made available for inspection by DEC.

Recommended Modification: Documentation of existing site inspection and enforcement procedures is required, including responsibility for site inspections as well as authority to implement enforcement procedures.

Sediment and Erosion Control BMPs

Permit Requirement: Requirements for construction site operators performing land disturbance activities within the MS4 jurisdiction that result in stormwater discharges to the MS4 to implement a sediment and erosion control program that includes BMPs appropriate for the conditions at the construction site. The program may include references to BMP design standards in state manuals, such as the Massachusetts Stormwater Handbook or design standards developed by the MS4. EPA supports and encourages the use of design standards in local programs. Examples of appropriate sediment and erosion control measures for construction sites include local requirements to:

- *Minimize the amount of disturbed area and protect natural resources*
- *Stabilize sites when projects are complete, or operations have temporarily ceased*
- *Protect slopes on the construction site*
- *Protect all storm drain inlets and armor all newly constructed outlets*
- *Use perimeter controls at the site*
- *Stabilize construction site entrances and exists to prevent off-site tracking*

- *Inspect stormwater controls at consistent intervals*

Excerpts from Devens' Regulations that Support Permit Requirement: 974 CMR 3.02(3)(e) states that "All site plan submissions shall include an Erosion and Sediment Control Plan containing sufficient information to describe the nature and purpose of the proposed development, pertinent conditions of the site and the adjacent areas, and proposed erosion and sedimentation controls. The plan shall include such detail as is necessary to demonstrate that the proposed development will comply with Massachusetts Department of Environmental Protection Stormwater Management Standards, the Devens Stormwater Pollution Prevention Plan (SWPPP) and 974 CMR 3.04 design standards. The Devens SWPPP provides guidance on measures that may be utilized to prevent erosion and sedimentation during construction activities. The Erosion and Sediment Control Plan shall include the following:

.....

5. Location and details of all erosion and sediment control measures with a narrative of the construction sequence/phasing of the project, including both Operation and Maintenance for structural and non-structural control measures and best management practices, interim grading, and material stockpiling areas in accordance with the Devens Stormwater Pollution Prevention Plan and Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas. Such narrative and Operation and Maintenance Plan for temporary and permanent erosion control measures during Construction, shall be included on the erosion and sediment control plan and include but not be limited to, the following requirements:

...

- b. Perimeter sediment control system shall be installed prior to soil disturbance and maintained to contain soils on-site. Areas outside of the perimeter sediment control system must not be disturbed unless the Applicant has obtained prior approval from the DEC.
- c. Measures shall be taken to control erosion within the project area. Sediment in runoff water shall be trapped and retained within the project area and street sweeping of adjacent Streets and Roads shall be included where necessary.

...

- e. Monitoring and maintenance of erosion and sediment control measures throughout the course of construction shall be required. Sediment shall be removed once the volume reaches $\frac{1}{4}$ to $\frac{1}{2}$ the height of the erosion control.
- f. Divert runoff from offsite and undisturbed areas away from construction to minimize soil erosion and sedimentation on and off-site. Temporarily stabilize all highly erodible soils and slopes immediately.
- g. Land disturbance activities exceeding two acres in size shall not be disturbed without a sequencing plan that requires stormwater controls to be installed and exposed soils stabilized, as disturbance beyond the two acres continues. A construction phasing plan, including erosion and sediment control plan for each phase, shall be submitted to the DEC prior to any construction on the site. Mass clearings and grading of the entire site shall be avoided.
- h. Soil stockpiles must be stabilized or covered at the end of each workday. Stockpile side slopes shall not be greater than 2:1. All stockpiles shall be surrounded by sediment controls.
- i. Disturbed areas remaining idle for more than 14 days shall be temporarily or permanently stabilized.
- j. Permanent seeding shall be undertaken in the spring from March through May, and in late summer and early fall from August to October 15. During the peak summer months and

in the fall after October 15, when seeding is found to be impractical, an appropriate temporary mulch and/or non-asphaltic soil tackifier with winter rye shall be applied. Permanent seeding may be undertaken during the summer if plans provide for adequate mulching and watering.

- k. Anti-tracking pad(s) shall be constructed at all entrance/exist points of the site to reduce the amount of soil carried onto roadways and off the site. Dust shall also be controlled at the site.
- l. All slopes steeper than 3:1 (h:v, 33.3%), as well as perimeter dikes, sediment basins or traps, and embankments must, upon completion, be immediately stabilized with sod, seed and anchored straw mulch, or other approved stabilization measures.
- m. Temporary sediment trapping devices must not be removed until permanent stabilization is established in all construction areas associated with the project. Similarly, stabilization must be established prior to converting temporary sediment traps/basins into permanent (post-construction) stormwater management facilities. All facilities used for temporary measures shall be cleaned and re-stabilized prior to being put into final operation.”

Control of Wastes

Permit Requirement: Requirements for construction site operators within the MS4 jurisdiction to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes. These wastes may not be discharged to the MS4.

Excerpts from Devens’ Regulations that Support Permit Requirement: Waste disposal and recycling affidavits are required as part of the building permit process: http://www.devensec.com/forms/Building_Permit_2016.pdf (see page 2). Devens Enterprise Commission Determination of Completeness requirements also require applicants to identify waste disposal methods as part of the site plan (recycling, composting, reuse): http://www.devensec.com/forms/DOC_Form_2012.pdf (see page 3). Recycling and waste management guidelines, including guidelines for construction waste, are publicly available at http://www.devensec.com/news/Recycling_Guidance_Document_updated_final_6-6-19.pdf. Copies of these documents are also included in Appendix G.

Per 974 CMR 3.02(3)(e)(4), the Erosion and Sediment Control Plan shall also include the following:

.....

“4. A description of construction and waste materials expected to be stored on-site. The Plan shall include a description and details of controls to reduce pollutants from these materials, including storage practices to minimize exposure of the materials to stormwater, and spill prevention and response.”

Site Plan Review Inspection and Enforcement

Permit Requirement: Development of written procedures for site plan review, inspection and enforcement. The site plan review procedure shall include a pre-construction review by the permittee of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development. The review procedure shall incorporate procedures for the consideration of potential water quality impacts, and procedures for the receipt and consideration of information submitted by the public. The site plan review procedure shall also include evaluation of opportunities for use of low impact design and green infrastructure. When the opportunity exists, the permittee shall encourage project

proponents to incorporate these practices into the site design. The procedures for site inspection conducted by the permittee shall include the requirement that inspections occur during construction of BMPs as well as after construction of BMPs to ensure they are working as described in the approved plans, clearly defined procedures for inspections including qualifications necessary to perform the inspections, the use of mandated inspections forms if appropriate, and procedure for tracking the number of site reviews, inspections, and enforcement actions.

Recommended Modification: Separate documentation of existing in-house site plan review procedures is required, including inspection and enforcement procedures. Much of what is required is included in existing regulations and just needs to be pulled out to create a separate stand-alone document for in-house use.

3.3.2.1 Construction Site Stormwater Runoff Control – Permit Year 2 Update

Devens' existing regulatory mechanisms were reviewed for compliance with Section 2.3.5 of the MS4 permit during Permit Year 2, and found to effectively meet the requirements of that section. While the regulations can function as written procedures for Site Plan Review, Site Inspection, and Enforcement, Devens also drafted a separate SOP for Site Plan Review, Site Inspection, and Enforcement during Permit Year 2. Once finalized, the SOP will be included in Appendix H of the SWMP.

3.3.2.2 Construction Site Stormwater Runoff Control – Permit Year 3 Update

The SOP for Site Plan Review, Site Inspection, and Enforcement was finalized during Permit Year 3. The SOP is included in Appendix H of the SWMP.

3.3.3 *Post-Construction Stormwater Management*

The 2016 MS4 Permit requires the following as it relates to post construction runoff from new development and redevelopment:

Regulate Post-Construction Runoff from New and Re-Development Disturbing Greater than One Acre

Permit Requirement: Develop, implement and enforce a program to address post-construction stormwater runoff from new development and redevelopment that disturbs greater than one acre and discharges into the MS4. The program shall also include projects that disturb less than one acre if the project is part of a larger common plan of development which disturbs greater than one acre. As part of that program, Devens is required to develop a regulatory mechanism to address post-construction stormwater runoff from properties that disturb greater than one acre and discharge to the MS4 by requiring the use of sediment and erosion control practices at construction sites. This regulatory mechanism is required to be developed and adopted, where feasible, no later than three years from the permit effective date.

Excerpts from Devens' Regulations that Support Permit Requirement: Continue to require compliance with Devens Enterprise Commission (DEC) regulatory requirements for post-construction runoff from new development and re-development as included in 974 CMR 4.08 and 4.09.

Low Impact Development

Permit Requirement: Low Impact Development (LID) site planning and design strategies must be used to the maximum extent feasible.

Excerpts from Devens' Regulations that Support Permit Requirement: LID is addressed in numerous places, including in the DEC Regulations 974 CMR 3.04.4.a.3 where it states that "Low Impact Development (LID) Stormwater Management Design shall be incorporated into the site plan to allow for the full utilization of the property while maintaining the pre-development characteristics of the site as though it were a "green field" (volume, frequency, peak runoff rate) to the maximum extent feasible. Maximizing the use of pervious areas minimizes stormwater runoff from a site, improves stormwater quality, and increases groundwater recharge. Maintenance of these on-site stormwater management systems must be incorporated into facility operations, and is the responsibility of the landowner. For requirements, design standards, and criteria for LID techniques, refer to 974 CMR 4.08."

Per the requirements outlined in CMR 3.04(4)(a)1. & 974 CMR 4.08, Devens will continue to utilize and improve on green infrastructure guidelines to guide, regulate and incentivize green infrastructure on all development and redevelopment projects. The Green Infrastructure Guidelines adopted by Devens in August 2014 are included in Appendix G. This document is intended to provide applicants with a better understanding of what Green Infrastructure is, the local incentives to promote Green Infrastructure, and guidance on how to strategically locate and incorporate Green Infrastructure into projects to meet multiple regulatory requirements within the DEC Rules and Regulations. Devens shall also continue to monitor impervious surface reductions in Devens Sustainable Indicators Reports.

BMP Design Guidance

Permit Requirement: The design of treatment and infiltration practices should follow the guidance in Volume 2 of the Massachusetts Stormwater Handbook, as amended, or other federally or State approved BMP design guidance.

Excerpts from Devens' Regulations that Support Permit Requirements: As referenced in 974 CMR 4.08.2.a "All applications, regardless of whether the project is subject to the Wetland Protection Act or not, shall design the stormwater management system in compliance with the Massachusetts DEP Stormwater Management Standards, January, 2008, as amended ("SMS") and the Massachusetts Stormwater Handbook, February 2008, as amended ("Handbook"). The applicant shall submit a completed and endorsed Stormwater Management Form that indicates compliance with the SMS, in addition to any supporting calculations indicating compliance with the required standards."

Compliance with the Stormwater Management Standards for New Development

Permit Requirement: Stormwater Management systems on new development sites shall be designed to:

- *Not allow new stormwater conveyances to discharge untreated stormwater in accordance with Massachusetts Stormwater Handbook Standard 1;*
- *Control peak runoff rates in accordance with Massachusetts Stormwater Handbook Standard 2;*

- *Recharge groundwater in accordance with Massachusetts Stormwater Handbook Standard 3;*
- *Eliminate or reduce the discharge of pollutants from land uses with higher pollutant loads as defined in the Massachusetts Stormwater Handbook in accordance with Massachusetts Stormwater Handbook Standard 5;*
- *Protect Zone 2 or Interim Wellhead Protection Areas of public water supplies in accordance with Massachusetts Stormwater Handbook Standard 6;*
- *Implement long term maintenance practices in accordance with Massachusetts Stormwater Handbook Standard 9;*
- *Require that all stormwater management systems be designed to:*
 1. *Retain the volume of runoff equivalent to, or greater than, one (1) inch multiplied by the total post-construction impervious surface area on the site;*

AND/OR

2. *Remove 90% of the average annual load of TSS generated from the total post-construction impervious surface area on the site AND 60 % of the average annual load of TP generated from the post-construction impervious surface area on the site. Pollutant removal shall be calculated consistent with EPA Region 1's Evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance any federally or State approved BMP design guidance or performance standards may be used to calculated BMP performance.*

Excerpts from Devens' Regulations that Support Permit Requirement: As referenced in 974 CMR 4.08.2.a "All applications, regardless of whether the project is subject to the Wetland Protection Act or not, shall design the stormwater management system in compliance with the Massachusetts DEP Stormwater Management Standards, January, 2008, as amended ("SMS") and the Massachusetts Stormwater Handbook, February 2008, as amended ("Handbook"). The applicant shall submit a completed and endorsed Stormwater Management Form that indicates compliance with the SMS, in addition to any supporting calculations indicating compliance with the required standards."

Per 974 CMR 3.04(4), "site generated stormwater shall be managed on-site to meet green field requirements. Conveyance to a common system (operated by the owners of more than one lot), or to the Devens Stormwater System (DSS), managed by MassDevelopment is an option once green field requirements have been met and all reuse and on-site infiltration methods have been exhausted."

Recommended Modification: In those instances where green field requirements have been met and all reuse and on-site infiltration methods have been exhausted, a requirement should be added that all stormwater management systems shall be designed to "Remove 90% of the average annual load of TSS generated from the total post-construction impervious surface area on the site AND 60 % of the average annual load of TP generated from the post-construction impervious surface area on the site. Pollutant removal shall be calculated consistent with EPA Region 1's Evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance any federally or State approved BMP design guidance or performance standards may be used to calculated BMP performance."

Adopted Updates to Meet Permit Requirements:

Updates were made to 974 CMR 4.08 to address post-construction stormwater management standards on applicable development projects. No distinction was made between new development and redevelopment projects relating to required stormwater treatment standards. The pollutant removal requirements included above were incorporated into 974 CMR 4.08.3.i. The updated version of 974 CMR 4.08 is included in Appendix G.

Compliance with the Stormwater Management Standards for Redevelopment

Permit Requirement: *Stormwater management systems on redevelopment sites shall meet the following standards to the maximum extent feasible:*

- *Not allow new stormwater conveyances to discharge untreated stormwater in accordance with Massachusetts Stormwater Handbook Standard 1;*
- *Control peak runoff rates in accordance with Massachusetts Stormwater Handbook Standard 2;*
- *Recharge groundwater in accordance with Massachusetts Stormwater Handbook Standard 3;*
- *The pretreatment and structural best management practices requirements of Standards 5 (eliminate or reduce the discharge of pollutants from land uses with higher pollutant loads as defined in the Massachusetts Stormwater Handbook) and 6 (protect Zone 2 or Interim Wellhead Protection Areas of public water supplies in accordance with Massachusetts Stormwater Handbook Standard 6);*
- *Stormwater management systems on redevelopment sites shall also improve existing conditions by requiring that stormwater management systems be designed to:*
 1. *Retain the volume of runoff equivalent to, or greater than 0.8 inch multiplied by the total post-construction impervious surface area on the site;*

AND/OR

2. *Remove 80% of the average annual post-construction load of TSS generated from the total post-construction impervious area on the site AND 50% of the average annual load of TP generated from the total post-construction impervious surface area on the site. Pollutant removal shall be calculated consistent with EPA Region 1's Evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance any federally or State approved BMP design guidance or performance standards may be used to calculated BMP performance.*
- *Stormwater management systems on redevelopment sites may utilize offsite mitigation within the same USGS HUC10 as the redevelopment site to meet the equivalent retention or pollutant removal requirements indicated above.*

Excerpts from Devens' Regulations that Support Permit Requirement: As referenced in 974 CMR 4.08.2.a "All applications, regardless of whether the project is subject to the Wetland Protection Act or not, shall design the stormwater management system in compliance with the Massachusetts DEP Stormwater Management Standards, January, 2008, as amended ("SMS") and the Massachusetts Stormwater Handbook, February 2008, as amended ("Handbook"). The applicant shall submit a

completed and endorsed Stormwater Management Form that indicates compliance with the SMS, in addition to any supporting calculations indicating compliance with the required standards.”

There is not currently language included in the existing regulations, which makes a distinction between new and redevelopment. Currently, all redevelopment projects are subject to the same requirements as new development projects. Confirm whether the DEC will make a distinction going forward and whether offsite mitigation shall be allowed for redevelopment projects and modify regulations accordingly.

Permit Requirement: Redevelopment activities that are exclusively limited to maintenance and improvement of existing roadways, (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects) shall improve existing conditions where feasible and are exempt from any of the parts listed previously in part d. Roadway widening or improvements that increase the amount of impervious area on the redevelopment site by greater than or equal to a single lane width shall meet the requirements of part d fully.

Potential Modification if Exemption is Not Already Included: “Maintenance and redevelopment activities to existing roads including repaving, drainage infrastructure improvements, adding shoulders, or correcting intersections shall be exempt from other requirements in this part. Projects of this nature should consider options to improve any existing conditions by incorporating LID techniques or other stormwater best management practices and include in the construction permit application process a narrative describing that investigation’s conclusions and chosen results when possible. Any road construction that increases the impervious surface by more than a single lane will not be covered under this exemption and shall be subject to all requirements for new and redevelopment.”

Adopted Updates to Meet Permit Requirements:

The DEC incorporated this exemption into 974 CMR 4.08.3.i. The updated regulatory mechanism is included in Appendix G of the SWMP.

Submission of As-Builts

Permit Requirement: The permittee shall require, at a minimum, the submission of as-built drawings no later than two (2) years after completion of construction projects. The as-built drawings must depict all on site controls, both structural and non-structural, designed to manage the stormwater associated with the completed site (post construction stormwater management).

Excerpts from Devens’ Regulations that Support Permit Requirement: The DEC shall continue to require the submission of as-builts prior to occupancy. Per 974 CMR 1.09, “a permit is completed upon application of a Certificate of Occupancy, Wetlands Certificate of Compliance, and submission of an as-built plan. Per 974 CMR 2.06 (4) (b), As-Built Plan., “Upon completion of construction, and before release of a performance guarantee, the DEC may require the Applicant to prepare and submit As-Built Plans at the same scale as the Street and/or Road plans, which shall indicate all of the following:

1. Boundaries of the Right-of-Way;
2. Location and elevations of roadway Improvements;
3. Driveway locations;
4. Permanent monuments;

5. Location and inverts, with elevation, of the required Utilities, hydrants and drainage including the location, with ties, and depth of sewer and water laterals serving each Lot;
6. Location of any other underground Utilities, such as natural gas, electricity, telephone lines, and street lighting;
7. Lot boundaries; and,
8. Centerline stationing.

The Applicant's Surveyor or Engineer shall certify that the ways and services as shown in the As-Built Plans are complete and the As-Built Plans are accurate. The DEC shall accept the As-Built Plans upon determining that their content and form comply with 974 CMR 2.00." The DEC requirements for as-built submissions are available to applicants on their website at http://www.devensec.com/development/As-built_Policy.pdf and is also included in Appendix G.

Long-term Operation & Maintenance

Permit Requirement: The new development/redevelopment program shall have procedures to ensure adequate long-term operation and maintenance of stormwater management practices that are put in place after the completion of a construction project. These procedures may include the use of dedicated funds or escrow accounts for development projects or the acceptance of ownership by the permittee of all privately owned BMPs. These procedures may also include the development of maintenance contracts between the owner of the BMP and the permittee. Alternatively, these procedures may include the submission of an annual certification documenting the work that has been done over the last 12 months to properly operate and maintain the stormwater control measures. The procedures to require submission of as-built drawings and ensure long term operation and maintenances shall be a part of the SWMP.

Excerpts from Devens' Regulations that Support Permit Requirement: The DEC shall continue current procedures which require the development of O&M Plans as part of the permitting process and as a condition of occupancy. The DEC shall also continue to require property owners to file annual reports regarding system maintenance to the DEC.

Site Plan Review requires submission of a Stormwater Operation and Maintenance Plan in accordance with 974 CMR 3.04(4) and 974 CMR 4.08. The Site Plan must specify the construction and post-development maintenance schedule in detail on the utility plan. Per 974 CMR 4.08, "An Operation and Maintenance Plan (O&M Plan) for stormwater management systems is required at the time of application for all projects. The O&M Plan shall be designed to ensure compliance with the Massachusetts Surface Water Quality Standards (314 CMR 4.00), the Stormwater Plan and the DEC annual stormwater reporting form requirements. The O&M Plan shall be shown on the site plan(s) and shall include at a minimum the following:

- (a) The name(s) of the owner(s) for all components of the system.
- (b) A statement that the Applicant is responsible for the operation and maintenance of the entire on-site system.
- (c) An O&M Inspection and Maintenance Schedule which shall include:
 1. Parking Lot Sweeping: with mechanized cleaning equipment on an annual basis.
 2. Catch Basin Cleaning: Catch Basins and Infiltration Chamber shall be inspected on a bi-annual basis. Any sediment accumulations in excess of half of the unit's sump depth shall be removed. Material shall be removed by a licensed contractor, who

- shall be responsible for disposing of the material off-site in a manner consistent with all local, state and federal regulations.
3. Infiltration Swales: Ensure proper establishment of full vegetative cover. Swale embankments and side slopes must be properly maintained to ensure long-term stability. Annual and seasonal inspections are required to ensure a healthy groundcover is maintained to avoid erosion and promote infiltration. Bare spots shall be repaired and planted with native ground cover material. Saplings and large shrubs shall be removed to maintain integrity of the swale. Level spreader shall be inspected seasonally to remove any build-up of sediment and ensure proper drainage flows.
 4. Detention/Retention Basin Inspection and Maintenance: Wet and dry basins shall be inspected annually to ensure inlets and outlets remain unobstructed. Inlets and outlets and forebays shall also be inspected for potential sediment, erosion, cracking, tree growth, damage to the emergency spillway and erosion within the basin and on within the banks. Upper side slopes, embankment and emergency spillway shall be mowed annually. Any tree saplings shall be removed. Accumulated sediment shall be removed as necessary and at least once every ten years. Bare spots shall be repaired and planted with native ground cover material.
 5. Biofiltration Systems: Quarterly inspections for accumulated sediment shall be performed. Debris, sediment accumulation, erosion shall be removed/repared at least twice a year. Any dead or damaged plantings shall be replaced. All invasive species shall be removed on an annual basis. Re-mulch any void areas by hand. Native grasses and plants shall be maintained by hand without the use of fertilizers and limited use of organic herbicides. Trimming of surrounding grasses shall be restricted to a minimum of 5 inches. When cation exchange capacity of soil media decreases, the soil media shall be replaced to prevent contaminants from reaching the groundwater.
 6. Sediment Trap/Oil-Water Separator: Shall be inspected annually for sediment and debris accumulation. Any sediment accumulations in excess of half of the unit's sump depth shall be removed. Material shall be removed by a licensed contractor, who shall be responsible for disposing of the material off-site in a manner consistent with all regulations.
 7. Sub-Surface Infiltration Systems: Shall be inspected annually for proper function and sediment accumulation. Accumulations of sediment and/or materials that negatively impact the infiltration capacity of the system shall be removed.
 8. Constructed Stormwater Wetlands: In the first three years after construction, Applicants shall inspect the constructed stormwater wetlands twice a year during both the growing and non-growing seasons. After three years such inspections shall occur on a periodic basis. During these inspections, the following information shall be recorded:
 - a. The types and distribution of the dominant wetland plants in the marsh;
 - b. The presence and distribution of planted wetland species;
 - c. The presence and distribution of invasive wetland species (invasives shall be removed);
 - d. Indications that other species are replacing the planted wetland species;
 - e. Percentage of standing water that is unvegetated (excluding the deep water cells which are not suitable for emergent plant growth);
 - f. The maximum elevation and the vegetative condition in this zone, if the design elevation of the normal pool is being maintained for wetlands with extended zones;
 - g. Stability of the original depth zones and the micro-topographic features; and
-

- h. Accumulation of sediment in the forebay and micropool; and survival rate of plants (cells with dead plants must be replanted). Sediment forebays must be cleaned annually.
- (d) Applicants shall submit annual stormwater monitoring and maintenance reports to the DEC addressing inspection and maintenance of the BMPs. The reports shall include:
 1. Descriptions of the condition of the BMPs,
 2. Descriptions of maintenance performed and,
 3. Receipts for maintenance performed.

For ease of reporting, the DEC and MassDevelopment have created standard annual reporting templates for use by all Applicants. Failure to submit the required annual report is a violation of the Unified Permit.”

Phosphorous Impairment:

Permit Requirement: For discharges to water quality limited water bodies and their tributaries where phosphorous is the cause of the impairment, the permittee’s regulatory mechanism for Stormwater Management in New Development and Redevelopment (Year 4 Permit Requirement), shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal.

Recommended Modification: In Section 974 CMR 4.08(3), Design Standards and Criteria, language should be added, which requires that all BMPs installed are optimized for phosphorous removal and also that there be a methodology in place for evaluating BMP performance. Include the following statement, “To support compliance with the MS4 Permit, all BMPs must be optimized for the removal of phosphorous. The justification and design of such BMPs must also include a methodology for assessing BMP performance. Pollutant removal shall be consistent with EPA Region 1’s Evaluation tool.”

Adopted Updates to Meet Permit Requirements:

Language requiring stormwater BMPs to be optimized for phosphorus removal was incorporated into 974 CMR 4.08.3.j. The updated regulatory mechanism is included in Appendix G.

3.3.3.1 Post-Construction Stormwater Management – Permit Year 2 Update

Devens’ existing regulatory mechanisms meet the requirements of Section 2.3.6 of the Permit pertaining to Low-Impact Development, BMP Design Guidance, the submission of as-built plans, and long-term operation and maintenance of stormwater management systems. As written, the regulations require further updates to meet the Permit requirements for stormwater management standards for new development and redevelopment, and the necessary requirements for phosphorous impaired waters. Updates to 974 CMR 4.08 were drafted during Permit Year 2 to bring Devens’ regulatory mechanism into compliance with the Permit. The updated language is currently under review and will be enacted by the end of Permit Year 3. All new or updated regulatory mechanisms pertaining to stormwater management will be included in Appendix G of this document.

3.3.3.2 Post-Construction Stormwater Management – Permit Year 3 Update

The updates made during Permit Year 3 (FY2021) have been discussed under the “Adopted Updates to Meet Permit Requirements” headings above. The updates made to the DEC regulations (974 CMR) were adopted at a public hearing on May 25, 2021.

4.0 IDDE PLAN

4.1 IDDE Plan

As a new permittee not previously covered under the 2003 MS4 Permit, Devens must establish legal authority to prohibit illicit discharges, investigate suspected illicit discharges, eliminate illicit discharges, and implement enforcement procedures through adoption of a new or modification of an existing regulatory mechanism. Under the new MS4 Permit, Devens is required to implement their Illicit Discharge Detection and Elimination Investigation Program by presenting a defined approach to investigate, identify and remove illicit connections. Devens is required to adopt a regulatory mechanism no later than Year 3 of the Permit, and develop the written plan in Year 4. Devens must then continue to implement the plan throughout the permit term.

As part of Minimum Control Measure No. 3, Illicit Discharge Detection and Elimination (IDDE), Devens is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. This includes, but is not limited to, the following measures:

1. Developing a comprehensive map of the drainage system.
2. Ensuring that appropriate regulatory mechanisms and enforcement procedures are in place to prohibit illicit discharges.
3. Developing and implementing a written plan to detect and eliminate illicit discharges, which references the required authority to implement all aspects of the IDDE program, clearly identifies responsibilities with regard to eliminating illicit discharges, and outlines written procedures for dry and wet weather outfall screening and sampling and catchment investigations.
4. Providing training annually to employees involved in the IDDE program about the program, including how to recognize illicit discharges and SSOs.

Such measures will be performed with the goal of finding and removing all illicit discharges, which include fixed point source discharges such as illegal/improper sanitary or floor drain connections and cross connections between the sanitary and drainage infrastructure, in addition to all isolated or recurring discharges such as illegal dumping and improper disposal of waste from boats. Illicit discharges could also be indirect sources that infiltrate into the drainage system through cracks/defects in infrastructure, such as sanitary wastes from failing sewer pipes. Exceptions do exist for the discharge of clean water from sources such as water line flushing, fire-fighting operations, non-contact cooling waters, and for other discharges that have separately obtained a permit from the NPDES Program, and these discharges should be highlighted in any regulatory mechanism adopted.

4.1.1 Mapping

Devens had already developed a comprehensive map of their drainage system, which includes outfalls, pipes, manholes, catch basins, municipally owned stormwater treatment structures and impaired water bodies. Interconnections with other MS4s are in the process of being identified, and outfalls and interconnection are being analyzed to create a defined catchment area that includes surface runoff to catch basins tributary to the identified outfall or interconnection. The catchment delineation process considers each catch basin upstream from the outfall or interconnection and the area that would conceivably drain to that catch basin based on topography. As drainage

infrastructure mapping becomes more complete over the course of the investigations performed throughout the permit term, this exercise will be refined and updated.

Mapping has been in accordance with the 2016 MS4 Permit's accuracy guidelines and has been recorded on a publicly available map, the most recent version of which can be found at the end of Section 1.0 of this report.

Drainage infrastructure within Devens' boundaries has been reviewed to determine ownership. Private infrastructure or infrastructure owned and operated by another municipality, state or federal entity has been determined and designated in Devens' drainage GIS.

The mapping will serve as a planning tool for the implementation and phasing of Devens' IDDE Program and demonstration of the extent of complete and planned investigations and corrections. Devens will update their mapping as needed to reflect newly discovered information and required corrections or modifications. Devens will report annually on progress toward completion of the system map in their MS4 Annual Report.

4.1.2 *Catchment Prioritization and Ranking*

Devens is working to develop an initial inventory and priority ranking to assess the illicit discharge and SSO potential of each regulated catchment and the related public health significance. The ranking will determine the priority order for screening of outfalls and interconnections, catchment investigations for evidence of illicit discharges, and provide the basis for determining permit milestones. Major factors to be considered in the prioritization and ranking of catchments include:

- Past discharge complaints and reports
- Receiving water quality
- Density of generating sites.
- Age of development and infrastructure
- Culverted streams
- Water body impairments

This inventory and ranking will be documented in the Devens' IDDE Plan and will be updated annually throughout the permit term to reflect new findings from dry and wet-weather sampling and other IDDE program activities. It will also be documented in the Devens' MS4 Annual Reports.

4.1.3 *Field Investigation*

The MS4 Permit requires Devens to develop a storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs.

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges:

- Sandbagging - If no flow is observed at a particular junction manhole or key junction manhole at the time of inspection, the drain segment in the area of concern can be isolated by placing sandbags within outlets to manholes to form a temporary dam that collects any intermittent

flow for a 24 to 48-hour dry weather period to determine if any intermittent dry-weather flow is present. If intermittent flow is captured, grabs samples will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. If it is determined that no flow is captured behind the sandbag after a 24 to 48-hour period, the tributary drainage pipes can be excluded as the source of any intermittent discharge.

- Dye Testing - dyed water is poured into plumbing fixtures and downstream drainage is observed to confirm connections.
- ZoomCam Inspections - in selected tributary areas, or where indicated based on findings from other field investigation work, drainage structures will be inspected with a “zoom camera-on-a-stick” in an attempt to gather additional information and narrow the location of observed dry-weather flow.
- Smoke Testing - non-toxic smoke is introduced into drainage segments containing suspected illicit discharges and adjacent buildings are observed for signs of a connection, or smoke emanating from floor drains or sump pump connections.
- CCTV/Video Inspections – drainage pipes are internally inspected to pinpoint and evaluate connections through the use of a closed-circuit television camera through all or a portion of the drain segment believed to contain the connection.

Upon location of an illicit discharge, Devens will work to eliminate the illicit discharge as expeditiously as possible. When the specific source of an illicit discharge is identified, Devens will exercise its authority as necessary to require its removal. Devens will notify all responsible parties of any such discharge and require immediate cessation of improper disposal practices in accordance with its legal authorities.

4.1.4 Sanitary Sewer Overflows

Sanitary Sewer Overflows (SSOs) are included in the MS4 Permit’s definition of illicit discharges and can be defined as discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, power failures, vandalism, and sewer defects. This includes SSOs resulting during dry or wet weather, from inadequate conveyance capacities, or where interconnectivity of the storm and sanitary sewer infrastructure allows for communication of flow between the systems.

Devens will maintain and update annually an inventory, that identifies all known locations where SSOs have discharged to the MS4 within the five (5) years prior to the effective date of the MS4 Permit (July 1, 2018), and any SSOs that have occurred thereafter. This includes SSOs resulting, during dry or wet weather, from inadequate conveyance capacities, or where interconnectivity of the storm and sanitary sewer infrastructure allows for transmission of flow between the systems. The inventory will include the following information, when available:

- Location (approximate street crossing/address and receiving water, if any);
- A clear statement of whether the discharge entered a surface water directly or entered the MS4
- Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge);
- Estimated volume of the occurrence;
- Description of the occurrence indicating known or suspected cause(s);

- Mitigation and corrective measures completed with dates implemented; and
- Mitigation and corrective measures planned with implementation schedules.

Upon detection of an SSO, Devens will provide oral notice to EPA within 24 hours, a written notice to EPA within five (5) days and shall include the information in the updated inventory as identified above, and mitigate it as expeditiously as possible taking interim measures to minimize the discharge of pollutants to and from its MS4 until elimination is completed.

Devens has had eight (8) SSO occurrences in the five years prior to the permit effective date to present, including three (3) in Permit Year 3 (FY2021). These include the following:

- On April 7, 2015, an SSO was called in by a UPS delivery driver on Lovell Street near Hospital Road. Flow discharged overland from a sewer manhole and then entered Tail Race Brook via surface runoff. The volume of the discharge was approximately 8,200 gallons. The blockage was caused by a traffic cone lodged in a sewer siphon. Because almost all the flow in that portion of the system is from an upstream pump station, the pump station was shut down and a vactor truck was used to remove the blockage. The affected area was treated with lime. Additional cleaning was performed to ensure that no other obstructions were present.
- On July 20, 2015, an SSO was called in by a United Water worker near 270 Jackson Road. Flow discharged overland from a sewer manhole and then entered Willow Brook via surface runoff. The volume of the discharge was approximately 750 gallons. During an ongoing sewer main replacement project, a partial collapse occurred, causing the SSO. A temporary bypass was set up and the sewer main was eventually replaced. The affected area was treated with lime.
- On August 8, 2016, an SSO was called in by a contractor near 200 Jackson Road. Flow discharged from a gravity sewer main to the ground surface. The source was believed to be a crack in the sewer main. The volume of the discharge was intermittent based on flow and ranged from 0-1 GPM. The contractor televised the pipe to locate the source and scheduled for the pipe to be repaired.
- Another SSO occurred on August 8, 2016 at 249 Barnum Road, which was observed by the Board of Health. Flow discharged from a gravity sewer main to the ground surface. The volume of the discharge was approximately 3 gallons. A temporary repair was made until a new main connection was made on August 10, 2016.
- On December 20, 2017, an SSO occurred at SMH #879 in the woods located behind the Barnum Road Pump Station and discharged to the ground surface. The volume of the discharge was approximately 900 gallons. It was estimated that 15 gpm was leaking from the sewer manhole cover for a period of 60 minutes. The cause of the SSO event appeared to be a sewer system blockage and the entire gravity line was jetted approximately 200-feet. However, no roots or material was actually observed during jetting. The downstream pump station wet well was checked for any debris that may have caused this back-up. No debris was identified and there were no issues with the pumps. Corrective actions taken included spraying 10 gallons of sodium hypochlorite on the affected area.

- On July 21, 2020, an SSO occurred at SMH #958 on Hospital Road and discharged to the ground surface. The discharge volume was approximately 725 gallons—it was estimated that 5 gpm was leaking from the sewer manhole for a period of 145 minutes. The cause of the SSO was caused to be a blockage in the sewer line. The line was jetted and vacuumed, and lime was spread on the affected overflow area.
- On December 26, 2020, an SSO was discovered at the Devens Wastewater Treatment Facility at 7:30am. The SSO was caused by failure of the programmable logic controller (PLC) card at the facility, which has since been replaced. The volume of the discharge was estimated to be 15,625 gallons based on average influent flows in SCADA. The area impacted by the discharge was cleaned with 15 gallons of 12.5% sodium hypochlorite.
- On March 3, 2021, an SSO occurred in the basement of 8 Adams Circle at 6:45pm. The volume of the discharge was 5-10 gallons and contained to the basement of 8 Adams Circle. The backup was determined to be caused by a sewer manhole (SMH #1251) that was surcharged but not overflowing. Corrective actions taken included using a jet/vactor truck to clear the blockage in the service and in SMH #1251.

Devens will maintain this SSO inventory as part of this plan and their IDDE Plan. Information will also be included in Devens' MS4 Annual Reports, including the status of mitigation and corrective measures to address each identified SSO.

4.1.5 IDDE Plan – Permit Years 2 & 3 Update

Devens developed a draft IDDE Plan during Years 2 & 3, which includes a draft catchment ranking and prioritization matrix, procedures for dry and wet weather outfall screening and sampling, and catchment investigation methodologies. Employee training on Illicit Discharge Detection and Elimination will begin in Permit Year 4 once the IDDE Plan is final. The written IDDE program, once finalized, will be available under separate cover on the DEC and MassDevelopment websites.

4.1.6 IDDE Plan – Permit Year 4 Update

Devens finalized the IDDE plan and catchment ranking and prioritization matrix during Permit Year 4. Devens will begin implementation of its IDDE program, including employee training, during Permit Year 5.

5.0 STANDARD OPERATING PROCEDURES

5.1 MS4 Permit Compliance

As part of the minimum control measure for Pollution Prevention/Good Housekeeping for Municipal Operations, the MS4 Permit requires permittees to implement an Operations and Maintenance (O&M) program for permittee-owned facilities and activities to prevent or reduce pollutant runoff and protect water quality. The O&M Program is required to include the following elements:

- 1) An inventory of all permittee-owned facilities.
- 2) Written O&M procedures for the following activities:
 - a. Parks and open space
 - b. Buildings and facilities where pollutants are exposed to runoff
 - c. Vehicles and equipment
- 3) A written program detailing the activities and procedures the permittee will implement so that MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4, to include:
 - a. Optimization of routine inspections, cleaning and maintenance of catch basins.
 - b. Implementation of procedures for sweeping and/or cleaning streets, and permittee-owned parking lots.
 - c. Proper storage and disposal of catch basin cleanings and street sweepings.
 - d. Implementation of procedures for winter road maintenance.
 - e. Implementation of inspection and maintenance frequencies and procedures for storm drain systems and stormwater treatment structures.
- 4) Written records for all maintenance activities, inspections and training.

5.2 Inventory of Municipal Facilities

The inventory of municipal facilities will be developed no later than Permit Year 4.

5.2.1 *Inventory of Municipal Facilities – Year 4 Update*

The inventory of municipal facilities is included in the Operation and Maintenance Plan, discussed in Section 5.3

5.3 Operation and Maintenance Procedures for Municipal Activities and Facilities

To address the MS4 Permit requirements, Standard Operating Procedures (SOPs) associated with the identified municipal activities and facilities are required to be developed within four years of the permit effective date, except for procedures for winter road maintenance, which are required to be developed within three years of the permit effective date. The SOP for winter road maintenance, which includes snow removal and deicing, will be included in Appendix I along with additional SOPs developed in Permit Year 4.

5.3.1 *Operation and Maintenance Procedures for Municipal Activities and Facilities – Year 4 Update*

Devens developed a draft Operation and Maintenance (O&M) Plan for its municipal activities and facilities in Permit Year 4. The plan will be included in Appendix I of the SWMP once it is finalized.

5.4 Catch Basin Cleaning and Optimization

Devens currently has approximately 1,212 catch basins. Approximately 50% of Devens' catch basins are cleaned per year using in-house staff and equipment. Catch basin cleanings are stockpiled in a self-contained erosion-free area at the DPW yard. When the piles are large enough, they are transported to a landfill. To meet the anticipated requirements of the new MS4 Permit, Devens will need to optimize catch basin inspection, cleaning and maintenance such that the following conditions are met:

- Inspection and maintenance of catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment) are prioritized. Catch basins in such areas must be cleaned more frequently if inspection and maintenance activities indicate excessive sediment or debris loading.
- A schedule must be established such that the frequency of routine cleaning ensures that no catch basin at any time will be more than 50 percent full. A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.
- If a catch basin sump is more than 50 percent full during two consecutive routine inspections/cleaning events, Devens must document the finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources.
- Devens shall maintain documentation, including metrics and other information, used to reach the determination that the established plan for cleaning and maintenance is optimal and meets the requirements of the MS4 Permit, including a log of catch basins cleaned and inspected.
- Devens must track and report the following information to EPA annually:
 - Total number of catch basins community-wide
 - Number of catch basins inspected
 - Number of catch basins cleaned
 - Total volume or mass of material removed from all catch basins

Devens collected additional data during the 2019, 2020, 2021 and 2022 cleaning seasons as part of their optimization plan to ensure that no catch basin is more than 50% full. Data collected includes depth from the catch basin rim to the top of sediment, to the bottom of the basin, and to the invert of the outlet pipe. Devens will continue to collect data as needed until data is available for all catch basins. This data will be integrated into the Devens' GIS and utilized to identify those catch basins that are filling up more frequently and will therefore need to be cleaned more than once annually to ensure that the catch basin sump is never more than 50% full.

6.0 TMDLS AND WATER QUALITY LIMITED WATERS

6.1 Discharges to Water Quality Limited Waters

Under Massachusetts General Law (MGL) Chapter 21, MassDEP is responsible for monitoring the waters of the Commonwealth, identifying those waters that are impaired, and developing a plan to bring them back into compliance with Massachusetts Surface Water Quality Standards. The list of impaired waters, better known as the "303(d) list," identifies impaired surface waters and the reasons for impairment.

Once a waterbody is identified as impaired, MassDEP is required by the Federal Clean Water Act (CWA) to develop a strategy for restoring the health of the impaired waterbody. The process of developing this strategy, which is generally referred to as a Total Maximum Daily Load (TMDL) includes identifying the type of pollutant, and the potential sources of the pollutant, in addition to determining the maximum amount of pollutant that can be discharged to a specific surface water body in order to meet surface water quality standards. Part of the TMDL also includes the development of a plan to help in meeting the Total Maximum Daily Load limits once they have been established. These impaired waters are listed under Category 4A in Part 2 of the Massachusetts Integrated List of Waters. Devens does not currently discharge to any receiving waters that have an approved TMDL, nor is Devens located in a watershed for which a TMDL has already been developed.

In addition to identifying water bodies for which a Total Maximum Daily Load has already been developed, the Integrated List of Waters also identifies the 303(d) List of Impaired Waters under Category 5. The 303(d) List identifies water bodies that are impaired for one or more designated uses and require a TMDL. In Devens, this includes the Nashua River (Segment MA-81-05) which is impaired for phosphorus and E. Coli; and Catacoonamug Brook (MA81-74) which is impaired for E. Coli.

6.2 Phosphorus Impairments

The Nashua River is impaired for phosphorus and requires the development of a TMDL. Devens has a number of outfalls, which discharge directly or indirectly, to the Nashua River and therefore, Devens is subject to the requirements of Appendix H of the MS4 Permit, which outlines requirements related to discharges to water quality limited water bodies and their tributaries where phosphorus is the cause of the impairment.

6.2.1 *Public Education and Outreach*

Devens must distribute additional educational messages to residential property owners, businesses, and commercial institutions about the proper use and disposal of grass clippings, and to encourage the use of slow release and phosphorous-free fertilizers annually in the spring, between March and April. An additional pet waste message must also be distributed to residents annually in the summer, between June and July, encouraging the proper management of pet waste and noting any existing bylaws where appropriate. In the Fall (August/September/October), an educational message detailing the proper disposal of leaf litter must be distributed to residential and commercial property owners. Devens must begin distribution of all required messages within three years of the permit effective date. Messages that have been distributed to date are included in Appendix F of this report.

6.2.2 *Regulatory Updates*

Devens must also update their regulations to require that all new development and redevelopment stormwater management BMPs constructed within Devens be optimized for phosphorous removal. A comprehensive review of all existing rules and regulations must be performed within four years of the permit effective date to determine any updates that must be made to comply with this statute and any progress shall be reported here and in Devens' Annual Report. Updates to 974 CMR 4.08, Industrial Performance Standards and General Regulations for Stormwater Management, were drafted during Permit Year 2 to require stormwater management BMPs on new development and redevelopment sites to be optimized for phosphorus removal. These updates were adopted during Permit Year 3.

In addition, as part of the assessment to identify permittee-owned property that can be retrofitted with BMPs, the incorporation of BMPs that infiltrate stormwater shall be prioritized where feasible to aid in phosphorus removal.

6.2.3 *Good Housekeeping and Pollution Prevention*

Devens shall develop and implement a program to manage grass clippings and leaf litter on all permittee-owned property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces, within four years of the permit effective date. That plan shall be appended here.

Devens shall increase street and municipal parking lot sweeping frequencies to a minimum of two times per year within three years of the permit effective date, in the spring after snowmelt and sanding practices have subsided, and in the fall after leaf fall events (September 1st to December 1st). A street sweeping schedule shall be included in this plan and in Devens' Annual Reports.

6.2.4 *Phosphorus Source Identification*

Devens must develop a comprehensive Phosphorous Source Identification Report within 6 years of the permit effective date. This report must include the following elements:

- Calculation of the total MS4 regulated area draining to the Nashua River. The analysis will reflect any updated MS4 mapping and catchment delineations.
- Outfalls discharging directly to the Nashua River will be tested for phosphorus during dry and wet weather sampling events, where flowing.
- Calculation of Impervious Area and Directly Connected Impervious Area for each catchment.
- Identification, delineation and prioritization of potential catchments with high phosphorous loading.
- Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment, including the removal of impervious area to reduce phosphorous loadings.

This report must be appended to Devens' Year 6 Annual Report and to this SWMP upon completion.

After the submission of the report, Devens' must evaluate all permittee-owned properties within the drainage area that could be candidates for a BMP retrofit. This evaluation must include:

- The next planned infrastructure, resurfacing or redevelopment activity planned for the property or planned retrofit date;

- The estimated cost of redevelopment or retrofit BMPs; and
- The engineering and regulatory feasibility of redevelopment or retrofit BMPs.

This analysis must be complete within 7 years of the permit effective date, and a plan and schedule for implementation must be included in the Year 7 Annual Report. Devens must plan and install at least one structural BMP as a demonstration project within the drainage area of the Nashua River within 8 years of the permit effective date. This BMP must target a catchment with high phosphorus load potential. Any other identified BMP retrofit project must be installed according to the schedule outlined in the Year 7 Annual Report. For those structural BMPs installed, Devens must document the following in each MS4 Annual Report:

- BMP type
- Total area treated by the BMP
- Design storage volume of the BMP
- Estimated phosphorus removed in mass per year by the BMP

6.3 Bacteria Impairments

Since the Nashua River and the Catacoonamug Brook are impaired for E. Coli and require the development of a TMDL, Devens is subject to the requirements of Appendix H of the MS4 Permit, which outlines the requirement related to discharges to water quality limited water bodies where bacteria or pathogens is the cause of the impairment.

6.3.1 Public Education and Outreach

Devens has a comprehensive public education program for multiple purposes and has easily been able to add in specific, targeted information regarding actions that can be taken to reduce sources of bacteria from outfalls tributary to the Nashua River and Catacoonamug Brook.

Devens must supplement its residential public education program by distributing information to pet owners within those catchments tributary to the Nashua River and Catacoonamug Brook about the proper management of pet waste, including noting any existing bylaws. This message must be disseminated to all residents annually and pet owners at the time of pet license issuance and renewal, beginning in the first year of the permit. This informational campaign can be combined with the phosphorus education requirements outlined in Section 6.2.1.

Devens is almost 100% on sewer, although there is one (1) property on septic. Devens will distribute information to the septic system owner about proper maintenance.

In implementing their Illicit Discharge Detection and Elimination Program, Devens will designate all catchments that are tributary to the Nashua River and Catacoonamug Brook as problem or high priority under the catchment prioritization and ranking.

7.0 REPORTING, EVALUATION AND MODIFICATION

7.1 MS4 Permit Reporting

The MS4 Permit requires submission of annual reports assessing the effectiveness of the proposed BMPs and reporting if the minimum control measures were met. The initial report is due 90 days from the close of the reporting period, or September 30th, 2019, and annually thereafter. Reports are to be submitted to both EPA and MADEP. At a minimum, the report should include the following:

- The status of compliance with permit conditions, including an assessment of the appropriateness of the selected BMPs and progress toward achieving the selected measurable goals for each minimum control measure.
- Results of any information collected and analyzed, including monitoring data, if any. Outfall screening and monitoring data collected shall be submitted for both the reporting cycle and cumulative for the permit term.
- A summary of the stormwater activities planned for the next reporting cycle.
- A change in any identified best management practices or measurable goals for any minimum control measure.
- Notice of relying on another governmental entity to satisfy some of the permit obligations, if applicable.

Devens will append future annual reports in compliance with the 2016 MS4 Permit as they are prepared in Appendix I.

7.2 Evaluation of SWMP Success

This SWMP should be considered a dynamic document that is modified as necessary to account for changes such as in drainage infrastructure, laws and regulations, and Devens leadership and policy. The success of programs implemented by the SWMP – such as IDDE – should also be evaluated to ensure that they are accomplishing the goals for which they were intended and, in a method and timetable that continues to be appropriate. In addition, the SWMP should be reviewed and revised as necessary to keep text and appendices current. For example:

- After each year of stormwater monitoring to update appended findings and priorities.
- As needed to keep appended IDDE investigation, identification and removal documentation current.
- After each NPDES stormwater permit renewal to incorporate new requirements, as well as append copies of new permits and associated Notices of Intent (NOIs).
- After adoption of any new or revised ordinances or other regulatory mechanisms related to stormwater or drainage infrastructure.

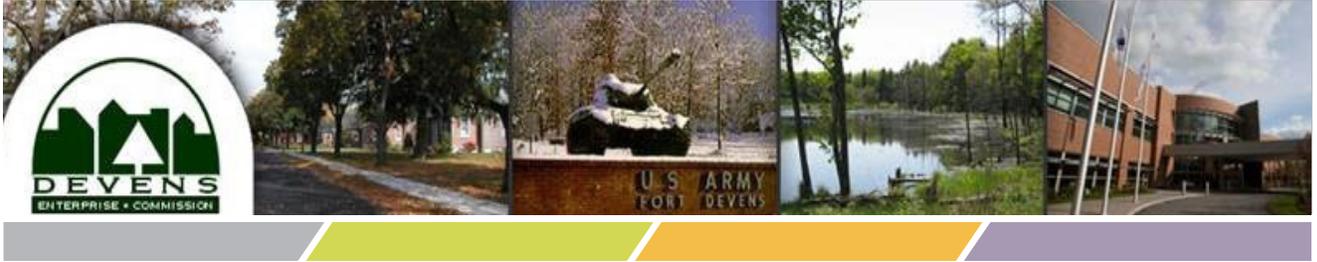
Devens undertook this SWMP, in part, in order to ensure the protection of its water resources and the large investment in drainage infrastructure. Periodic review and revision of this written document will help achieve these goals on a perpetual basis.

7.3 Modifications to the SWMP or Notice of Intent

As discussed above, minor modifications to this SWMP should be made on a regular and frequent basis to keep it current. However, major changes to the SWMP or needed modifications to the NOI for inclusion under the NPDES Permit require an official process. In accordance with the MS4 Permit, modifications to the SWMP or NOI may be made under the following provisions:

- At any time, Devens may add (but not subtract or replace) components, controls or requirements to the SWMP if written notification is made to EPA and MADEP.
- Devens may request to replace an ineffective or infeasible BMP specifically identified in the SWMP with an alternative BMP at any time if the request is made in writing to EPA and MADEP. Unless the request is denied, changes proposed in accordance with the criteria below shall be deemed approved and may be implemented 60 days from submittal of the request. If the request is denied, EPA or MADEP, as applicable, will send Devens a written explanation of the denial.
- Modification requests must include the following information:
 - An analysis of why the BMP is ineffective or infeasible (or cost prohibitive).
 - Expectations on the effectiveness of the replacement BMP.
 - An analysis of why the replacement BMP is expected to achieve the goals of the BMP to be replaced.
- Change requests or notifications must be made in writing to EPA (with copy to MADEP) and signed in accordance with EPA signatory requirements.

Devens does not anticipate any major modifications to the SWMP or NOI requiring official notification.



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STORMWATER MANAGEMENT PLAN APPENDICES

MS4 GENERAL PERMIT COMPLIANCE
JUNE 2019
UPDATED JUNE 2022



Devens
MASSACHUSETTS

swmp

APPENDICES

APPENDIX A

Abbreviations and Definition

ABBREVIATIONS AND DEFINITIONS

Best Management Practices (BMPs) - schedules of activities, practices (and prohibitions of practices), structures, vegetation, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Common Plan of Development - A "larger common plan of development or sale" is a contiguous area where multiple separate and distinct construction activities may be taking place at different times different schedules under one plan. For example, if developer buys a 20-acre lot and builds roads, installs pipes, and runs electricity with the intention of constructing homes or other structures sometime in the future, this would be considered a larger common plan of development or sale. If the land is parceled off or sold, and construction occurs on plots that are less than one acre by separate, independent builders, this activity still would be subject to stormwater permitting requirements if the smaller plots were included on the original site plan.

Control Measure - refers to any BMP or other method (including effluent limitations) used to prevent or reduce the discharge of pollutants to waters of the United States.

Director - a Regional Administrator of the Environmental Protection Agency or an authorized representative.

Discharge - when used without qualification, means the "discharge of a pollutant."

Discharge of a pollutant - any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source," or any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. This includes additions of pollutants into waters of the United States from surface runoff which is collected or channeled by man; or discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works.

Discharge-related activities - activities which cause, contribute to, or result in stormwater and allowable non-stormwater point source discharges, and measures such as the siting, construction and operation of BMPs to control, reduce, or prevent pollution in the discharges.

Disturbance - action to alter the existing vegetation and/or underlying soil of a site, such as clearing, grading, site preparation (e.g., excavating, cutting, and filling), soil compaction, and movement and stockpiling of top soils.

Existing Discharger – an operator applying for coverage under this permit for discharges covered previously under an NPDES general or individual permit.

Facility or Activity - any NPDES "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

.....

Federal Facility – Any buildings, installations, structures, land, public works, equipment, aircraft, vessels, and other vehicles and property, owned by, or constructed or manufactured for the purpose of leasing to, the federal government.

Illicit Discharge - any discharge to a municipal separate storm sewer that is not composed entirely of stormwater except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities.

Impaired Water – A water is impaired if it does not meet one or more of its designated use(s). For purposes of this permit, “impaired” refers to categories 4 and 5 of the five-part categorization approach used for classifying the water quality standards attainment status for water segments under the TMDL program. Impaired waters compilations are also sometimes referred to as “303(d) lists.” Category 5 waters are impaired because at least one designated use is not being supported or is threatened and a TMDL is needed. Category 4 waters indicate that at least one designated use is not being supported but a TMDL is not needed (4a indicates that a TMDL has been approved or established by EPA; 4b indicates other required control measures are expected in result in the attainment of water quality standards in a reasonable period of time; and 4c indicates that the nonattainment of the water quality standard is the result of pollution (e.g. habitat) and is not caused by a pollutant). See USEPA’s 2006 Integrated Report Guidance, July 29, 2005 for more detail on the five-part categorization of waters [under EPA National TMDL Guidance <http://www.epa.gov/owow/tmdl/policy.html>].

Impervious Surface- Any surface that prevents or significantly impedes the infiltration of water into the underlying soil. This can include but is not limited to: roads, driveways, parking areas and other areas created using non porous material; buildings, rooftops, structures, artificial turf and compacted gravel or soil.

Industrial Activity - the ten categories of industrial activities included in the definition of “stormwater discharges associated with industrial activity,” as defined in 40 CFR 122.26(b)(14)(i)-(ix) and (xi).

Industrial Stormwater - stormwater runoff associated with the definition of “stormwater discharges associated with industrial activity.”

Interconnection – the point (excluding sheet flow over impervious surfaces) where the permittee’s MS4 discharges to another MS4 or other storm sewer system, through which the discharge is eventually conveyed to a water of the United States. Interconnections shall be treated similarly to outfalls throughout the permit.

Junction Manhole - For the purposes of this permit, a junction manhole is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

Key Junction Manhole - For the purposes of this permit, key junction manholes are those junction manholes that can represent one or more junction manholes without compromising adequate

implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee’s ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

Municipal Separate Storm Sewer - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designed or used for collecting or conveying stormwater;(iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Municipal Separate Storm Sewer System (MS4) - means all separate storm sewers that are defined as “large” or “medium” or “small” municipal storm sewer systems pursuant to paragraphs 40 CFR 122.26 (b)(4) and (b)(7), or designated under paragraph 40 126.26(a) (1)(v). For the purposes of this permit “MS4” may also refer to the permittee with jurisdiction over the sewer system.

New Development – any construction activities or land alteration resulting in total earth disturbances greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) on an area that has not previously been developed to include impervious cover. (see part 2.3.6. of the permit)

New Discharger – For the purposes of this permit, a new discharger is an entity that discharges stormwater from a new facility with an entirely new separate storm sewer system that is not physically located on the same or adjacent land as an existing facility and associated system operated by the same MS4.

New Source - any building, structure, facility, or installation from which there is or may be a “discharge of pollutants,” the construction of which commenced:

- after promulgation of standards of performance under section 306 of the CWA which are applicable to such source, or
- after proposal of standards of performance in accordance with section 306 of the CWA which are applicable to such source, but only if the standards are promulgated in accordance with section 306 within 120 days of their proposal.

No exposure - all industrial materials or activities are protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff.

One Lane Width – The width of the travel lane for a roadway. Lane width does not include shoulders, curbs, and on-street parking areas.

.....

Outfall Catchment – The land area draining to a single outfall or interconnection. The extent of an outfall’s catchment is determined not only by localized topography and impervious cover but also by the location of drainage structures and the connectivity of MS4 pipes.

Owner or operator - the owner or operator of any “facility or activity” subject to regulation under the NPDES program.

Person - an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point source - any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

Pollutant - dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal and agricultural waste discharged into water.

Pollutant of concern – A pollutant which causes or contributes to a violation of a water quality standard, including a pollutant which is identified as causing an impairment in a State’s 303(d) list.

Redevelopment – for the purposes of part 2.3.6., any construction, land alteration, or improvement of impervious surfaces resulting in total earth disturbances greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) that does not meet the definition of new development (see above).

Runoff coefficient - the fraction of total rainfall that will appear at the conveyance as runoff.

Site – for the purposes of part 2.3.6., the area extent of construction activities, including but not limited to the creation of new impervious cover and improvement of existing impervious cover (e.g. repaving not covered by 2.3.6.a.ii.4.d.)

Small Municipal Separate Storm Sewer System – all separate storm sewer systems that are (i) owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district, or drainage district, or similar entity or an Indian tribe or an authorized Indian tribal organization or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States, and (ii) not defined as “large” or “medium” municipal separate storm sewer system pursuant to paragraphs 40 CFR 122.26 (b)(4) and (b)(7), or designated under paragraph 40 126.26(a) (1)(v). This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. This term does not include separate storm sewers in very discrete areas, such as individual buildings.

Small MS4 – means a small municipal separate storm sewer system.

Stormwater - stormwater runoff, snow melt runoff, and surface runoff and drainage.

Stormwater Discharges Associated with Construction Activity - a discharge of pollutants in stormwater runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavating), construction materials, or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located. (See 40 CFR 122.26(b)(14)(x) and 40 CFR 122.26(b)(15).

Stormwater Discharges Associated with Industrial Activity - the discharge from any conveyance that is used for collecting and conveying stormwater and that is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program under Part 122. For the categories of industries identified in this section, the term includes, but is not limited to, stormwater discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste water (as defined at part 401 of this chapter); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and final products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to stormwater. For the purposes of this paragraph, material handling activities include storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product, by-product or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with stormwater drained from the above described areas. Industrial facilities include those that are federally, State, or municipally owned or operated that meet the description of the facilities listed in Appendix D of this permit. The term also includes those facilities designated under the provisions of 40 CFR 122.26(a)(1)(v).

Total Maximum Daily Loads (TMDLs) - A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL includes wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources and/or natural background, and must include a margin of safety (MOS) and account for seasonal variations. (See section 303(d) of the Clean Water Act and 40 CFR 130.2 and 130.7).

Urbanized Area – US Census designated area comprised of a densely settled core of census tracts and/or census blocks that meet minimum population density requirements, along with adjacent territory containing non-residential urban land uses as well as territory with low population density included to link outlying densely settled territory with the densely settled core. For the purposes of this permit, Urbanized Areas as defined by any Census since 2000 remain subject to stormwater regulation even if there is a change in the reach of the Urbanized Area because of a change in more recent Census data.

Water Quality Limited Water – for the purposes of this permit, a water quality limited water is any waterbody that does not meet applicable water quality standards, including but not limited to waters listed in categories 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b).

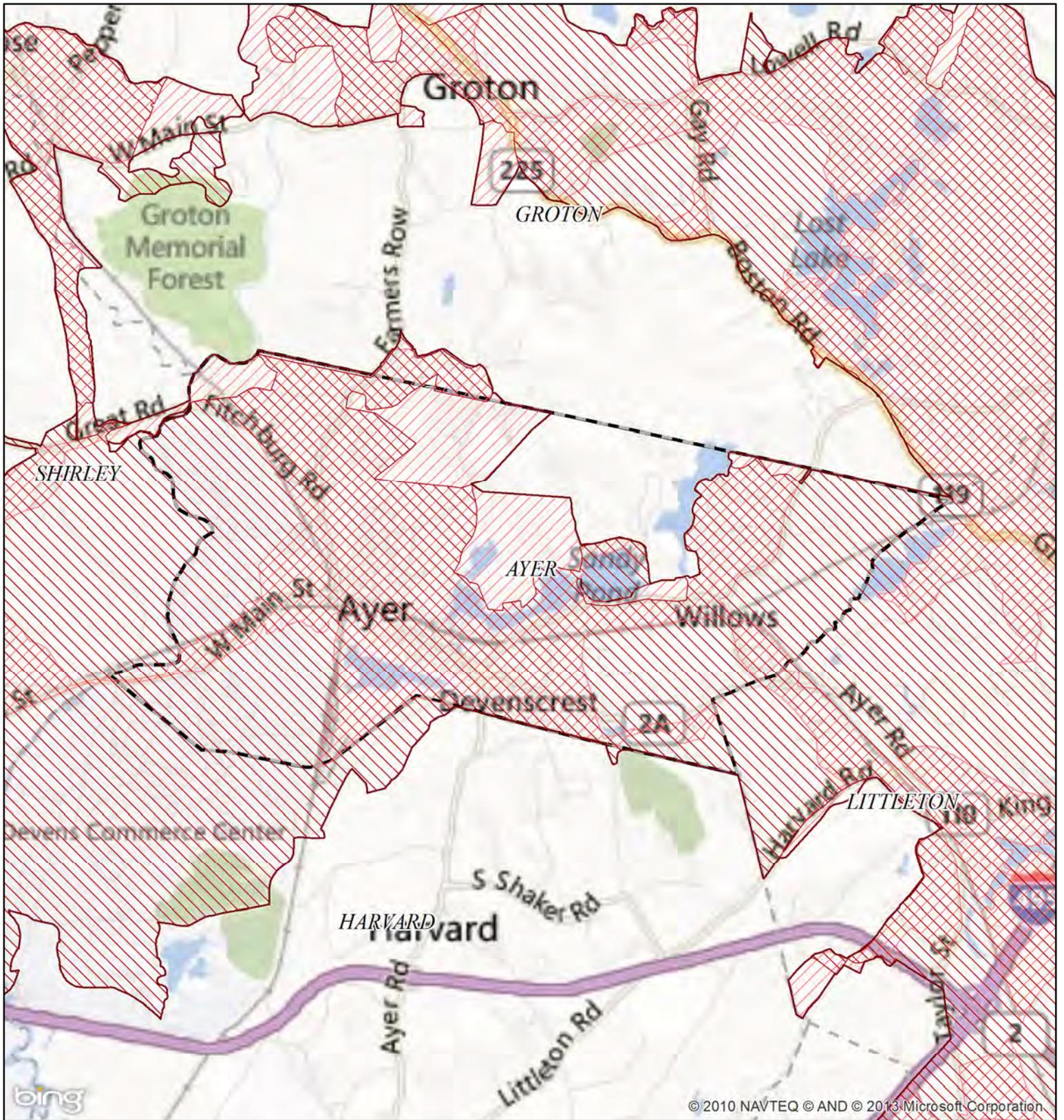
Water Quality Standards - A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States and EPA adopt WQS to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (See CWA sections 101(a)2 and 303(c)).

ABBREVIATIONS AND ACRONYMS

BMP – Best Management Practice
BPJ – Best Professional Judgment
CGP – Construction General Permit
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DCIA – Directly Connected Impervious Area
EPA – U. S. Environmental Protection Agency
ESA – Endangered Species Act
USFWS – U. S. Fish and Wildlife Service
IA – Impervious Area
IDDE – Illicit Discharge Detection and Elimination
LA – Load Allocations
MS4 – Municipal Separate Storm Sewer System
MSGP – Multi-Sector General Permit
NHPA – National Historic Preservation Act
NMFS – U. S. National Marine Fisheries Service
NOI – Notice of Intent
NPDES – National Pollutant Discharge Elimination System
NRHP – National Register of Historic Places
NSPS – New Source Performance Standard
PCP – Phosphorus Control Plan
SHPO – State Historic Preservation Officer
SPCC – Spill Prevention, Control, and Countermeasure
SWMP – Stormwater Management Program
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
TSS – Total Suspended Solids
WLA – Wasteload Allocation
WQS – Water Quality Standard

APPENDIX B

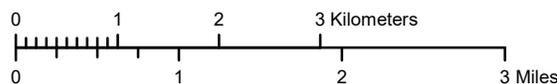
Regulated Area Maps



NPDES Phase II Stormwater Program
Automatically Designated MS4 Areas

Ayer MA

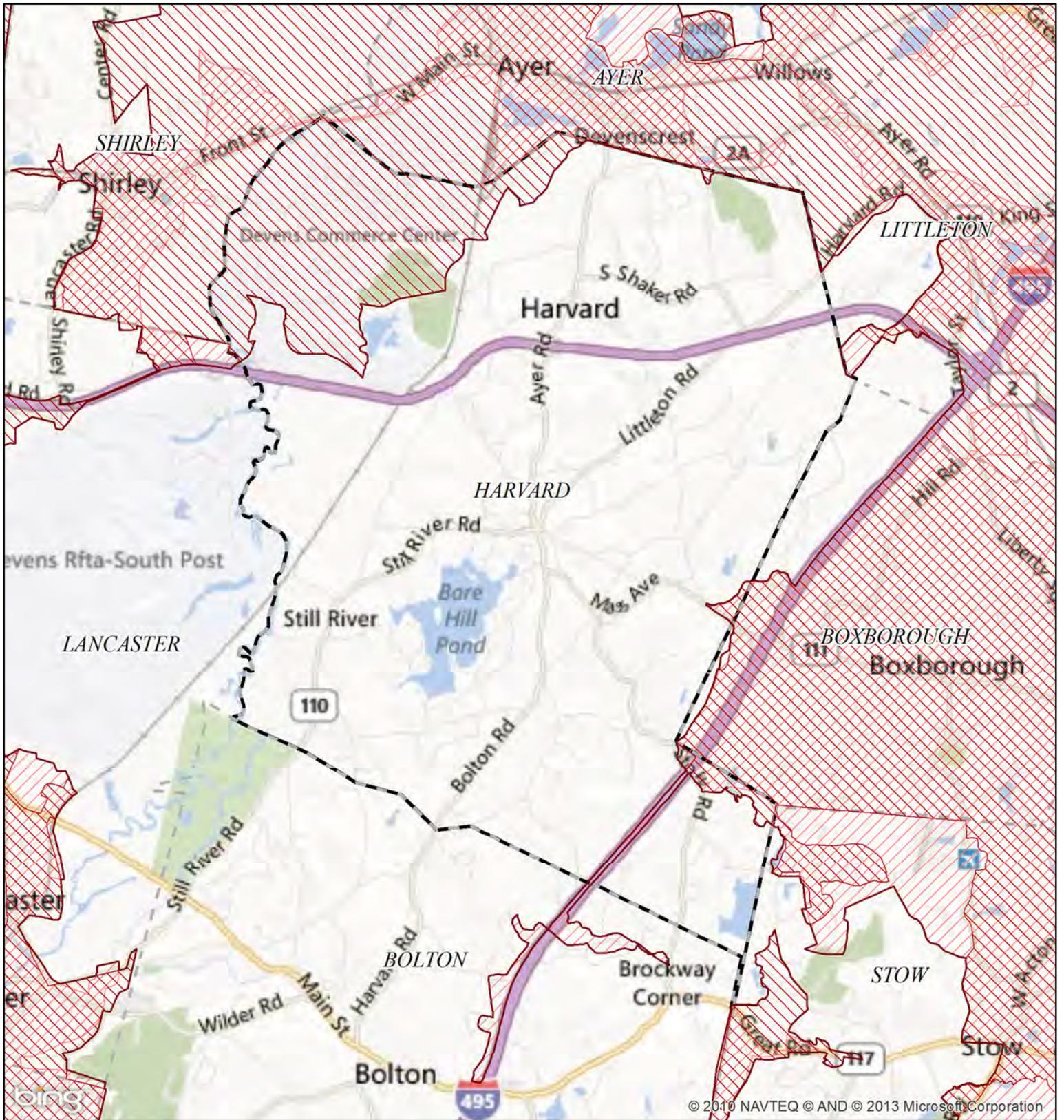
Regulated Area:



Town Population: 7427
Regulated Population: 7367
(Populations estimated from 2010 Census)



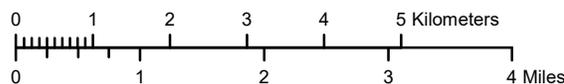
●
Urbanized Areas, Town Boundaries:
US Census (2000, 2010)
Base map © 2013 Microsoft Corporation
and its data suppliers



NPDES Phase II Stormwater Program
Automatically Designated MS4 Areas

Harvard MA

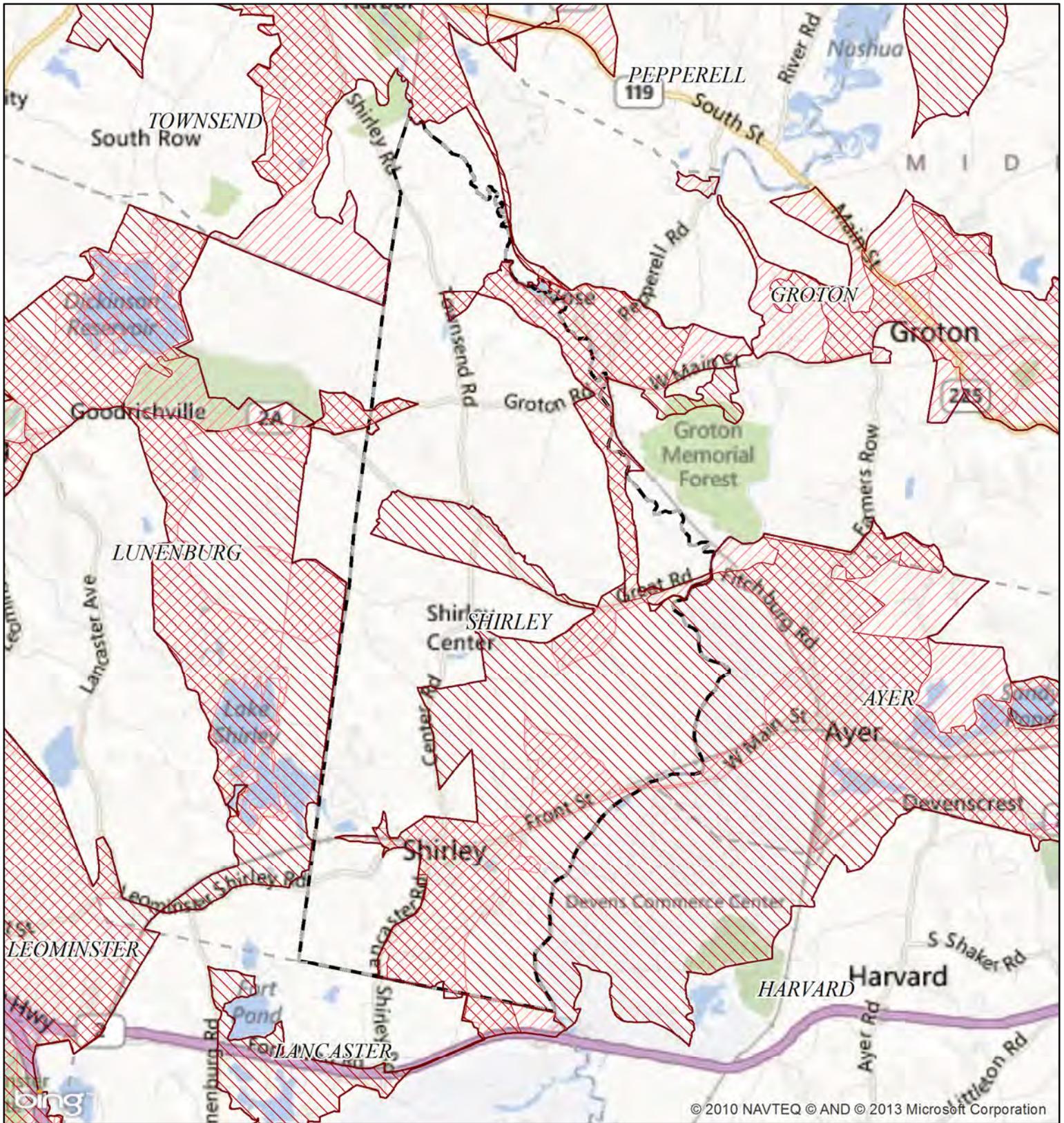
Regulated Area:



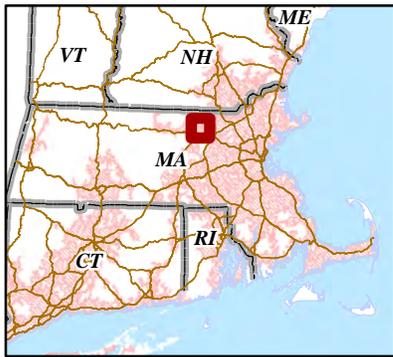
Town Population: 6522
Regulated Population: 1538
(Populations estimated from 2010 Census)



Urbanized Areas, Town Boundaries:
US Census (2000, 2010)
Base map © 2013 Microsoft Corporation
and its data suppliers



© 2010 NAVTEQ © AND © 2013 Microsoft Corporation



**NPDES Phase II Stormwater Program
Automatically Designated MS4 Areas**

Shirley MA

Regulated Area:



Town Population: 7211
 Regulated Population: 5302
 (Populations estimated from 2010 Census)



Urbanized Areas, Town Boundaries:
 US Census (2000, 2010)
 Base map © 2013 Microsoft Corporation
 and its data suppliers

APPENDIX C

2016 MS4 Permit

Minor Permit Modification Summary

The following permit has been modified in accordance with 40 CFR §122.63:

Permit Name: GENERAL PERMITS FOR STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS IN MASSACHUSETTS

Issue date: April 4, 2016

Effective Date: July 1, 2018

The following minor modifications were made on November 7, 2018:

Page	Modification
2	Table of Contents was updated to reflect the changes below
3	Table of Contents was updated to reflect the changes below
5	Line was added before first bullet point for consistency
6	Line was removed between parts for consistency
8	Lines were added and removed between parts for consistency
8	Typos were fixed
11	Extra word was removed
11	Extra spaces were removed between words for consistency
12	Extra spaces were removed between words for consistency
12	Extra words were removed
12	Text was moved to a bullet point in the last paragraph of part 1.10.2 instead of as part of the 1.10.3 title for consistency
12	Duplicate words and symbols were deleted
13	Bullets were moved to the correct subsection, consistent with other relevant sections of the permit
14	Typos were fixed
15	Extra spaces were removed between words for consistency
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27	Duplicate character was removed
29	Typo was fixed
30	Duplicate character was removed
32	Lines were added before bullet points for consistency
33	Lines were added and removed between paragraphs for consistency
34	Line was added before bullet points for consistency
34	Typo was fixed
34	Duplicate spaces were removed
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37	Lines were added before bullet points and in between parts for consistency
38	Line was added in between parts for consistency
38	Typos were fixed

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56	Line was added for consistency
57	Lines were added and removed for consistency

**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**

**AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the Clean Water Act (CWA), as amended (33 U.S.C. §1251 *et seq.*), and the Massachusetts Clean Waters Act, as amended (M.G.L. Chap.21 §§ 26-53), any operator of a small municipal separate storm sewer system whose system:

- Is located in the areas described in part 1.1;
- Is eligible for coverage under part 1.2 and part 1.9; and
- Submits a complete and accurate Notice of Intent in accordance with part 1.7 of this permit and EPA issues a written authorization

is authorized to discharge in accordance with the conditions and the requirements set forth herein.

The following appendices are also included as part of these permits:

- Appendix A – Definitions, Abbreviations, and Acronyms;
- Appendix B – Standard permit conditions applicable to all authorized discharges;
- Appendix C – Endangered Species Act Eligibility Guidance;
- Appendix D – National Historic Preservation Act Eligibility Guidance;
- Appendix E – Information required for the Notice of Intent (NOI);
- Appendix F – Requirements for MA Small MS4s Subject to Approved TMDLs;
- Appendix G – Impaired Waters Monitoring Parameter Requirements;
- Appendix H – Requirements related to discharges to certain water quality limited waterbodies;

These permits become effective on **July 1, 2017**.

These permits and the authorization to discharge expire at midnight, **June 30, 2022**.

Signed this 4th day of April, 2016



Ken Moraff, Director
Office of Ecosystem Protection
United States Environmental Protection Agency
5 Post Office Square – Suite 100
Boston, Massachusetts 02109-3912

Signed this 4th day of April 2016



Douglas E. Fine
Assistant Commissioner for Water
Resources
Department of Environmental Protection
One Winter Street
Boston, Massachusetts 02108

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1.0. Introduction

This document consists of three (3) general permits listed in part 1.1. Each general permit is applicable to a particular type of municipal system within Massachusetts. Many of the permit terms and conditions are applicable across all regulated entities, and therefore are presented just once in parts 1-2, part 4, and Appendices A through E. Other conditions are applicable to a particular set of authorized entities; these terms and conditions are included in parts 3, and 5 and Appendices F through H. Throughout the permit, the terms “this permit” or “the permit” will refer to the three general permits.

1.1. Areas of Coverage

This permit covers small municipal separate storm sewer systems (MS4s) located in the Commonwealth of Massachusetts:

- Traditional Cities and Towns (NPDES Permit No. MAR041000)
- State, federal, county and other publicly owned properties (Non-traditional) (MAR042000)
- State transportation agencies (except for MassDOT- Highway Division) (MAR043000)

1.2. Eligibility

The MS4 shall meet the eligibility provisions described in part 1.2.1 and part 1.9 to be eligible for authorization under this permit.

1.2.1. Small MS4s Covered

This permit authorizes the discharge of stormwater from small MS4s as defined at 40 CFR § 122.26(b) (16). This includes MS4s described in 40 CFR §122.32(a) (1) and (a) (2). An MS4 is eligible for coverage under this permit if it is:

- A small MS4 within the Commonwealth of Massachusetts;
- Not a large or medium MS4 as defined in 40 CFR §§122.26(b)(4) or (7);
- Located either fully or partially within an urbanized area as determined by the latest Decennial Census by the Bureau of Census as of the effective date of this permit (the 2010 Census); or
- Located in a geographic area designated by EPA as requiring a permit.

If the small MS4 is not located entirely within an urbanized area, only the portion of the MS4 that is located within the urbanized area is regulated under 40 CFR §122.32(a) (1).

A small municipal separate storm sewer system means all separate storm sewers that are:

- Owned or operated by the United States, a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States.
- Not defined as large or medium municipal separate storm sewer systems pursuant to 40 CFR § 122.26(b) (4) and (b) (7) or designated under 40 CFR § 122.26(a) (1) (v).
- This term includes systems similar to separate storm sewer systems in municipalities such as systems at military bases, large hospitals or prison complexes, and highways

and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

1.3. Limitations on Coverage

This permit does not authorize the following:

- a. Stormwater discharges mixed with sources of non-stormwater unless such non-stormwater discharges are:
 - Authorized under a separate NPDES permit; or
 - A non-stormwater discharge as listed in part 1.4.
- b. Stormwater discharges associated with industrial activity as defined in 40 CFR §122.26 (b) (14) (i)-(ix) and (xi).
- c. Stormwater discharges associated with construction activity as defined in 40 CFR §122.26(b) (14) (x) or (b) (15).
- d. Stormwater discharges currently authorized under another NPDES permit, including discharges covered under other regionally issued general permits.
- e. Stormwater discharges or discharge related activities that are likely to adversely affect any species that are listed as endangered or threatened under the Endangered Species Act (ESA) or result in the adverse modification or destruction of habitat that is designated as critical under the ESA. The permittee shall follow the procedures detailed in Appendix C to make a determination regarding eligibility. The permittee shall certify compliance with this provision on the submitted NOI.
- f. Stormwater discharges whose direct or indirect impacts do not prevent or minimize adverse effects on any Essential Fish Habitat.
- g. Stormwater discharges, or implementation of a stormwater management program, which adversely affects properties listed or eligible to be listed on the National Register of Historic Places. The permittee shall follow the procedures detailed in Appendix D to make a determination regarding eligibility. The permittee shall certify compliance with this provision on the submitted NOI.
- h. Stormwater discharges prohibited under 40 CFR § 122.4.
- i. Stormwater discharges to the subsurface subject to state Underground Injection Control (UIC) regulations. Although the permit includes provisions related to infiltration and groundwater recharge, structural controls that dispose of stormwater into the ground may be subject to UIC regulation requirements. Authorization for such discharges shall be obtained from Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program, Underground Injection Control, One Winter Street, Boston, MA 02108 – phone 617-292-5859.
- j. Any non-traditional MS4 facility that is a “new discharger” as defined in part 5.1.4. and discharges to a waterbody listed in category 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) due to nutrients (Total Nitrogen or (Total Phosphorus), metals (Cadmium, Copper, Iron, Lead or Zinc), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enterococcus or Fecal Coliform), chloride (Chloride) or oil and grease

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(Petroleum Hydrocarbons or Oil and Grease), or discharges to a waterbody with an approved TMDL for any of those pollutants.

1.4. Non-Stormwater Discharges

The following categories of non-stormwater discharges are allowed under this permit *unless* the permittee, EPA, or the MassDEP identifies any category or individual discharge of non-stormwater discharge in part 1.4.a-r as a significant contributor of pollutants to the MS4, then that category or individual discharge is not allowed under part 1.4, but rather shall be deemed an “illicit discharge” under part 2.3.4.1, and the permittee shall address that category or individual discharge as part of the Illicit Discharge Detection and Elimination (IDDE) Program described in part 2.3.4 of this permit.

- a. Water line flushing
- b. Landscape irrigation
- c. Diverted stream flows
- d. Rising ground water
- e. Uncontaminated ground water infiltration (as defined at 40 CFR § 35.2005(20))
- f. Uncontaminated pumped ground water
- g. Discharge from potable water sources
- h. Foundation drains
- i. Air conditioning condensation
- j. Irrigation water, springs
- k. Water from crawl space pumps
- l. Footing drains
- m. Lawn watering
- n. Individual resident car washing
- o. Flows from riparian habitats and wetlands
- p. De-chlorinated swimming pool discharges
- q. Street wash waters
- r. Residential building wash waters without detergents

Discharges or flows from firefighting activities are allowed under this permit need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

1.5. Permit Compliance

Non-compliance with any of the requirements of this permit constitutes a violation of the permit and the CWA and may be grounds for an enforcement action and may result in the imposition of injunctive relief and/or penalties.

1.6. Continuation of this Permit

If this permit is not reissued prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedure Act and remain in force and effect for discharges that were authorized prior to expiration. If a small MS4 was granted permit authorization prior to the expiration date of this permit, it will automatically remain authorized by this permit until the earliest of:

- Authorization under a reissued general permit following timely and appropriate submittal of a complete and accurate NOI requesting authorization to discharge under the reissued permit; or
- Issuance or denial of an individual permit for the MS4’s discharges; or

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- Authorization or denial under an alternative general permit.

If the MS4 operator does not submit a timely, appropriate, complete, and accurate NOI requesting authorization to discharge under the reissued permit or a timely request for authorization under an individual or alternative general permit, authorization under this permit will terminate on the due date for the NOI under the reissued permit unless otherwise specified in the reissued permit.

1.7. Obtaining Authorization to Discharge

1.7.1. How to Obtain Authorization to Discharge

To obtain authorization under this permit, a small MS4 shall:

- Be located in the areas listed in part 1.1 of this permit;
- Meet the eligibility requirements in part 1.2 and part 1.9;
- Submit a complete and accurate Notice of Intent (NOI) in accordance with the requirements of part 1.7.2; and
- EPA issues a written authorization.

1.7.2. Notice of Intent

- a. Operators of Small MS4s seeking authorization to discharge under the terms and conditions of this permit shall submit a Notice of Intent that contains the information identified in Appendix E. This includes operators of small MS4s that were previously authorized under the May 1, 2003 small MS4 general permit (MS4-2003 permit).
- b. The NOI shall be signed by an appropriate official (see Appendix B, Subparagraph B.11, Standard Conditions).
- c. The NOI shall contain the following 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 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.

Print the name and title of the official, followed by signature and date.

- d. The NOI shall be submitted within 90 days of the effective date of the permit. If EPA notifies an MS4 that it is designated under 40 CFR § 122.32(a) (2) or (b), the NOI shall be submitted within 180 days of receipt of notice unless granted a longer period of time by EPA.

1.7.3. Submission of Notice of Intent

- a. All small MS4s shall submit a complete and accurate Notice of Intent (suggested form in Appendix E) to EPA-Region 1 at the following address:

United States Environmental Protection Agency
Stormwater and Construction Permits Section (OEP06-1)
Five Post Office Square, Suite 100

Boston, MA 02109

Or submitted electronically to EPA at the following email address: stormwater.reports@epa.gov

b. All small MS4s shall also submit a copy of the NOI to the MassDEP at the following address:

Massachusetts Department of Environmental Protection
One Winter Street -5th Floor
Boston, Massachusetts 02108
ATTN: Frederick Civian, Stormwater Coordinator

c. Late notification: A small MS4 is not prohibited from submitting a NOI after the dates provided in part 1.7.2.d. However, if a late NOI is submitted, authorization is only for discharges that occur after permit authorization is granted. EPA and MassDEP reserve the right to take enforcement actions for any unpermitted discharges. All NOIs submitted after December 21, 2020 must be submitted electronically.

1.7.4. Public Notice of NOI and Effective Date of Coverage

a. EPA will provide a public notice and opportunity for comment on the contents of the submitted NOIs. The public comment period will be a minimum of 30 calendar days.

b. Based on a review of a small MS4's NOI or other information, EPA may grant authorization, extend the public comment period, or deny authorization under this permit and require submission of an application for an individual or alternative NPDES permit. (See part 1.8) A small MS4 will be authorized to discharge under the terms and conditions of this permit upon receipt of notice of authorization from EPA.

c. Permittees whose authorization to discharge under the MS4-2003 permit, which expired on May 1, 2008, has been administratively continued in accordance with the Administrative Procedure Act 5 U.S.C. § 558(c) and 40 CFR § 122.6, who wish to obtain coverage under this permit, must submit a new NOI requesting permit coverage in accordance with the requirements of part 1.7 of this permit to EPA within 90 days after the effective date of this permit. Permittees whose authorization to discharge under the expired MS4-2003 permit was administratively continued, who fail to submit a timely, complete and accurate NOI or an application for an individual NPDES permit within 90 days after the effective date of this permit will be considered to be discharging without a permit (see 40 CFR § 122.28(b)(3)(iii)).

1.8. Individual Permits and Alternative General Permits

a. EPA may require a small MS4 to apply for and obtain authorization under either an individual NPDES permit or an alternative NPDES general permit. Any interested person may petition EPA in accordance with the provisions of 40 CFR § 122.26(f) to require a small MS4 to apply for and/or obtain authorization under either an individual NPDES permit or an alternative NPDES general permit. If EPA requires a small MS4 to apply for an individual or alternative NPDES permit, EPA will notify the small MS4 in writing that a permit application is required. This notification will include a brief statement of the reasons for this decision and will provide application information and an application deadline. If a small MS4 is authorized under the MS4-2003 permit or this permit and fails to submit an individual NPDES or an alternative general permit NPDES permit application as required by EPA, then the authorization under the MS4-2003 permit or this permit to the small MS4 is automatically terminated at the end of the date specified by EPA as the deadline

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for application submittal. EPA reserves the right to take enforcement action for any unpermitted discharge.

- b. A small MS4 may request to be excluded from this general permit by applying for an individual permit or authorization under an alternative general permit. In such a case, a small MS4 shall submit an individual permit application in accordance with the requirements of 40 CFR § 122.33(b) (2) (i) or § 122.33(b) (2) (ii), with reasons supporting the request, to EPA at the address listed in part 1.7.3 of this permit. The request may be granted by issuance of an individual permit or authorization under an alternative general permit if EPA determines that the reasons stated by the small MS4 are adequate to support the request. (See 40 CFR § 122.28(b) (3)).
- c. When an individual NPDES permit is issued, or a small MS4 is authorized to discharge under an alternative NPDES general permit, authorization under this permit automatically terminates on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit.

1.9. Special Eligibility Determinations

1.9.1. Documentation Regarding Endangered Species

The small MS4 shall certify eligibility regarding endangered species in the NOI required by part 1.7.2. The Stormwater Management Program (SWMP) shall include documentation supporting the permittee's eligibility determination with regard to federal Endangered and Threatened Species and Critical Habitat Protection, including:

- Results of the Appendix C U.S. Fish and Wildlife Service endangered species screening determination; and
- If applicable, a description of the measures the small MS4 shall implement to protect federally listed endangered or threatened species, or critical habitat, including any conditions imposed by the U.S. Fish and Wildlife Service. If a permittee fails to document and implement such measures, the permittee's discharges are ineligible for coverage under this permit.

1.9.2. Documentation Regarding Historic Properties

The small MS4 shall certify eligibility regarding historic properties on the NOI required by part 1.7.2. The SWMP shall include documentation supporting the small MS4's eligibility determination with regard to Historic Properties Preservation, including:

- Information on whether the permittee's stormwater discharges, allowable non-stormwater discharges, or stormwater discharge-related activities would have an effect on a property that is listed or eligible for listing on the National Register of Historic Properties (NRHP);
- Where such effects may occur, any documents received by the permittee or any written agreements the permittee has made with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other Tribal representative to mitigate those effects;
- Results of the Appendix D historic property screening investigations; and
- If applicable, a description of the measures the permittee shall implement to avoid or minimize adverse impacts on places listed, or eligible for listing, on the NRHP, including any conditions imposed by the SHPO or THPO. If the permittee fails to

document and implement such measures, those discharges are ineligible for coverage under this permit.

1.10. Stormwater Management Program (SWMP)

- a. The permittee shall develop and implement a written (hardcopy or electronic) SWMP. The SWMP shall be signed in accordance with Appendix B, Subsection 11, including the date of signature. A signature and date is required for initial program preparation and for any significant revision to the program, which shall be in writing. The written SWMP shall be completed within one (1) year of the effective date of the permit.

The SWMP is the document used by the permittee to describe and detail the activities and measures that will be implemented to meet the terms and conditions of the permit. The SWMP shall accurately describe the permittees plans and activities. The document should be updated and/or modified during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term.

- b. Permittees authorized by the MS4-2003 permit shall modify or update their existing Best Management Practices (BMPs) and measurable goals to meet the terms and conditions of part 2.3 of this permit within one (1) year of the effective date of the permit. These modifications and updates shall be reflected in the written (hardcopy or electronic) SWMP. Permittees authorized by the MS4-2003 permit shall continue to implement their existing SWMP until the program has been updated.

1.10.1. Stormwater Management Program Availability

- a. The permittee shall retain a copy of the current SWMP required by this permit at the office or facility of the person listed as the program contact on the submitted Notice of Intent (NOI). The SWMP shall be immediately available to representatives from EPA, MassDEP, U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) at the time of an onsite inspection or upon request.
- b. The permittee shall make the SWMP available to the public during normal business hours. The permittee shall also post the SWMP online¹ if the permittee has a website on which to post the SWMP.

1.10.2. Contents and Timelines of the Stormwater Management Program for 2003 permittees

The following information must be included in the SWMP within one (1) year of the permit effective date and updated annually thereafter, as necessary:

- Identification of names and titles of people responsible for program implementation. If a position is currently unfilled, list the title of the position and modify the SWMP with the name once the position is filled;
- Documentation of compliance with part 1.9.1;
- Documentation of compliance with part 1.9.2;

¹ Should a permittee not wish to post mapping information included in the SWMP (see part 1.10.2) on their website for public safety reasons, they must state the reason either with or within the online SWMP and provide how the MS4 mapping information can be obtained. The permittee must retain the entire SWMP, including all completed mapping, at a location where it can be made available to the public during normal business hours.

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- Documentation of authorization of all new or increased discharges granted by MassDEP in compliance with part 2.1.2;
- Listing of all discharges identified pursuant to part 2.1.1 and description of response;
- Description of practices to achieve compliance with part 2.3 (MEP requirements) identified in the permittee's NOI and any updates to those BMPs within the first year;
 - For each permit condition in part 2.3 identify:
 - The person(s) or department responsible for the measure;
 - The BMPs for the control measure or permit requirement;
 - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal shall have a measure of assessment associated with it;
- Sanitary Sewer Overflow (SSO) inventory including all of the information required in part 2.3.4.4.b;
- Written IDDE Program pursuant to part 2.3.4.6;
- Written procedures for site inspections and enforcement of sediment and erosion control procedures in accordance with part 2.3.5;
- Description of measures to avoid or minimize impacts to surface public drinking water supply sources. The permittee is also encouraged to include provisions to notify public water supplies in the event of an emergency. Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program, One Winter Street, Boston, MA 02108 – phone 617.292.5770.
- Description of activities to achieve compliance with part 3.0;
- Annual program evaluation (part 4.1). Update annually and maintain copies.

The following information must be included in the SWMP within two (2) years of the permit effective date and updated annually thereafter, as necessary:

- Listing of all receiving waterbody segments, their classification under the applicable state water quality standards, any impairment(s) and associated pollutant(s) of concern, applicable TMDLs and WLAs, and number of outfalls from the MS4 that discharge to each waterbody. In addition to the receiving water, the permittee shall document in the SWMP all surface public drinking water sources that may be impacted by MS4 discharges;
- Listing of all interconnected MS4s and other separate storm sewer systems receiving a discharge from the permitted MS4, the receiving waterbody segment(s) ultimately receiving the discharge, their classification under the applicable state water quality standards, any impairment(s) and associated pollutant(s) of concern, applicable TMDLs and WLAs, and the number of interconnections;
- Written procedures to require submission of as-built drawings and ensure long term operation and maintenance in accordance with part 2.3.6.a.iii;
- The map of the separate storm sewer system required by part 2.3.4.5.

The following information must be included in the SWMP within four (4) years of the permit effective date and updated annually thereafter, as necessary:

- Report(s) assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover.

The following information must be included in the SWMP concurrent with the applicable

deadlines in Appendix F and H and updated annually thereafter, as necessary:

- Description of practices to achieve compliance with part 2.2.1 (TMDL requirements) including:
 - The person(s) or department responsible for the measure;
 - The BMPs for the control measure or permit requirement;
 - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal must have an associated measure of assessment.
- Description of practices to achieve compliance with part 2.2.2 (discharges to certain water quality limited waters subject to additional requirements) including:
 - The person(s) or department responsible for the measure;
 - The BMPs for the control measure or permit requirement;
 - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal must have an associated measure of assessment;
- Description of any other practices to achieve compliance with part 2.1 (water quality based requirements)

1.10.3. Contents and Timelines of the Stormwater Management Program for New Permittees

a. Permittees seeking authorization for the first time shall meet all deadlines contained in this permit except the following:

- Timelines for public education requirements in part 2.3.2.c shall be extended by one (1) year and need to include one (1) message to each audience over the permit term;
- The ordinances, by-laws, or other regulatory mechanisms required by parts 2.3.4, 2.3.5 and 2.3.6 shall be completed as soon as possible, but no later than three (3) years from the permit effective date; and
- All other deadlines in part 2.3.4 shall be extended by three (3) years.
- All other deadlines in part 2.3.5, 2.3.6 and 2.3.7 shall be extended by two (2) years.
- All deadlines for discharges to water quality limited waters without a TMDL under part 2.2.2 shall be extended by two (2) years.

b. Contents of the Stormwater Management Program for New Permittees

The following information must be included in the SWMP within one (1) year of the permit effective date and updated annually thereafter, as necessary:

- Identification of names and titles of people responsible for program implementation. If a position is currently unfilled, list the title of the position and modify the SWMP with the name once the position is filled;
- Documentation of compliance with part 1.9.1;
- Documentation of compliance with part 1.9.2;
- Documentation of authorization of all new or increased discharges granted by MassDEP in compliance with part 2.1.2;
- Listing of all discharges identified pursuant to part 2.1.1 and description of response;
- Description of practices to achieve compliance with part 2.3 (MEP requirements) identified in the permittee's NOI and any updates to those BMPs within the first year;

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For each permit condition in part 2.3 identify:

- The person(s) or department responsible for the measure;
 - The BMPs for the control measure or permit requirement;
 - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal shall have a measure of assessment associated with it;
- Description of measures to avoid or minimize impacts to surface public drinking water supply sources. The permittee is also encouraged to include provisions to notify public water supplies in the event of an emergency. Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program, One Winter Street, Boston, MA 02108 – phone 617.292.5770. Description of activities to achieve compliance with part 3.0;
 - Annual program evaluation (part 4.1). Update annually and maintain copies.

The following information must be included in the SWMP within three (3) years of the permit effective date and updated annually thereafter, as necessary:

- Written procedures for site inspections and enforcement of sediment and erosion control procedures in accordance with part 2.3.5;

The following information must be included in the SWMP within four (4) years of the permit effective date and updated annually thereafter, as necessary:

- Outfall and interconnection inventory;
- Sanitary Sewer Overflow (SSO) inventory including all of the information required in part 2.3.4.4.b;
- Written IDDE Program pursuant to part 2.3.4.6.
- Written operation and maintenance procedures for municipal activities in part 2.3.7.a.ii;
- Written program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4 in accordance with part 2.3.7.a.iii.1;
- Written procedures to require submission of as-built drawings and ensure long term operation and maintenance in accordance with part 2.3.6.a.iii;

The following information must be included in the SWMP within five (5) years of the permit effective date and updated annually thereafter, as necessary:

- Phase 1 of the map of the separate storm sewer system required by part 2.3.4.5;
- Listing of all receiving waterbody segments, their classification under the applicable state water quality standards, any impairment(s) and associated pollutant(s) of concern, applicable TMDLs and WLAs, and number of outfalls from the MS4 that discharge to each waterbody. In addition to the receiving water, the permittee shall document in the SWMP all surface public drinking water sources that may be impacted by MS4 discharges;
- Listing of all interconnected MS4s and other separate storm sewer systems receiving a discharge from the permitted MS4, the receiving waterbody segment(s) ultimately receiving the discharge, their classification under the applicable state water quality standards, any impairment(s) and associated pollutant(s) of concern, applicable TMDLs and WLAs, and the number of interconnections;

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The following information must be included in the SWMP within six (6) years of the permit effective date and updated annually thereafter, as necessary:

- Report(s) assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover.

The following information must be included in the SWMP concurrent with the applicable deadlines in Appendix F and H (extended by two (2) years) and updated annually thereafter, as necessary:

- Description of practices to achieve compliance with part 2.2.1 (discharges subject to requirements related to approved TMDLs) including:
 - The person(s) or department responsible for the measure;
 - The BMPs for the control measure or permit requirement;
 - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal must have an associated measure of assessment.
- Description of practices to achieve compliance with part 2.2.2 (discharges to certain water quality limited waters subject to additional requirements) including:
 - The person(s) or department responsible for the measure;
 - The BMPs for the control measure or permit requirement;
 - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal must have an associated measure of assessment;
- Description of any other practices to achieve compliance with part 2.1 (water quality based requirements).

2.0. Non-Numeric Effluent Limitations

The permittee shall develop, implement, and enforce a program to reduce the discharge of pollutants from the MS4 to the maximum extent practicable; to protect water quality and to satisfy the appropriate water quality requirements of the Clean Water Act and the Massachusetts Water Quality Standards.

2.1. Water Quality Based Effluent Limitations

Pursuant to Clean Water Act 402(p)(3)(B)(iii), this permit includes provisions to ensure that discharges from the permittee's small MS4 do not cause or contribute to an exceedance of water quality standards, in addition to requirements to reduce the discharge of pollutants to the maximum extent practicable. The requirements found in this part and part 2.2 constitute appropriate water quality based effluent limits of this permit. Requirements to reduce the discharge of pollutants to the maximum extent practicable are set forth in part 2.3.

2.1.1. Requirement to Meet Water Quality Standards

- a. The permittee shall reduce the discharge of pollutants such that the discharges from the MS4 do not cause or contribute to an exceedance of water quality standards.

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- b. If there is a discharge from the MS4 to a waterbody (or its tributaries in some cases) that is subject to an approved TMDL identified in part 2.2.1, the permittee is subject to the requirements of part 2.2.1 and Appendix F of this permit and the permittee shall comply with all applicable schedules and requirements in Appendix F. A permittee's compliance with all applicable requirements and BMP implementation schedules in Appendix F applicable to it will constitute compliance with part 2.1.1.a. of the Permit.
- c. If there is a discharge from the MS4 to a waterbody (or its tributaries in some cases) that is water quality limited (see definition in Appendix A) due to nutrients (Total Nitrogen or Total Phosphorus), metals (Cadmium, Copper, Iron, Lead or Zinc), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enterococcus or Fecal Coliform), chloride (Chloride) or oil and grease (Petroleum Hydrocarbons or Oil and Grease) and is not subject to an approved TMDL, or the MS4 is located within a municipality listed in part 2.2.2.a.-b., the permittee is subject to the requirements of part 2.2.2 and Appendix H of this permit and the permittee shall comply with all applicable schedules and requirements in Appendix H. A permittee's compliance with all applicable requirements and BMP implementation schedules in Appendix H applicable to it will constitute compliance with part 2.1.1.a. of the Permit.
- d. Except where a pollutant of concern in a discharge is subject to the requirements of part 2.2.1 and/or part 2.2.2 of this permit or is the result of an illicit discharge and subject to part 2.3.4 of this Permit, if a pollutant in a discharge from the MS4 is causing or contributing to a violation of applicable water quality criteria² for the receiving water, the permittee shall, as expeditiously as possible, but no later than 60 days of becoming aware of the situation, reduce or eliminate the pollutant in its discharge such that the discharge meets applicable water quality criteria.

2.1.2. Increased Discharges

- a. Any increased discharge, including increased pollutant loading(s) through the MS4 to waters of the United States is subject to Massachusetts antidegradation regulations at 314 CMR 4.04. The permittee shall comply with the provisions of 314 CMR 4.04 including information submittal requirements and obtaining authorization for increased discharges where appropriate³. Any authorization of an increased discharge by MassDEP shall be incorporated into the permittee's SWMP. If an applicable MassDEP approval specifies additional conditions or requirements, then those requirements are incorporated into this permit by reference. The permittee must comply with all such requirements.
- b. There shall be no increased discharges, including increased pollutant loading(s) from the MS4 to impaired waters listed in categories 5 or 4b on the most recent Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) unless the permittee demonstrates that there is no net increase in loading from the MS4 to the impaired water of the pollutant(s) for which the waterbody is impaired. The permittee may demonstrate compliance with this provision by *either*:
 - i. Documenting that the pollutant(s) for which the waterbody is impaired is not present in the MS4's discharge and retaining documentation of this finding with the SWMP; or

² Applicable water quality criteria are part of the state standards that have been federally approved as of the effective date of this permit and are compiled by EPA at <http://www.epa.gov/waterscience/standards/wqslibrary/>

³ Contact MassDEP for guidance on compliance with 314 CMR 4.04

- ii. Documenting that the total load of the pollutant(s) of concern from the MS4 to any impaired portion of the receiving water will not increase as a result of the activity and retaining documentation of this finding in the SWMP. Unless otherwise determined by the Permittee, USEPA or by MassDEP that additional demonstration is necessary, compliance with the requirements of part 2.2.2 and part 2.3.6 of this Permit, including all reporting and documentation requirements, shall be considered as demonstrating no net increase as required by this part.
- c. The requirements of this part are independent of permit conditions requiring reduction in discharges of pollutants as set forth in parts 2.1.1 and 2.2 (water quality based requirements) and 2.3 (requirements to reduce discharge of pollutants to the maximum extent practicable). Permittees remain subject to requirements to reduce the discharge of pollutants from the MS4 as set forth in those parts.

2.2. Discharges to Certain Impaired Waters

The permittee shall identify in the SWMP and Annual Reports all MS4 discharges, including both outfalls and interconnections to other MS4s or other separate storm sewer systems, that:

- Are subject to Total Maximum Daily Load (TMDL) related requirements as identified in part 2.2.1.
- Are subject to additional requirements to protect water quality as identified in part 2.2.2.

The discharge location from an interconnection shall be determined based on the receiving water of the outfall from the interconnected system.

2.2.1. Discharges Subject to Requirements Related to an Approved TMDL

- a. “Approved TMDLs” are those that have been approved by EPA as of the date of issuance of this permit.
- b. The MS4s specified below discharge to waters within Massachusetts that are subject to TMDLs, or in some cases, to tributaries of such waters, and shall comply with the requirements of Appendix F, part A. Appendix F identifies, by section, the provisions the permittee shall implement to be consistent with the terms of the approved TMDL. Alternatively, EPA may notify the permittee that an individual permit application is necessary in accordance with part 1.8.a.
 - i. The following is a list of municipalities in the Charles River Watershed:

1.

Arlington	Mendon
Ashland	Milford
Bellingham	Millis
Belmont	Natick
Brookline	Needham
Cambridge	Newton
Dedham	Norfolk

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Dover	Sherborn
Foxborough	Walpole
Franklin	Waltham
Holliston	Watertown
Hopedale	Wayland
Hopkinton	Wellesley
Lexington	Weston
Lincoln	Westwood
Medfield	Wrentham
Medway	

Permittees that operate regulated MS4s located in municipalities listed above that discharge to the Charles River or its Tributaries shall meet the requirements of Appendix F, part A.I with respect to the reduction of phosphorus discharges from their MS4.

- ii. The following is a list of municipalities that contain a lake or pond subject to an approved lake or pond phosphorus TMDL in the Northern Blackstone Basin, Chicopee Basin, Connecticut Basin, French Basin, Millers Basin or in the watershed of Bare Hill Pond, Flint Pond, Indian Lake, Lake Boon, Lake Quinsigamond, Leesville Pond, Salisbury Pond, Quaboag Pond or Quacumquasit Pond.

1.

Auburn	Millbury
Charlton	Oxford
Dudley	Shrewsbury
Gardner	Spencer
Grafton	Springfield
Granby	Stow
Hadley	Templeton
Harvard	Westminster
Hudson	Winchendon
Leicester	Wilbraham
Ludlow	

Permittees that operate regulated MS4s in the above municipalities that discharge to waterbodies listed on Table F-6 in Appendix F or their tributaries, and any other MS4 that discharges to waterbodies listed on Table F-6 in Appendix F or their tributaries, shall meet the requirements of Appendix F, part A.II with respect to reduction of phosphorus discharges from their MS4.

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iii. The following is a list of municipalities that contain waters subject to an approved TMDL for bacteria or pathogens.

1.

Abington	Marshfield
Acushnet	Mashpee
Andover	Mattapoissett
Avon	Medfield
Barnstable	Medway
Bedford	Melrose
Bellingham	Mendon
Belmont	Milford
Berkley	Millis
Beverly	Milton
Billerica	Nahant
Bourne	Natick
Brewster	Needham
Bridgewater	New Bedford
Brockton	Newton
Brookline	Norfolk
Burlington	North Andover
Cambridge	Norton
Canton	Norwell
Chatham	Norwood
Cohasset	Orleans
Concord	Peabody
Danvers	Pembroke
Dartmouth	Plymouth
Dedham	Raynham
Dennis	Rehoboth
Dighton	Revere
Dover	Rockland
Duxbury	Rockport
East Bridgewater	Salem
Eastham	Sandwich
Essex	Saugus
Everett	Scituate
Fairhaven	Seekonk
Fall River	Sharon
Falmouth	Sherborn
Foxborough	Somerset
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Freetown	Swampscott
Gloucester	Swansea
Hanover	Taunton
Hanson	Tewksbury
Harwich	Wakefield
Holliston	Walpole
Hopedale	Waltham
Hopkinton	Wareham
Ipswich	Watertown
Kingston	Wellesley
Lawrence	Wellfleet
Lexington	West Bridgewater
Lincoln	Weston
Lynn	Westport
Lynnfield	Westwood
Malden	Whitman
Manchester	Wilmington
Mansfield	Winthrop
Marblehead	Yarmouth
Marion	

The operators of MS4s located in municipalities listed above that discharge to a waterbody segment listed on Table F-8 in Appendix F and any other MS4 that discharges directly to a waterbody segment listed on Table F-8 in Appendix F shall meet the requirements of Appendix F, part A.III with respect to reduction of bacteria/pathogens discharges from their MS4.

- iv. The following is a list of municipalities located on Cape Cod that contain waters subject to an approved TMDL for nitrogen (Total Nitrogen).

- 1.

Bourne
Barnstable
Chatham
Falmouth
Harwich
Mashpee
Orleans
Yarmouth

Permittees that operate regulated MS4s located in the municipalities above that discharge to waterbodies found on Table F-9 in Appendix F or their tributaries and any other MS4 that discharges to waterbodies found on Table F-9 in Appendix F or their

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tributaries shall meet the requirements of Appendix F, part A.IV with respect to reduction of nitrogen discharges from their MS4.

v. The following is a list of municipalities located in the Assabet River Watershed:

1.

Acton	Hudson
Berlin	Littleton
Bolton	Marlborough
Boxborough	Maynard
Boylston	Northborough
Carlisle	Shrewsbury
Clinton	Stow
Concord	Westborough
Grafton	Westford
Harvard	

Permittees that operate regulated MS4s located in the municipalities above that discharge to the Assabet River or its tributaries shall meet the requirements of Appendix F part A.V with respect to reduction of phosphorus discharges from their MS4.

c. The MS4s specified below discharge to waters, or tributaries of waters, that have been identified in an adjacent state’s approved TMDL as being impaired due, in part, to MS4 stormwater discharges in Massachusetts, and shall comply with the requirements of Appendix F, part B. Appendix F identifies, by section, the provisions the permittee shall implement to be consistent with the reasonable assumptions related to Massachusetts MS4 discharges. Alternatively, EPA may notify the permittee that an individual permit application is necessary in accordance with part 1.8.a.

i. The following is a list of municipalities in Massachusetts located in the watershed of Long Island Sound, which has an approved TMDL for nitrogen (Total Nitrogen).

1.

Adams	North Adams
Agawam	Northampton
Amherst	Oxford
Ashburnham	Palmer
Ashby	Paxton
Auburn	Pelham
Belchertown	Pittsfield
Charlton	Richmond
Cheshire	Russell
Chicopee	Rutland
Dalton	South Hadley
Douglas	Southampton

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Dudley	Southbridge
East Longmeadow	Southwick
Easthampton	Spencer
Gardner	Springfield
Granby	Sturbridge
Hadley	Sutton
Hampden	Templeton
Hatfield	Ware
Hinsdale	Webster
Holyoke	West Springfield
Lanesborough	Westfield
Leicester	Westhampton
Lenox	Westminster
Longmeadow	Wilbraham
Ludlow	Williamsburg
Millbury	Winchendon
Monson	

Permittees that operate regulated MS4s located in the municipalities above that discharge to a water within the Connecticut River Watershed, the Housatonic River Watershed, or the Thames River Watershed shall meet the requirements of Appendix F part B. I with respect to nitrogen discharges from their MS4.

- ii. The following is a list of municipalities in Massachusetts identified in a TMDL as containing MS4s contributing phosphorus to waterbody segments that have out of state approved TMDLs for phosphorus:

- 1.

Attleboro
North Attleborough
Plainville
Rehoboth
Seekonk
Swansea

Permittees that operate regulated MS4s located in the municipalities above that discharge to a waterbody found on Table F-12 in Appendix F or its tributaries shall meet the requirements of Appendix F part B. II with respect to phosphorus discharges from their MS4.

- iii. The following is a list of municipalities in Massachusetts identified in a TMDL as containing MS4s contributing bacteria/pathogens to waterbody segments that have out of state approved TMDLs for bacteria/pathogens:

- 1.

Attleboro

North Attleborough
Plainville
Rehoboth
Seekonk

Permittees that operate regulated MS4s located in the municipalities above that discharge to a waterbody found on Table F-13 in Appendix F or its tributaries shall meet the requirements of Appendix F part B. III with respect to bacteria/pathogens discharges from their MS4.

- iv. The following is a list of municipalities in Massachusetts identified in a TMDL as containing MS4s contributing metals (cadmium, lead, aluminum iron) to waterbody segments that have out of state approved TMDLs for metals (cadmium, lead, aluminum, iron):

1.

Attleboro
North Attleborough
Plainville
Seekonk

Permittees that operate regulated MS4s located in the municipalities above that discharge to a waterbody found on Table F-14 in Appendix F or its tributaries shall meet the requirements of Appendix F part B. IV with respect to metals discharges from their MS4.

2.2.2. Discharges to Certain Water Quality Limited Waters Subject to Additional Requirements

For purposes of this permit, a ‘water quality limited water body’ is any water body that does not meet applicable water quality standards, including but not limited to waters listed in categories 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b).

If there is a discharge from the MS4 to a water quality limited waterbody where pollutants typically found in stormwater (specifically nutrients (Total Nitrogen or Total Phosphorus), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enterococcus or Fecal Coliform), chloride (Chloride), metals (Cadmium, Copper, Iron, Lead or Zinc) and oil and grease (Petroleum Hydrocarbons or Oil and Grease)) are the cause of the impairment and there is not an approved TMDL, or the MS4 is located in a town listed in part 2.2.2.a.-b, the permittee shall comply with the provisions in Appendix H applicable to it.

In the absence of a defined pollutant reduction target and where no approved TMDL has been established, this permit part and Appendix H define an iterative approach addressing pollutant reductions to waterbodies where the permittee’s discharge is causing or contributing to an excursion above water quality standards due to nutrients (Total Nitrogen Total Phosphorus), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enterococcus or Fecal Coliform), chloride (Chloride), metals (Cadmium, Copper, Iron, Lead or Zinc) or oil and grease (Petroleum Hydrocarbons or Oil and Grease).

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a. Discharges to water quality limited waterbodies where nitrogen (Total Nitrogen) is the cause of the impairment, or their tributaries

i. The requirements of this part are applicable to:

1. Permittees (including traditional and non-traditional MS4s) that own or operate an MS4 in the following municipalities. Discharges from MS4s within these municipalities are to waterbodies that are impaired due to nitrogen (Total Nitrogen), or their tributaries.

Abington	Mattapoisett
Acushnet	Middleborough
Attleboro	New Bedford
Avon	Norton
Barnstable	Peabody
Berkley	Pembroke
Bourne	Plainville
Bridgewater	Plymouth
Brockton	Plympton
Carver	Raynham
Dartmouth	Rehoboth
Dighton	Rochester
East Bridgewater	Salem
Easton	Seekonk
Fairhaven	Sharon
Fall River	Somerset
Foxborough	Stoughton
Freetown	Swansea
Halifax	Taunton
Hanson	Wakefield
Holbrook	Wareham
Kingston	West Bridgewater
Lakeville	Westport
Lynnfield	Whitman
Mansfield	Wrentham
Marion	Yarmouth

2. Any other permittee that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to nitrogen (Total Nitrogen), or a tributary of such water.

ii. Permittees subject to part 2.2.2.a.i above shall meet the requirements of Appendix H part I with respect to the control of nitrogen discharges from their MS4;

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- iii. During development of their Notice of Intent, the permittee may determine that all discharges from the regulated area through their MS4 are outside of a watershed that contains a nitrogen (Total Nitrogen) impairment in a downstream segment. The permittee shall retain all documentation used in this determination as part of their NOI and are relieved from the requirements of part 2.2.2.a.i and Appendix H part I.
- b. Discharges to water quality limited waterbodies where phosphorus (“Total Phosphorus”) is the cause of the impairment, or their tributaries
- i. The requirements of this part are applicable to:
 - 1. Permittees (including traditional and non-traditional MS4s) that own or operate an MS4 in the following municipalities. Discharges from MS4s within these municipalities are to waterbodies that are impaired due to phosphorus (Total Phosphorus), or their tributaries.

Abington	Lynn
Acushnet	Lynnfield
Andover	Malden
Arlington	Mansfield
Ashburnham	Marlborough
Ashland	Mashpee
Auburn	Medfield
Avon	Medford
Ayer	Melrose
Barnstable	Mendon
Bedford	Methuen
Belchertown	Millbury
Belmont	Millville
Billerica	Milton
Blackstone	North Andover
Bolton	Northbridge
Brewster	Norton
Bridgewater	Norwood
Brockton	Oxford
Burlington	Peabody
Cambridge	Pembroke
Canton	Pepperell
Carlisle	Pittsfield
Carver	Quincy
Chelmsford	Randolph
Chelsea	Reading

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Clinton	Revere
Concord	Rockland
Dalton	Salem
Dedham	Scituate
Douglas	Seekonk
Dover	Sharon
Dracut	Shirley
Dunstable	Shrewsbury
East Bridgewater	Somerville
Eastham	Southampton
Easthampton	Spencer
Everett	Springfield
Falmouth	Stoneham
Fitchburg	Stoughton
Foxborough	Sudbury
Framingham	Sutton
Gloucester	Taunton
Grafton	Tewksbury
Granby	Townsend
Groton	Tyngsborough
Halifax	Upton
Hanover	Uxbridge
Hanson	Wakefield
Harvard	Walpole
Haverhill	Wareham
Hinsdale	Watertown
Hopkinton	Wayland
Hudson	West Bridgewater
Lancaster	Westfield
Lawrence	Westminster
Leicester	Westwood
Lenox	Whitman
Leominster	Wilmington
Lexington	Winchendon
Littleton	Winchester
Lowell	Winthrop
Lunenburg	Woburn
Lynn	

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2. Any other permittee that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to phosphorus (“Total Phosphorus”), or to a tributary of such water.
- ii. The permittees subject to part 2.2.2.b.i. above shall meet all requirements of Appendix H part II with respect to the control of phosphorus discharges from the MS4.
 - iii. During development of their Notice of Intent, the permittee may determine that all discharges from the regulated area through their MS4 are outside of a watershed that contains a phosphorus (“Total Phosphorus”) impairment in a downstream segment. The permittee shall retain all documentation used in this determination as part of their NOI and are relieved from the requirements of part 2.2.2.b.i and Appendix H part II.
- c. Discharges to water quality limited waterbodies where bacteria or pathogens is the cause of the impairment
- i. The requirements of this part are applicable to:
 1. Any MS4 discharge identified by the permittee on their Notice of Intent as discharging directly to an impaired waterbody on the most recent EPA approved Massachusetts 303(d) list where bacteria or pathogens (E. Coli, Enterococcus or Fecal Coliform) is the cause of the impairment.
 2. Any other MS4 that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to bacteria or pathogens.
 - ii. The permittees subject to part 2.2.2.c.i. shall meet all requirements of Appendix H part III with respect to reduction of bacteria or pathogens discharges from the MS4.
- d. Discharges to water quality limited waterbodies where chloride (Chloride) is the cause of the impairment
- i. The requirements of this part are applicable to:
 1. Any MS4 discharge identified by the permittee on their Notice of Intent as discharging directly to an impaired waterbody on the most recent EPA approved Massachusetts 303(d) list where chloride (Chloride) is the cause of the impairment.
 2. Any other MS4 that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to chloride (Chloride).
 - ii. The permittees subject to part 2.2.2.d.i. shall meet all requirements of Appendix H part IV with respect to reduction of chloride discharges from the MS4.
- e. Discharges to water quality limited waterbodies where oil and grease (Petroleum Hydrocarbons or Oil and Grease), solids (TSS or Turbidity) or metals (Cadmium, Copper, Iron, Lead or Zinc) is the cause of the impairment
- i. The requirements of this part are applicable to:
 1. Any MS4 discharge identified by the permittee on their Notice of Intent as discharging directly to an impaired waterbody on the most recent EPA

approved Massachusetts 303(d) list where oil and grease, solids or metals (Oil and Grease, Petroleum Hydrocarbons TSS, Turbidity, Cadmium, Copper, Iron, Lead or Zinc) is the cause of the impairment.

2. Any other MS4 that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to oil and grease (Petroleum Hydrocarbons or Oil and Grease), solids (TSS or Turbidity) or metals (Cadmium, Copper, Iron, Lead or Zinc).

ii. The permittees subject to part 2.2.2.d.i. shall meet all requirements of Appendix H part V with respect to reduction of solids, oil and grease or metals discharges from the MS4.

2.3. Requirements to Reduce Pollutants to the Maximum Extent Practicable (MEP)

The permittee shall reduce the discharge of pollutants from the MS4 to the maximum extent practicable (MEP) as detailed in parts 2.3.2 through 2.3.7.

2.3.1. Control Measures

- a. Permittees authorized under the MS4-2003 permit shall continue to implement their existing SWMPs while updating their SWMPs pursuant to this permit. This permit does not extend the compliance deadlines set forth in the MS4-2003 permit.
- b. Implementation of one or more of the minimum control measures described in parts 2.3.2- 2.3.7 or other permit requirements may be shared with another entity (including another interconnected MS4) or the other entity may fully implement the measure or requirement, if the following requirements are satisfied:
 - The other entity, in fact, implements the control measure.
 - The particular control measure or component thereof undertaken by the other entity is at least as stringent as the corresponding permit requirement.
 - The other entity agrees to implement the control measure on the permittee's behalf. The annual reports must specify that the permittee is relying on another entity to satisfy some of its permit obligations and specify what those obligations are.
 - If the permittee is relying on another governmental entity regulated under 40 CFR §122 to satisfy all of its permit obligations, including the obligation to file annual reports, the permittee shall note that fact in its NOI, but is not required to file annual reports.
 - The permittee remains responsible for compliance with all permit obligations if the other entity fails to implement the control measures (or component thereof). The permittee may enter into a legally binding agreement with the other entity regarding the other entity's performance of control measures, but the permittee remains ultimately responsible for permit compliance.

2.3.2. Public Education and Outreach

Objective: The permittee shall implement an education program that includes educational goals based on stormwater issues of significance within the MS4 area. The ultimate objective of a public education program is to increase knowledge and change behavior of the public so that pollutants in stormwater are reduced.

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- a. The permittee shall continue to implement the public education program required by the MS4-2003 permit by distributing educational material to the MS4 community. The educational program shall define educational goals, express specific messages, define the targeted audience for each message, and identify responsible parties for program implementation. If appropriate for the target audience, materials may be developed in a language other than English. At a minimum, the program shall provide information concerning the impact of stormwater discharges on water bodies within the community, especially those waters that are impaired or identified as priority waters. The program shall identify steps and/or activities that the public can take to reduce the pollutants in stormwater runoff and their impacts to the environment.
- b. The educational program shall include education and outreach efforts for the following four audiences: (1) residents, (2) businesses, institutions (churches, hospitals), and commercial facilities, (3) developers (construction), and (4) industrial facilities, unless one of these audiences is not present in the MS4 community. In such a situation, the MS4 must document in both the NOI and SWMP which audience is absent from the community and no educational messages are required to that audience.
- c. The permittee shall distribute a minimum of two (2) educational messages over the permit term to each audience identified in part 2.3.2.b. The distribution of materials to each audience shall be spaced at least a year apart. Educational messages may be printed materials such as brochures or newsletters; electronic materials such as websites; mass media such as newspaper articles or public service announcement (radio or cable); targeted workshops on stormwater management, or displays in a public area such as town/city hall. The permittee may use existing materials if they are appropriate for the message the permittee chooses to deliver or the permittee may develop its own educational materials. The permittee may partner with other MS4s, community groups or watershed associations to implement the education program to meet this permit requirement.

Some EPA educational materials are available at: <http://cfpub.epa.gov/npstbx/index.html>.

- d. The permittee shall, at a minimum, consider the topics listed in part 2.3.2.d.i. – iv when developing the outreach/education program. The topics are not exclusive and the permittee shall focus on those topics most relevant to the community.
 - i. Residential program: effects of outdoor activities such as lawn care (use of pesticides, herbicides, and fertilizers and information on Massachusetts Regulation 331 CMR 31 pertaining to proper use of phosphorus containing fertilizers on turf grasses) on water quality; benefits of appropriate on-site infiltration of stormwater; effects of automotive work and car washing on water quality; proper disposal of swimming pool water; proper management of pet waste; maintenance of septic systems. If the small MS4 area has areas serviced by septic systems, the permittee shall consider information pertaining to maintenance of septic systems as part of its education program.
 - ii. Business/Commercial/Institution program: proper lawn maintenance (use of pesticides, herbicides and fertilizer, and information on Massachusetts Regulation 331 CMR 31 pertaining to proper use of phosphorus containing fertilizers on turf grasses); benefits of appropriate on-site infiltration of stormwater; building maintenance (use of detergents); use of salt or other de-icing and anti-icing materials (minimize their use); proper storage of salt or other de-icing/anti-icing materials (cover/prevent runoff to storm system and contamination to ground water); proper storage of materials (emphasize pollution prevention); proper management of waste materials and dumpsters (cover and pollution

prevention); proper management of parking lot surfaces (sweeping); proper car care activities (washing of vehicles and maintenance); and proper disposal of swimming pool water by entities such as motels, hotels, and health and country clubs (discharges must be dechlorinated and otherwise free from pollutants).

- iii. Developers and Construction: proper sediment and erosion control management practices; information about Low Impact Development (LID) principles and technologies; and information about EPA's construction general permit (CGP). This education can also be a part of the Construction Site Stormwater Runoff Control measure detailed in part 2.3.5.
 - iv. Industrial program: equipment inspection and maintenance; proper storage of industrial materials (emphasize pollution prevention); proper management and disposal of wastes; proper management of dumpsters; minimization of use of salt or other de-icing/anti-icing materials; proper storage of salt or other de-icing/anti-icing materials (cover/prevent runoff to storm system and ground water contamination); benefits of appropriate on-site infiltration of stormwater runoff from areas with low exposure to industrial materials such as roofs or employee parking; proper maintenance of parking lot surfaces (sweeping); and requirements for coverage under EPA's Multi-Sector General Permit.
- e. The program shall show evidence of focused messages for specific audiences as well as evidence that progress toward the defined educational goals of the program has been achieved. The permittee shall identify methods that it will use to evaluate the effectiveness of the educational messages and the overall education program. Any methods used to evaluate the effectiveness of the program shall be tied to the defined goals of the program and the overall objective of changes in behavior and knowledge.
 - f. The permittee shall modify any ineffective messages or distribution techniques for an audience prior to the next scheduled message delivery.
 - g. The permittee shall document in each annual report the messages for each audience; the method of distribution; the measures/methods used to assess the effectiveness of the messages, and the method/measures used to assess the overall effectiveness of the education program.

2.3.3. Public Involvement and Participation

Objective: The permittee shall provide opportunities to engage the public to participate in the review and implementation of the permittee's SWMP.

- a. All public involvement activities shall comply with state public notice requirements (MGL Chapter 30A, Sections 18 – 25 – effective 7/10/2010). The SWMP and all annual reports shall be available to the public.
- b. The permittee shall annually provide the public an opportunity to participate in the review and implementation of the SWMP.
- c. The permittee shall report on the activities undertaken to provide public participation opportunities including compliance with part 2.3.3.a. Public participation opportunities pursuant

to part 2.3.3.b may include, but are not limited to, websites; hotlines; clean-up teams; monitoring teams; or an advisory committee.

2.3.4. Illicit Discharge Detection and Elimination (IDDE) Program

Objective: The permittee shall implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges.

- a. Legal Authority - The IDDE program shall include adequate legal authority to: prohibit illicit discharges; investigate suspected illicit discharges; eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system; and implement appropriate enforcement procedures and actions. Adequate legal authority consists of a currently effective ordinance, by-law, or other regulatory mechanism. For permittees authorized by the MS4-2003 permit, the ordinance, by-law, or other regulatory mechanism was a requirement of the MS4-2003 permit and was required to be effective by May 1, 2008. For new permittees the ordinance, by-law, or other regulatory mechanism shall be in place within 3 years of the permit effective date.
- b. During the development of the new components of the IDDE program required by this permit, permittees authorized by the MS4-2003 permit must continue to implement their existing IDDE program required by the MS4-2003 permit to detect and eliminate illicit discharges to their MS4.

2.3.4.1. Definitions and Prohibitions

The permittee shall prohibit illicit discharges and sanitary sewer overflows (SSOs) to its MS4 and require removal of such discharges consistent with parts 2.3.4.2 and 2.3.4.4 of this permit.

An SSO is a discharge of untreated sanitary wastewater from a municipal sanitary sewer.

An illicit discharge is any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities.

2.3.4.2. Elimination of Illicit Discharges

- a. Upon detection of an illicit discharge, the permittee shall locate, identify and eliminate the illicit discharge as expeditiously as possible. Upon identification of the illicit source the MS4 notify all responsible parties for any such discharge and require immediate cessation of improper disposal practices in accordance with its legal authorities. Where elimination of an illicit discharge within 60 days of its identification as an illicit discharge is not possible, the permittee shall establish an expeditious schedule for its elimination and report the dates of identification and schedules for removal in the permittee's annual reports. The permittee shall immediately commence actions necessary for elimination. The permittee shall diligently pursue elimination of all illicit discharges. In the interim, the permittee shall take all reasonable and prudent measures to minimize the discharge of pollutants to and from its MS4.
- b. The period between identification and elimination of an illicit discharge is not a grace period. Discharges from an MS4 that are mixed with an illicit discharge are not authorized by this Permit (part 1.3.a) and remain unlawful until eliminated.

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2.3.4.3. Non-Stormwater Discharges

The permittee may presume that the sources of non-stormwater listed in part 1.4 of this permit need not be addressed. However, if the permittee identifies any of these sources as significant contributors of pollutants to the MS4, then the permittee shall implement measures to control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely, consistent with part 2.3.4.

2.3.4.4. Sanitary Sewer Overflows

- a. Upon detection of an SSO the permittee shall eliminate it as expeditiously as possible and take interim mitigation measures to minimize the discharge of pollutants to and from its MS4 until elimination is completed.
- b. The permittee shall identify all known locations where SSOs have discharged to the MS4 within the previous five (5) years. This shall include SSOs resulting, during dry or wet weather, from inadequate conveyance capacities, or where interconnectivity of the storm and sanitary sewer infrastructure allows for communication of flow between the systems. Within one (1) year of the effective date of the permit, the permittee shall develop an inventory of all identified SSOs indicating the following information, if available:
 1. Location (approximate street crossing/address and receiving water, if any);
 2. A clear statement of whether the discharge entered a surface water directly or entered the MS4;
 3. Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge);
 4. Estimated volume(s) of the occurrence;
 5. Description of the occurrence indicating known or suspected cause(s);
 6. Mitigation and corrective measures completed with dates implemented; and
 7. Mitigation and corrective measures planned with implementation schedules.

The permittee shall maintain the inventory as a part of the SWMP and update the inventory annually, all updates shall include the information in part 2.3.4.4.b.1-7.

- c. In accordance with Paragraph B.12 of Appendix B of this permit, upon becoming aware of an SSO to the MS4, the permittee shall provide oral notice to EPA within 24 hours. Additionally, the permittee shall provide written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence and shall include the information in the updated inventory. The notice shall contain all of the information listed in part 2.3.4.4.b. Where common notification requirements for SSOs are included in multiple NPDES permits issued to a permittee, a single notification may be made to EPA as directed in the permittee's wastewater or CSO NPDES permit and constitutes compliance with this part.
- d. The permittee shall include and update the SSO inventory in its annual report, including the status of mitigation and corrective measures implemented by the permittee to address each SSO identified pursuant to this part.
- e. The period between detection and elimination of a discharge from the SSO to the MS4 is not a grace period. Discharges from an MS4 that are mixed with an SSO are not authorized by this Permit (part 1.3.a) and remain unlawful until eliminated.

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2.3.4.5. System mapping

The permittee shall develop a revised and more detailed map than was required by the MS4-2003 permit. This revised map of the MS4 shall be completed in two phases as outlined below. The mapping shall include a depiction of the permittee's separate storm sewer system in the permit area. The mapping is intended to facilitate the identification of key infrastructure and factors influencing proper system operation, and the potential for illicit sanitary sewer discharges.

- a. Phase I: The system map shall be updated within two (2) years of the permit effective date to include the following information:
 - Outfalls and receiving waters (required by MS4-2003 permit)
 - Open channel conveyances (swales, ditches, etc.)
 - Interconnections with other MS4s and other storm sewer systems
 - Municipally-owned stormwater treatment structures (e.g., detention and retention basins, infiltration systems, bioretention areas, water quality swales, gross particle separators, oil/water separators, or other proprietary systems)
 - Waterbodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of waters report pursuant to Clean Water Act section 303(d) and 305(b)
 - Initial catchment delineations. Any available system data and topographic information may be used to produce initial catchment delineations. For the purpose of this permit, a catchment is the area that drains to an individual outfall or interconnection.

- b. Phase II: The system map shall be updated annually as the following information becomes available during implementation of catchment investigation procedures in part 2.3.4.8. This information must be included in the map for all outfalls within ten (10) years of the permit effective date:
 - Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
 - Pipes
 - Manholes
 - Catch basins
 - Refined catchment delineations. Catchment delineations shall be updated to reflect information collected during catchment investigations
 - Municipal sanitary sewer system (if available)
 - Municipal combined sewer system (if applicable).

- c. Recommended elements to be included in the system map as information becomes available:
 - Storm sewer material, size (pipe diameter) and age
 - Sanitary sewer system material, size (pipe diameter) and age
 - Privately-owned stormwater treatment structures
 - Where a municipal sanitary sewer system exists, properties known or suspected to be served by a septic system, especially in high-density urban areas
 - Area where the permittee's MS4 has received or could receive flow from septic system discharges (e.g., areas with poor soils, or high ground water elevations unsuitable for conventional subsurface disposal systems)
 - Seasonal high water table elevations impacting sanitary alignments
 - Topography
 - Orthophotography

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- Alignments, dates and representation of work completed (with legend) of past illicit discharge investigations (e.g., flow isolation, dye testing, CCTV)
 - Locations of suspected, confirmed and corrected illicit discharges (with dates and flow estimates).
- d. The mapping may be produced by hand or through computer-aided methods (e.g. GIS). The required scale and detail of the map shall be appropriate to facilitate a rapid understanding of the system by the permittee, EPA and the state. In addition, the mapping shall serve as a planning tool for the implementation and phasing of the IDDE program and demonstration of the extent of complete and planned investigations and corrections. The permittee shall update the mapping as necessary to reflect newly discovered information and required corrections or modifications.
- e. The permittee shall report on the progress towards the completion of the system map in each annual report.

2.3.4.6. Written Illicit Discharge Detection and Elimination Program

The IDDE program shall be recorded in a written (hardcopy or electronic) document. The IDDE program shall include each of the elements described in parts 2.3.4.7 and part 2.3.4.8, unless the permittee provides a written explanation within the IDDE program as to why a particular element is not applicable to the permittee.

Notwithstanding the permittee's explanation, EPA may at any time determine that a particular element is in fact applicable to the permittee and require the permittee to add it to the IDDE program. The written (hardcopy or electronic) IDDE program shall be completed within one (1) year of the effective date of the permit and updated in accordance with the milestones of this part. The permittee shall implement the IDDE program in accordance with the goals and milestones contained in this part.

- a. The written (hardcopy or electronic) IDDE program shall include a reference or citation of the authority the permittee will use to implement all aspects of the IDDE program.
- b. Statement of IDDE Program Responsibilities - The permittee shall establish a written (hardcopy or electronic) statement that clearly identifies responsibilities with regard to eliminating illicit discharges. The statement shall identify the lead municipal agency(ies) or department(s) responsible for implementing the IDDE Program as well as any other agencies or departments that may have responsibilities for aspects of the program (e.g., board of health responsibilities for overseeing septic system construction; sanitary sewer system staff; inspectional services for enforcing plumbing codes; town counsel responsibilities in enforcement actions, etc.). Where multiple departments and agencies have responsibilities with respect to the IDDE program specific areas of responsibility shall be defined and processes for coordination and data sharing shall be established and documented.
- c. Program Procedures – The permittee shall include in the written IDDE program all written procedures developed in accordance with the requirements and timelines in parts 2.3.4.7 and 2.3.4.8 below. At a minimum this shall include the written procedures for dry weather outfall screening and sampling and for catchment investigations.

2.3.4.7. Assessment and Priority Ranking of Outfalls/Interconnections

The permittee shall assess and priority rank the outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. This ranking will determine the priority order for

screening of outfalls and interconnections pursuant to part 2.3.4.7.b, catchment investigations for evidence of illicit discharges and SSOs pursuant to part 2.3.4.8, and provides the basis for determining permit milestones of this part.

a. Outfall/Interconnection Inventory and Initial Ranking:

An initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information shall be completed within one (1) year from the effective date of the permit; an updated inventory and ranking will be provided in each annual report thereafter. The inventory shall be updated annually to include data collected in connection with the dry weather screening and other relevant inspections conducted by the permittee.

- i. The outfall and interconnection inventory will identify each outfall and interconnection discharging from the MS4, record its location and condition, and provide a framework for tracking inspections, screenings and other activities under the permittee's IDDE program.
 - An outfall means a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. (40 CFR § 122.26(b)(9)). However, it is strongly recommended that a permittee inspect all accessible portions of the system as part of this process. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.
 - An interconnection means the point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.
- ii. The permittee shall classify each of the permittee's outfalls and interconnections into one of the following categories:
 - Problem Outfalls: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input.⁴ Problem Outfalls need not be screened pursuant to part 2.3.4.7.b.
 - High Priority Outfalls: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:
 - discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds;
 - determined by the permittee as high priority based on the characteristics listed below or other available information;
 - Low Priority Outfalls: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.
 - Excluded outfalls: Outfalls/interconnections with no potential for illicit discharges may be

⁴ Likely sewer input indicators are any of the following:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

- iii. The permittee shall priority rank outfalls into the categories above (except for excluded outfalls), based on the following characteristics of the defined initial catchment area where information is available:
- Past discharge complaints and reports.
 - Poor receiving water quality- the following guidelines are recommended to identify waters as having a high illicit discharge potential: exceeding water quality standards for bacteria; ammonia levels above 0.5 mg/l; surfactants levels greater than or equal to 0.25 mg/l.
 - Density of generating sites- Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes; gas stations; garden centers; and industrial manufacturing areas.
 - Age of development and infrastructure – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.
 - Sewer conversion – contributing catchment areas that were once serviced by septic systems, but have been converted to sewer connections may have a high illicit discharge potential.
 - Historic combined sewer systems – contributing areas that were once serviced by a combined sewer system, but have been separated may have a high illicit discharge potential.
 - Surrounding density of aging septic systems – Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.
 - Culverted streams – any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.
 - Water quality limited waterbodies that receive a discharge from the MS4 or waters with approved TMDLs applicable to the permittee, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.
 - The permittee may also consider additional relevant characteristics, including location-specific characteristics; if so, the permittee shall include the additional characteristics in its written (hardcopy or electronic) IDDE program.
- b. Dry Weather Outfall and Interconnection Screening and Sampling
All outfalls/interconnections (excluding Problem and excluded Outfalls) shall be inspected for the presence of dry weather flow within three (3) years of the permit effective date. The permittee shall screen all High and Low Priority Outfalls in accordance with their initial ranking developed at part 2.3.4.7.a.
- i. Written procedure: The permittee shall develop an outfall and interconnection screening and sampling procedure to be included in the IDDE program within one (1) year of the permit effective date. This procedure shall include the following procedures for:
- sample collection,
 - use of field kits,

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- storage and conveyance of samples (including relevant hold times), and
- field data collection and storage.

An example screening and sampling protocol (*EPA New England Bacterial Source Tracking Protocol*) can be found on EPA's website.

- ii. Weather conditions: Dry weather screening and sampling shall proceed only when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring.
- iii. Screening requirements: For each outfall/interconnection:
 1. The permittee shall record all of the following information and include it in the outfall/interconnection inventory and priority ranking:
 - unique identifier,
 - receiving water,
 - date of most recent inspection,
 - dimensions,
 - shape,
 - material (concrete, PVC),
 - spatial location (latitude and longitude with a minimum accuracy of +/-30 feet,
 - physical condition,
 - indicators of potential non-stormwater discharges (including presence or evidence of suspect flow and sensory observations such as odor, color, turbidity, floatables, or oil sheen).
 2. If an outfall/interconnection is inaccessible or submerged, the permittee shall proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results.
 3. If no flow is observed, but evidence of illicit flow exists, the permittee shall revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow (proceed as in iv. below).
 4. Where dry weather flow is found at an outfall/interconnection, at least one (1) sample shall be collected, and:
 - a) Samples shall be analyzed at a minimum for:
 - ammonia,
 - chlorine,
 - conductivity,
 - salinity,
 - *E. coli* (freshwater receiving water) or enterococcus (saline or brackish receiving water),
 - surfactants (such as MBAS),
 - temperature, and

- pollutants of concern⁵
- b) All analyses with the exception of indicator bacteria and pollutants of concern can be performed with field test kits or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern shall be conducted using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. Sampling for ammonia and surfactants must use sufficiently sensitive methods to detect those parameters at or below the threshold indicator concentrations of 0.5 mg/L for ammonia and 0.25 mg/L for surfactants. Sampling for residual chlorine must use a method with a detection limit of 0.02 mg/L or 20 ug/L.
 - iv. The permittee may rely on screening conducted under the MS4-2003 permit, pursuant to an EPA enforcement action, or by the state or EPA to the extent that it meets the requirements of part 2.3.4.7.b.iii.4. All data shall be reported in each annual report. Permittees that have conducted substantially equivalent monitoring to that required by part 2.3.4.7.b as part of an EPA enforcement action can request an exemption from the requirements of part 2.3.4.7.b by submitting a written request to EPA and retaining exemption approval from EPA as part of the SWMP. Until the permittee receives formal written approval of the exemption from part 2.3.4.7.b from EPA the permittee remains subject to all requirements of part 2.3.4.7.b.
 - v. The permittee shall submit all screening data used in compliance with this part in its Annual Report.
- c. Follow-up ranking of outfalls and interconnections:
- i. The permittee's outfall and interconnection ranking (2.3.4.7.a) shall be updated to reprioritize outfalls and interconnections based on information gathered during dry weather screening (part 2.3.4.7.b).
 - ii. Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input⁶ shall be considered highly likely to contain illicit discharges from sanitary sources, and such outfalls/interconnections shall be ranked at the top of the High Priority Outfalls category for investigation. At this time, permittees may choose to rank other outfalls and interconnections based on any new information from the dry weather screening.
 - iii. The ranking can be updated continuously as dry weather screening information becomes available, but shall be completed within three (3) years of the effective date of the permit.

2.3.4.8. Catchment Investigations

The permittee shall develop a systematic procedure to investigate each catchment associated with an

⁵ Where the discharge is directly into a water quality limited water or a water subject to an approved TMDL as indicated in Appendix F; the sample shall be analyzed for the pollutant(s) of concern identified as the cause of the impairment as specified in Appendix G

⁶ Likely sewer input indicators are any of the following:

- Olfactory or visual evidence of sewage,
- Ammonia \geq 0.5 mg/L, surfactants \geq 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia \geq 0.5 mg/L, surfactants \geq 0.25 mg/L, and detectable levels of chlorine.

outfall or interconnection within their MS4 system.

a. Timelines:

- A written catchment investigation procedure shall be developed within 18 months of the permit effective date in accordance with the requirements of part 2.3.4.8.b below.
- Investigations of catchments associated with Problem Outfalls shall begin no later than two (2) years from the permit effective date.
- Investigations of catchments associated with High and Low Priority Outfalls shall follow the ranking of outfalls updated in part 2.3.4.7.c.
- Investigations of catchments associated with Problem Outfalls shall be completed within seven (7) years of the permit effective date
- Investigations of catchments where any information gathered on the outfall/interconnection identifies sewer input⁷ shall be completed within seven (7) years of the permit effective date.
- Investigations of catchments associated with all High- and Low-Priority Outfalls shall be completed within ten (10) years of the permit effective date.

*For the purposes of these milestones, an individual catchment investigation will be considered complete if all relevant procedures in part 2.3.4.8.c. and 2.3.4.8.d. below have been completed.

b. A written catchment investigation procedure shall be developed that:

- i. **Identifies maps, historic plans and records, and other sources of data**, including but not limited to plans related to the construction of the storm drain and of sanitary sewers, prior work performed on the storm drains or sanitary sewers, board of health or other municipal data on septic system failures or required upgrades, and complaint records related to SSOs, sanitary sewer surcharges, and septic system breakouts. These data sources will be used in identifying system vulnerability factors within each catchment.
- ii. **Includes a manhole inspection methodology** that shall describe a storm drain network investigation that involves systematically and progressively observing, sampling (as required below) and evaluating key junction manholes (see definition in Appendix A) in the MS4 to determine the approximate location of suspected illicit discharges or SSOs. The manhole inspection methodology may either start from the outfall and work up the system or start from the upper parts of the catchment and work down the system or be a combination of both practices. Either method must, at a minimum, include an investigation of each key junction manhole within the MS4, even where no evidence of an illicit discharge is observed at the outfall. The manhole inspection methodology must describe the method the permittee will use. The manhole inspection methodology shall include procedures for dry and wet weather investigations.
- iii. **Establishes procedures to isolate and confirm sources of illicit discharges** where manhole investigations or other physical evidence or screening has identified that MS4 alignments are influenced by illicit discharges or SSOs. These shall include isolation of the drainage area for implementation of more detailed investigations, inspection of additional manholes along the alignment to refine the location of potential contaminant sources, and methods such as sandbagging key junction manhole inlets, targeted internal plumbing inspections, dye testing,

⁷ Likely sewer input indicators are any of the following:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

video inspections, or smoke testing to isolate and confirm the sources.

c. Requirements for each catchment investigation associated with an outfall/interconnection:

- i. For each catchment being investigated, the permittee shall review relevant mapping and historic plans and records gathered in accordance with Part 2.3.4.8.b.i. This review shall be used to identify areas within the catchment with higher potential for illicit connections. The permittee shall identify and record the presence of any of the following specific **System Vulnerability Factors (SVFs)**:
- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages;
 - Common or twin-invert manholes serving storm and sanitary sewer alignments;
 - Common trench construction serving both storm and sanitary sewer alignments;
 - Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system;
 - Sanitary sewer alignments known or suspected to have been constructed with an underdrain system;
 - Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints;
 - Areas formerly served by combined sewer systems;
 - Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations.

EPA recommends the permittee include the following in their consideration of System Vulnerability Factors:

- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs;
- Any sanitary sewer and storm drain infrastructure greater than 40 years old;
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance);
- History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance);

The permittee shall document the presence or absence of System Vulnerability Factors for each catchment, retain this documentation as part of its IDDE program, and report this information in Annual Reports. Catchments with a minimum of one (1) System Vulnerability Factor are subject to wet weather sampling requirements of part 2.3.4.8.c.ii.2.

- ii. For each catchment, the permittee must inspect key junction manholes and gather catchment information on the locations of MS4 pipes, manholes, and the extent of the contributing catchment.

1. For all catchments

- a) Infrastructure information shall be incorporated into the permittee's mapping required at part 2.3.4.5; the permittee will refine their catchment delineation based on the field investigation where appropriate.

- b) The SVF inventory for the catchment will be updated based on information obtained during the inspection, including common (twin invert) manholes, directly piped connections between storm drains and sanitary sewer infrastructure, common weir walls, sanitary sewer underdrain connections and other structural vulnerabilities where sanitary discharges could enter the storm drain system during wet weather.
 - 1) **Where a minimum of one (1) SVF is identified based on previous information or the investigation, a wet weather investigation must be conducted at the associated outfall (see below).**
 - c) During dry weather, key junction manholes⁸ shall be opened and inspected systematically for visual and olfactory evidence of illicit connections (e.g., excrement, toilet paper, gray filamentous bacterial growth, or sanitary products present).
 - 1) If flow is observed, the permittee shall sample the flow at a minimum for ammonia, chlorine and surfactants and can use field kits for these analyses.
 - 2) Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole shall be flagged for further upstream investigation.
 - d) Key junction and subsequent manhole investigations will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.
2. For all catchments with a minimum of one (1) SVF identified
- a) The permittee shall meet the requirements above for dry weather screening
 - b) The permittee shall inspect and sample under wet weather conditions to the extent necessary to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4.
 - 1) The permittee shall conduct at least one wet weather screening and sampling at the outfall that includes the same parameters required during dry weather screening, part 2.3.4.7.b.iii.4.
 - 2) Wet weather sampling and screening shall proceed during or after a storm event of sufficient depth or intensity to produce a stormwater discharge. EPA strongly recommends sampling during the spring (March through June) when groundwater levels are relatively high.
 - 3) The permit does not require a minimum rainfall event prior to wet weather screening. However, permittees may incorporate provisions that assist in targeting such discharges, including avoiding sampling during the initial period of discharge (“first flush”) and/or identifying minimum storm event intensities likely to trigger sanitary sewer interconnections.
 - c) This sampling can be done upon completion of any dry weather investigation but must be completed before the catchment investigation is marked as complete.
- iii. All data collected as part of the dry and wet weather catchment investigations shall be recorded and reported in each annual report.

⁸ Where catchments do not contain junction manholes, the dry weather screening and sampling shall be considered as meeting the manhole inspection requirement. In these catchments, dry weather screenings that indicate potential presence of illicit discharges shall be further investigated pursuant to part 2.3.4.8.d. Investigations in these catchments may be considered complete where dry weather screening reveals no flow; no evidence of illicit discharges or SSOs is indicated through sampling results or visual or olfactory means; and no wet weather System Vulnerability Factors are identified.

d. Identification/Confirmation of illicit source

Where the source of an illicit discharge has been approximated between two manholes in the permittee's MS4, the permittee shall isolate and identify/confirm the source of the illicit discharge using more detailed methods identified in their written procedure (2.3.4.8.b.iii). For outfalls that contained evidence of an illicit discharge, catchment investigations will be considered complete upon confirmation of all illicit sources.

e. Illicit discharge removal

When the specific source of an illicit discharge is identified, the permittee shall exercise its authority as necessary to require its removal pursuant to part 2.3.4.2 or 2.3.4.3.

i. For each confirmed source the permittee shall include in the annual report the following information:

- the location of the discharge and its source(s);
- a description of the discharge;
- the method of discovery;
- date of discovery;
- date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal; and
- estimate of the volume of flow removed.

ii. Within one year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening shall be conducted. The confirmatory screening shall be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening shall be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment shall be scheduled for additional investigation.

2.3.4.9. Indicators of IDDE Program Progress

The permittee shall define or describe indicators for tracking program success and evaluate and report on the overall effectiveness of the IDDE program in each annual report. At a minimum the permittee shall document in each annual report:

- the number of SSOs and illicit discharges identified and removed,
- the number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure,
- all dry weather and wet weather screening and sampling results and
- the volume of sewage removed

2.3.4.10 Ongoing Screening

Upon completion of all catchment investigations pursuant to part 2.3.4.8.c and illicit discharge removal and confirmation (if necessary) pursuant to paragraph 2.3.4.8.e, each outfall or interconnection shall be reprioritized for screening in accordance with part 2.3.4.7.a and scheduled for ongoing screening once every five years. Ongoing screening shall consist of dry weather screening and sampling consistent with part 2.3.4.7.b; wet weather screening and sampling shall also be required at outfalls where wet weather screening was required due to SVFs and shall be conducted in accordance with part 2.3.4.8.c.ii. All sampling results shall be reported in the permittee's annual report.

2.3.4.11 Training

The permittee shall, at a minimum, annually provide training to employees involved in IDDE program about the program, including how to recognize illicit discharges and SSOs. The permittee shall report on the frequency and type of employee training in the annual report.

2.3.5. Construction Site Stormwater Runoff Control

Objective: The objective of an effective construction stormwater runoff control program is to minimize or eliminate erosion and maintain sediment on site so that it is not transported in stormwater and allowed to discharge to a water of the U.S through the permittee's MS4. The construction site stormwater runoff control program required by this permit is a separate and distinct program from EPA's stormwater construction permit program.

(<http://cfpub1.epa.gov/npdes/stormwater/cgp.cfm>)

- a. Permittees shall implement and enforce a program to reduce pollutants in any stormwater runoff discharged to the MS4 from all construction activities that result in a land disturbance of greater than or equal to one acre within the regulated area. The permittee's program shall include disturbances less than one acre if that disturbance is part of a larger common plan of development or sale that would disturb one or more acres. Permittees authorized under the MS4-2003 permit shall continue to implement and enforce their existing program and modify as necessary to meet the requirements of this part.
- b. The permittee does not need to apply its construction program requirements to projects that receive a waiver from EPA under the provisions of 40 CFR § 122.26(b) (15) (i).
- c. The permittee shall develop and implement a construction site runoff control program that includes the elements in Paragraphs i. through v. of this part:
 - i. An ordinance or regulatory mechanism that requires the use of sediment and erosion control practices at construction sites. In addition to addressing sediment and erosion control, the ordinance must include controls for other wastes on construction sites such as demolition debris, litter and sanitary wastes. Development of an ordinance or other regulatory mechanism was a requirement of the MS4-2003 permit (See part II.B.4 and part IV.B.4).The ordinance or other regulatory mechanism required by the MS4-2003 permit shall have been effective by May 1, 2008.
 - ii. Written (hardcopy or electronic) procedures for site inspections and enforcement of sediment and erosion control measures. If not already existing, these procedures shall be completed within one (1) year from the effective date of the permit. The procedures shall clearly define who is responsible for site inspections as well as who has authority to implement enforcement procedures. The program shall provide that the permittee may, to the extent authorized by law, impose sanctions to ensure compliance with the local program. These procedures and regulatory authorities shall be documented in the SWMP.
 - iii. Requirements for construction site operators performing land disturbance activities within the MS4 jurisdiction that result in stormwater discharges to the MS4 to implement a sediment and erosion control program that includes BMPs appropriate for the conditions at the construction site. The program may include references to BMP

design standards in state manuals, such as the Massachusetts Stormwater Handbook⁹, or design standards developed by the MS4. EPA supports and encourages the use of design standards in local programs. Examples of appropriate sediment and erosion control measures for construction sites include local requirements to:

1. Minimize the amount of disturbed area and protect natural resources;
 2. Stabilize sites when projects are complete or operations have temporarily ceased;
 3. Protect slopes on the construction site;
 4. Protect all storm drain inlets and armor all newly constructed outlets;
 5. Use perimeter controls at the site;
 6. Stabilize construction site entrances and exits to prevent off-site tracking;
 7. Inspect stormwater controls at consistent intervals.
- iv. Requirements for construction site operators within the MS4 jurisdiction to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes. These wastes may not be discharged to the MS4.
- v. Written procedures for site plan review and inspection and enforcement. If not already existing, the procedures for site plan review and inspection and enforcement shall be completed within one (1) year from the effective date of the permit. The site plan review procedure shall include a pre-construction review by the permittee of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development. The review procedure shall incorporate procedures for the consideration of potential water quality impacts, and procedures for the receipt and consideration of information submitted by the public. The site plan review procedure shall also include evaluation of opportunities for use of low impact design and green infrastructure. When the opportunity exists, the permittee shall encourage project proponents to incorporate these practices into the site design. The procedures for site inspections conducted by the permittee shall include the requirement that inspections occur during construction of BMPs as well as after construction of BMPs to ensure they are working as described in the approved plans, clearly defined procedures for inspections including qualifications necessary to perform the inspections, the use of mandated inspection forms if appropriate, and procedure for tracking the number of site reviews, inspections, and enforcement actions. This tracking information shall be included as part of each annual report required by part 4.4.

2.3.6. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management)

Objective: The objective of this control measure is to reduce the discharge of pollutants found in stormwater through the retention or treatment of stormwater after construction on new or redeveloped sites. For the purposes of this part (2.3.6.), the following definitions apply:

site is defined as the area extent of construction activities, including but not limited to the creation of new impervious cover and improvement of existing impervious cover (e.g. repaving not covered by 2.3.6.a.ii.4.d.)

⁹ The handbook is available at: <http://www.mass.gov/dep/water/laws/policies.htm#storm>

new development is defined as any construction activities or land alteration resulting in total earth disturbances equal to or greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) on an area that has not previously been developed to include impervious cover.

redevelopment is defined as any construction, land alteration, or improvement of impervious surfaces resulting in total earth disturbances equal to or greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) that does not meet the definition of new development (see above).

- a. Permittees shall develop, implement, and enforce a program to address post-construction stormwater runoff from all new development and redevelopment sites that disturb one or more acres and discharge into the permittees MS4 at a minimum. Permittees authorized under the MS4-2003 permit shall continue to implement and enforce their program and modify as necessary to meet the requirements of this part.
 - i. The permittee's new development/ redevelopment program shall include sites less than one acre if the site is part of a larger common plan of development or redevelopment which disturbs one or more acre.
 - ii. The permittee shall develop or modify, as appropriate, an ordinance or other regulatory mechanism within two (2) years of the effective date of the permit to contain provisions that are at least as stringent as the following:
 1. Low Impact Development (LID) site planning and design strategies must be used to the maximum extent feasible.
 2. The design of treatment and infiltration practices should follow the guidance in Volume 2 of the Massachusetts Stormwater Handbook, as amended, or other federally or State approved¹⁰ BMP design guidance.
 3. Stormwater management systems on new development sites shall be designed to:
 - a) Not allow new stormwater conveyances to discharge untreated stormwater in accordance with Massachusetts Stormwater Handbook Standard 1;
 - b) Control peak runoff rates in accordance with Massachusetts Stormwater Handbook Standard 2¹¹;
 - c) Recharge groundwater in accordance with Massachusetts Stormwater Handbook Standard 3¹²;
 - d) Eliminate or reduce the discharge of pollutants from land uses with higher pollutant loads as defined in the Massachusetts Stormwater Handbook in accordance with Massachusetts Stormwater Handbook Standard 5;
 - e) Protect Zone II or Interim Wellhead Protection Areas of public water supplies in accordance with Massachusetts Stormwater Handbook Standard 6¹³;

¹⁰ State approved includes any state in the United States, including, but not limited to, approved guidance by the Commonwealth of Massachusetts

¹¹ Requirement necessary for Section 401 water quality certification by Massachusetts

¹² Requirement necessary for Section 401 water quality certification by Massachusetts

¹³ Requirement necessary for Section 401 water quality certification by Massachusetts

- f) Implement long term maintenance practices in accordance with Massachusetts Stormwater Handbook Standard 9; and
- g) Require that all stormwater management systems be designed to:
 - 1) Retain the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the site AND/OR
 - 2) Remove 90% of the average annual load of Total Suspended Solids (TSS) generated from the total post-construction impervious area on the site¹⁴ AND 60% of the average annual load of Total Phosphorus (TP) generated from the total post-construction impervious surface area on the site¹⁴. Pollutant removal shall be calculated consistent with EPA Region 1's BMP Performance Extrapolation Tool or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance any federally or State approved¹⁵ BMP design guidance or performance standards (e.g. State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance.

4. Redevelopment Requirements

- a) Stormwater management systems on Redevelopment sites shall meet the following sections of part 2.3.6.a.ii.3 to the maximum extent feasible:
 - 1) Part 2.3.6.a.ii.3(a) (Massachusetts Stormwater Standard 1);
 - 2) Part 2.3.6.a.ii.3(b) (Massachusetts Stormwater Standard 2);
 - 3) Part 2.3.6.a.ii.3(c) (Massachusetts Stormwater Standard 3); and
 - 4) The pretreatment and structural best management practices requirements of 2.3.6.a.ii.3(d) and 2.3.6.a.ii.3(e) (Massachusetts Stormwater Standards 5 and 6).
- b) Stormwater management systems on Redevelopment sites shall also improve existing conditions by requiring that stormwater management systems be designed to:
 - 1) Retain the volume of runoff equivalent to, or greater than, 0.80 inch multiplied by the total post-construction impervious surface area on the site AND/OR
 - 2) Remove 80% of the average annual post-construction load of Total Suspended Solids (TSS) generated from the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus (TP) generated from the total post-construction impervious surface area on the site. Pollutant removal shall be calculated consistent with EPA Region 1's BMP Performance Extrapolation Tool or other BMP performance evaluation tool provided by EPA Region 1 where available. If EPA Region 1 tools do not address the planned or installed BMP performance any federally or State approved BMP design guidance or performance standards (e.g. State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance.
- c) Stormwater management systems on redevelopment sites may utilize offsite mitigation within the same USGS HUC10 as the redevelopment site

¹⁴ The required removal percentage is not required for each storm, it is the average removal over a year that is required

¹⁵ See footnote 14

- to meet the equivalent retention or pollutant removal requirements in part 2.3.6.a.ii.4(b).
- d) Redevelopment activities that are exclusively limited to maintenance and improvement of existing roadways, (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects) shall improve existing conditions where feasible and are exempt from part 2.3.6.a.ii.4(a), part 2.3.6.a.ii.4(b) and part 2.3.6.a.ii.4(c). Roadway widening or improvements that increase the amount of impervious area on the redevelopment site by greater than or equal to a single lane width shall meet the requirements of part 2.3.6.a.ii.4(a) – (c) fully.
- iii. The permittee shall require, at a minimum, the submission of as-built drawings no later than two (2) years after completion of construction projects. The as-built drawings must depict all on site controls, both structural and non-structural, designed to manage the stormwater associated with the completed site (post construction stormwater management). The new development/redevelopment program shall have procedures to ensure adequate long-term operation and maintenance of stormwater management practices that are put in place after the completion of a construction project. These procedures may include the use of dedicated funds or escrow accounts for development projects or the acceptance of ownership by the permittee of all privately owned BMPs. These procedures may also include the development of maintenance contracts between the owner of the BMP and the permittee. Alternatively, these procedures may include the submission of an annual certification documenting the work that has been done over the last 12 months to properly operate and maintain the stormwater control measures. The procedures to require submission of as-built drawings and ensure long term operation and maintenance shall be a part of the SWMP. The permittee shall report in the annual report on the measures that the permittee has utilized to meet this requirement.
- b. Within four (4) years of the effective date of this permit, the permittee shall develop a report assessing current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover. This assessment shall be used to provide information to allow the permittee to determine if changes to design standards for streets and parking lots can be made to support low impact design options. If the assessment indicates that changes can be made, the assessment shall include recommendations and proposed schedules to incorporate policies and standards into relevant documents and procedures to minimize impervious cover attributable to parking areas and street designs. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The local planning board and local transportation board should be involved in this assessment. This assessment shall be part of the SWMP. The permittee shall report in each annual report on the status of this assessment including any planned or completed changes to local regulations and guidelines.
- c. Within four (4) years from the effective date of the permit, the permittee shall develop a report assessing existing local regulations to determine the feasibility of making, at a minimum, the following practices allowable when appropriate site conditions exist:
- i. Green roofs;
 - ii. Infiltration practices such as rain gardens, curb extensions, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils; and

- iii. Water harvesting devices such as rain barrels and cisterns, and the use of stormwater for non-potable uses.

The assessment should indicate if the practices are allowed in the MS4 jurisdiction and under what circumstances are they allowed. If the practices are not allowed, the permittee shall determine what hinders the use of these practices, what changes in local regulations may be made to make them allowable, and provide a schedule for implementation of recommendations. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The permittee shall report in each annual report on its findings and progress towards making the practices allowable. (Information available at:

<http://www.epa.gov/region1/npdes/stormwater/assets/pdf/AddressingBarrier2LID.pdf> and <http://www.mapc.org/resources/low-impact-dev-toolkit/local-codes-lid>)

- d. Four (4) years from the effective date of this permit, the permittee shall identify a minimum of 5 permittee-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 through the reduction of impervious area. Properties and infrastructure for consideration shall include those with the potential for reduction of on-site impervious area (IA) as well as those that could provide reduction of off-site IA. At a minimum, the permittee shall consider municipal properties with significant impervious cover (including parking lots, buildings, and maintenance yards) that could be modified or retrofitted. MS4 infrastructure to be considered includes existing street right-of-ways, outfalls and conventional stormwater conveyances and controls (including swales and detention practices) that could be readily modified or retrofitted to provide reduction in frequency, volume or pollutant loads of such discharges through reduction of impervious cover.

In determining the potential for modifying or retrofitting particular properties, the permittee shall consider factors such as access for maintenance purposes; subsurface geology; depth to water table; proximity to aquifers and subsurface infrastructure including sanitary sewers and septic systems; and opportunities for public use and education. In determining its priority ranking, the permittee shall consider factors such as schedules for planned capital improvements to storm and sanitary sewer infrastructure and paving projects; current storm sewer level of service; and control of discharges to water quality limited waters, first or second order streams, public swimming beaches, drinking water supply sources and shellfish growing areas.

Beginning with the fifth year annual report and in each subsequent annual report, the permittee shall identify additional permittee owned sites and infrastructure that could be retrofitted such that the permittee maintains a minimum of 5 sites in their inventory, until such a time as when the permittee has less than 5 sites remaining. In addition, the permittee shall report on all properties that have been modified or retrofitted with BMPs to mitigate IA that were inventoried in accordance with this part. The permittee may also include in its annual report non-MS4 owned property that has been modified or retrofitted with BMPs to mitigate IA.

2.3.7. Good House Keeping and Pollution Prevention for Permittee Owned Operations

Objective: The permittee shall implement an operations and maintenance program for permittee-owned operations that has a goal of preventing or reducing pollutant runoff and protecting water quality from all permittee-owned operations.

a. Operations and Maintenance Programs

- i. Within two (2) years from the effective date of the permit, the permittee shall develop, if not already developed, written (hardcopy or electronic) operations and maintenance

procedures for the municipal activities listed below in part 2.3.7.a.ii. These written procedures shall be included as part of the SWMP.

- ii. Within two (2) year of the effective date of this permit, the permittee shall develop an inventory of all permittee owned facilities within the categories listed below. The permittee shall review this inventory annually and update as necessary.
 1. Parks and open space: Establish procedures to address the proper use, storage, and disposal of pesticides, herbicides, and fertilizers including minimizing the use of these products and using only in accordance manufacturer's instruction. Evaluate lawn maintenance and landscaping activities to ensure practices are protective of water quality. Protective practices include reduced mowing frequencies, proper disposal of lawn clippings, and use of alternative landscaping materials (e.g., drought resistant planting). Establish pet waste handling collection and disposal locations at all parks and open space where pets are permitted, including the placing of proper signage concerning the proper collection and disposal of pet waste. Establish procedures to address waterfowl congregation areas where appropriate to reduce waterfowl droppings from entering the MS4. Establish procedures for management of trash containers at parks and open space (scheduled cleanings; sufficient number). Establish procedures to address erosion or poor vegetative cover when the permittee becomes aware of it; especially if the erosion is within 50 feet of a surface water.
 2. Buildings and facilities where pollutants are exposed to stormwater runoff: This includes schools (to the extent they are permittee-owned or operated), town offices, police, and fire stations, municipal pools and parking garages and other permittee-owned or operated buildings or facilities. Evaluate the use, storage, and disposal of petroleum products and other potential stormwater pollutants. Provide employee training as necessary so that those responsible for handling these products know proper procedures. Ensure that Spill Prevention Plans are in place, if applicable, and coordinate with the fire department as necessary. Develop management procedures for dumpsters and other waste management equipment. Sweep parking lots and keep areas surrounding the facilities clean to reduce runoff of pollutants.
 3. Vehicles and Equipment: Establish procedures for the storage of permittee vehicles. Vehicles with fluid leaks shall be stored indoors or containment shall be provided until repaired. Evaluate fueling areas owned or operated by the permittee. If possible, place fueling areas under cover in order to minimize exposure. Establish procedures to ensure that vehicle wash waters are not discharged to the municipal storm sewer system or to surface waters. This permit does not authorize such discharges.
- iii. Infrastructure Operations and Maintenance
 1. The permittee shall establish within two (2) year of the effective date of the permit a written (hardcopy or electronic) program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4. If the permittee has an existing program to maintain its MS4 infrastructure

in a timely manner to reduce or eliminate the discharge of pollutants from the MS4, the permittee shall document the program in the SWMP.

2. The permittee shall optimize routine inspections, cleaning and maintenance of catch basins such that the following conditions are met:
 - Prioritize inspection and maintenance for catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment). Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.
 - Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at anytime will be more than 50 percent full.
 - If a catch basin sump is more than 50 percent full during two consecutive routine inspections/cleaning events, the permittee shall document that finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources. The permittee shall describe any actions taken in its annual report.
 - For the purposes of this part, an excessive sediment or debris loading is a catch basin sump more than 50 percent full. A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.
 - The permittee shall document in the SWMP and in the first annual report its plan for optimizing catch basin cleaning, inspection plans, or its schedule for gathering information to develop the optimization plan. Documentation shall include metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for the MS4. The permittee shall keep a log of catch basins cleaned or inspected.
 - The permittee shall report in each annual report the total number of catch basins, number inspected, number cleaned, and the total volume or mass of material removed from all catch basins.
3. The permittee shall establish and implement procedures for sweeping and/or cleaning streets, and permittee-owned parking lots. All streets with the exception of rural uncurbed roads with no catch basins or high speed limited access highways shall be swept and/or cleaned a minimum of once per year in the spring (following winter activities such as sanding). The procedures shall also include more frequent sweeping of targeted areas determined by the permittee on the basis of pollutant load reduction potential, based on inspections, pollutant loads, catch basin cleaning or inspection results, land use, water quality limited or TMDL waters or other relevant factors as determined by the permittee. The permittee shall report in each annual report the number of miles cleaned or the volume or mass of material removed.

For rural uncurbed roadways with no catch basins and limited access highways, the permittee shall either meet the minimum frequencies above, or develop and implement an inspection, documentation and targeted sweeping plan within two (2) years of the effective date of the permit, and submit such plan with its year one annual report.

4. The permittee shall ensure proper storage of catch basin cleanings and street sweepings prior to disposal or reuse such that they do not discharge to receiving waters. These materials should be managed in compliance with current MassDEP policies:
 - For catch basins cleanings:
<http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html>
 - For street sweepings:
<http://www.mass.gov/eea/docs/dep/recycle/laws/stsweep.pdf>.
 5. The permittee shall establish and implement procedures for winter road maintenance including the use and storage of salt and sand; minimize the use of sodium chloride and other salts, and evaluate opportunities for use of alternative materials; and ensure that snow disposal activities do not result in disposal of snow into waters of the United States. For purposes of this MS4 Permit, salt shall mean any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.
 6. The permittee shall establish and implement inspection and maintenance frequencies and procedures for all stormwater treatment structures such as water quality swales, retention/detention basins, infiltration structures, proprietary treatment devices or other similar structures. All permittee-owned stormwater treatment structures (excluding catch basins) shall be inspected annually at a minimum.
- iv. The permittee shall report in the annual report on the status of the inventory required by this part and any subsequent updates; the status of the O&M programs for the permittee-owned facilities and activities in part 2.3.7.a.ii; and the maintenance activities associated with each.
 - v. The permittee shall keep a written (hardcopy or electronic) record of all required activities including but not limited to maintenance activities, inspections and training required by part 2.3.7.a. The permittee shall maintain, consistent with part 4.2.a, all records associated with maintenance and inspection activities required by part 2.3.7.a.

b. Stormwater Pollution Prevention Plan (SWPPP)

The permittee shall develop and fully implement a SWPPP for each of the following permittee-owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater as determined by the permittee. If facilities are located at the same property, the permittee may develop one SWPPP for the entire property. The SWPPP is a separate and different document from the SWMP required in part 1.10. A SWPPP does not need to be developed for a facility if the permittee has either developed a SWPPP or received a no exposure certification for the discharge under the Multi-Sector General Permit or the discharge is authorized under another NPDES permit.

- i. No later than two (2) years from the effective date of the permit, the permittee shall develop and implement a written (hardcopy or electronic) SWPPP for the facilities

described above. The SWPPP shall be signed in accordance with the signatory requirements of Appendix B – Subparagraph 11.

ii. The SWPPP shall contain the following elements:

1. Pollution Prevention Team

Identify the staff on the team, by name and title. If the position is unstaffed, the title of the position should be included and the SWPPP updated when the position is filled. The role of the team is to develop, implement, maintain, and revise, as necessary, the SWPPP for the facility.

2. Description of the facility and identification of potential pollutant sources

The SWPPP shall include a map of the facility and a description of the activities that occur at the facility. The map shall show the location of the stormwater outfalls, receiving waters, and any structural controls. Identify all activities that occur at the facility and the potential pollutants associated with each activity including the location of any floor drains. These may be included as part of the inventory required by part 2.3.7.a.

3. Identification of stormwater controls

The permittee shall select, design, install, and implement the control measures detailed in paragraph 4 below to prevent or reduce the discharge of pollutants from the permittee owned facility.

The selection, design, installation, and implementation of the control measures shall be in accordance with good engineering practices and manufacturer's specifications. The permittee shall also take all reasonable steps to control or address the quality of discharges from the site that may not originate at the facility.

If the discharge from the facility is to a water quality limited water and the facility has the potential to discharge the pollutant identified as causing the water quality limitation, the permittee shall identify the control measures that will be used to address this pollutant at the facility so that the discharge does not cause or contribute to a violation of a water quality standard.

4. The SWPPP shall include the following management practices:

- a) Minimize or Prevent Exposure: The permittee shall to the extent practicable either locate materials and activities inside, or protect them with storm-resistant coverings in order to prevent exposure to rain, snow, snowmelt and runoff (although significant enlargement of impervious surface area is not recommended). Materials do not need to be enclosed or covered if stormwater runoff from affected areas will not be discharged directly or indirectly to surface waters or to the MS4 or if discharges are authorized under another NPDES permit.
- b) Good Housekeeping: The permittee shall keep clean all exposed areas that are potential sources of pollutants, using such measures as sweeping at regular intervals. Ensure that trash containers are closed when not in use, keep storage areas well swept and free from leaking or damaged containers; and store leaking vehicles needing repair indoors.

- c) Preventative Maintenance: The permittee shall regularly inspect, test, maintain, and repair all equipment and systems to avoid situations that may result in leaks, spills, and other releases of pollutants in stormwater to receiving waters. Inspections shall occur at a minimum once per quarter.
- d) Spill Prevention and Response: The permittee shall minimize the potential for leaks, spills, and other releases that may be exposed to stormwater and develop plans for effective response to such spills if or when they occur. At a minimum, the permittee shall have procedures that include:
- Preventive measures such as barriers between material storage and traffic areas, secondary containment provisions, and procedures for material storage and handling.
 - Response procedures that include notification of appropriate facility personnel, emergency agencies, and regulatory agencies, and procedures for stopping, containing, and cleaning up leaks, spills and other releases. Measures for cleaning up hazardous material spills or leaks shall be consistent with applicable Resource Conservation and Recovery Act (RCRA) regulations at 40 CFR section 264 and 40 CFR section 265. Employees who may cause, detect, or respond to a spill or leak shall be trained in these procedures and have necessary spill response equipment available. If possible, one of these individuals should be a member of the Pollution Prevention Team; and
 - Contact information for individuals and agencies that shall be notified in the event of a leak, spill, or other release. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under 40 CFR section 110, 40 CFR section 117, or 40 CFR section 302, occurs during a 24-hour period, the permittee shall notify the National Response Center (NRC) at (800) 424-8802 in accordance with the requirements of 40 CFR section 110, 40 CFR section 117, and 40 CFR section 302 as soon as the permittee has knowledge of the discharge. State or local requirements may necessitate reporting spills or discharges to local emergency, public health or drinking water supply agencies, and owners of public drinking water supplies. Contact information shall be in locations that are readily accessible and available.
- e) Erosion and Sediment Control: The permittee shall use structural and non-structural control measures at the facility to stabilize and contain runoff from exposed areas and to minimize or eliminate onsite erosion and sedimentation. Efforts to achieve this may include the use of flow velocity dissipation devices at discharge locations and within outfall channels where necessary to reduce erosion.

- f) Management of Runoff: The permittee shall manage stormwater runoff from the facility to prevent or reduce the discharge of pollutants. This may include management practices which divert runoff from areas that are potential sources of pollutants, contain runoff in such areas, or reuse, infiltrate or treat stormwater to reduce the discharge of pollutants.
- g) Salt Storage Piles or Piles Containing Salt: For storage piles of salt or piles containing salt used for deicing or other purposes (including maintenance of paved surfaces) for which the discharge during precipitation events discharges to the permittee's MS4, any other storm sewer system, or to a Water of the US, the permittee shall prevent exposure of the storage pile to precipitation by enclosing or covering the storage piles. Such piles shall be enclosed or covered within two (2) years of the permit effective date. The permittee shall implement appropriate measures (e.g., good housekeeping, diversions, containment) to minimize exposure resulting from adding to or removing materials from the pile. The permittee is encouraged to store piles in such a manner as not to impact surface water resources, ground water resources, recharge areas, and wells.
- h) Employee Training: The permittee shall regularly train employees who work in areas where materials or activities are exposed to stormwater, or who are responsible for implementing activities identified in the SWPPP (e.g., inspectors, maintenance personnel), including all members of the Pollution Prevention Team. Training shall cover both the specific components and scope of the SWPPP and the control measures required under this part, including spill response, good housekeeping, material management practices, any best management practice operation and maintenance, etc. EPA recommends annual training.

The permittee shall document the following information for each training:

- The training date, title and training duration;
 - List of municipal attendees;
 - Subjects covered during training
- i) Maintenance of Control Measures: The permittee shall maintain all control measures, required by this permit in effective operating condition. The permittee shall keep documentation onsite that describes procedures and a regular schedule for preventative maintenance of all control measures and discussions of back-up practices in place should a runoff event occur while a control measure is off-line. Nonstructural control measures shall also be diligently maintained (e.g., spill response supplies available, personnel trained).

iii. The permittee shall conduct the following inspections:

- 1. Site Inspections: Inspect all areas that are exposed to stormwater and all stormwater control measures. Inspections shall be conducted at least once each calendar quarter. More frequent inspections may be required if significant activities are exposed to stormwater. Inspections shall be performed when the

facility is in operation. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring.

The permittee shall document the following information for each facility inspection:

- The inspection date and time;
- The name of the inspector;
- Weather information and a description of any discharge occurring at the time of the inspection;
- Identification of any previously unidentified discharges from the site;
- Any control measures needing maintenance or repair;
- Any failed control measures that need replacement.
- Any SWPPP changes required as a result of the inspection.

If during the inspections, or any other time, the permittee identifies control measures that need repair or are not operating effectively, the permittee shall repair or replace them before the next anticipated storm event if possible, or as soon as practicable following that storm event. In the interim, the permittee shall have back-up measures in place.

The permittee shall report the findings from the Site Inspections in the annual report.

- iv. The permittee must keep a written (hardcopy or electronic) record of all required activities including but not limited to maintenance, inspections, and training required by part 2.3.7.b. The permittee shall maintain all records associated with the development and implementation of the SWPPP required by this part consistent with the requirements of part 4.2.

3.0. Additional Requirements for Discharges to Surface Drinking Water Supplies and Their Tributaries

- a. Permittees which discharge to public surface drinking water supply sources (Class A and Class B surface waters used for drinking water) or their tributaries should consider these waters a priority in the implementation of the SWMP.
- b. Permittees should provide pretreatment and spill control measures to stormwater discharges to public drinking water supply sources or their tributaries to the extent feasible.
- c. Direct discharges to Class A waters should be avoided to the extent feasible.

4.0. Program Evaluation, Record Keeping, and Reporting

4.1. Program Evaluation

- a. The permittee shall annually self-evaluate its compliance with the terms and conditions of this permit and submit each self-evaluation in the Annual Report. The permittee shall also maintain the annual evaluation documentation as part of the SWMP.

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b. The permittee shall evaluate the appropriateness of the selected BMPs in achieving the objectives of each control measure and the defined measurable goals. Where a BMP is found to be ineffective the permittee shall change BMPs in accordance with the provisions below. In addition, permittees may augment or change BMPs at any time following the provisions below:

- Changes adding (but not subtracting or replacing) components or controls may be made at any time.
- Changes replacing an ineffective or infeasible BMP specifically identified in the SWMP with an alternative BMP may be made as long as the basis for the changes is documented in the SWMP by, at a minimum:
 - An analysis of why the BMP is ineffective or infeasible;
 - Expectations on the effectiveness of the replacement BMP; and
 - An analysis of why the replacement BMP is expected to achieve the defined goals of the BMP to be replaced.

The permittee shall indicate BMP modifications along with a brief explanation of the modification in each Annual Report.

c. EPA or MassDEP may require the permittee to add, modify, repair, replace or change BMPs or other measures described in the annual reports as needed:

- To address impacts to receiving water quality caused or contributed to by discharges from the MS4; or
- To satisfy conditions of this permit

Any changes requested by EPA or MassDEP will be in writing and will set forth the schedule for the permittee to develop the changes and will offer the permittee the opportunity to propose alternative program changes to meet the objective of the requested modification.

4.2. Record Keeping

- a. The permittee shall keep all records required by this permit for a period of at least five years. EPA may extend this period at any time. Records include information used in the development of any written (hardcopy or electronic) program required by this permit, any monitoring results, copies of reports, records of screening, follow-up and elimination of illicit discharges; maintenance records; inspection records; and data used in the development of the notice of intent, SWMP, SWPPP, and annual reports. This list provides examples of records that should be maintained, but is not all inclusive.
- b. Records other than those required to be included in the annual report, part 4.4, shall be submitted only when requested by the EPA or the MassDEP.
- c. The permittee shall make the records relating to this permit, including the written (hardcopy or electronic) stormwater management program, available to the public. The public may view the records during normal business hours. The permittee may charge a reasonable fee for copying requests. The permittee is encouraged to satisfy this requirement by posting records online.

4.3. Outfall Monitoring Reporting

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- a. The permittee shall monitor and sample its outfalls at a minimum through sampling and testing at the frequency and locations required in connection with IDDE screening under part 2.3.4.7.b. and 2.3.4.8.c.ii.2. The monitoring program may also include additional outfall and interconnection monitoring as determined by the permittee in connection with assessment of SWMP effectiveness pursuant to part 4.1; evaluation of discharges to water quality limited waters pursuant to part 2.2; assessment of BMP effectiveness pursuant to part 2.2 or 2.3; or otherwise.
- b. The permittee shall document all monitoring results each year in the annual report. The report shall include the date, outfall or interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results of all analyses. The annual report shall include all of this information and data for the current reporting period and for the entire permit period.
- c. The permittee shall also include in the annual report results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period where that data is being used by the permittee to inform permit compliance or program effectiveness. If such monitoring or studies were conducted on behalf of the permittee, or if monitoring or studies conducted by other entities were reported to the permittee, a brief description of the type of information gathered or received shall be included in the annual report(s) covering the time period(s) the information was received.

4.4. Annual Reports

- a. The permittee shall submit annual reports each year of the permit term. The reporting period will be a one year period commencing on the permit effective date, and subsequent anniversaries thereof, except that the first annual report under this permit shall also cover the period from May 1, [year of final permit effective date] to the permit effective date. The annual report is due ninety days from the close of each reporting period.
- b. The annual reports shall contain the following information:
 - i. A self-assessment review of compliance with the permit terms and conditions.
 - ii. An assessment of the appropriateness of the selected BMPs.
 - iii. The status of any plans or activities required by part 2.1 and/ or part 2.2, including:
 - Identification of all discharges determined to be causing or contributing to an exceedance of water quality standards and description of response including all items required by part 2.1.1;
 - For discharges subject to TMDL related requirements, identification of specific BMPs used to address the pollutant identified as the cause of impairment and assessment of the BMPs effectiveness at controlling the pollutant (part 2.2.1. and Appendix F) and any deliverables required by Appendix F;
 - For discharges to water quality limited waters a description of each BMP required by Appendix H and any deliverables required by Appendix H.
 - iv. An assessment of the progress towards achieving the measurable goals and objectives of each control measure in part 2.3 including:

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- Evaluation of the public education program including a description of the targeted messages for each audience; method of distribution and dates of distribution; methods used to evaluate the program; and any changes to the program.
 - Description of the activities used to promote public participation including documentation of compliance with state public notice regulations.
 - Description of the activities related to implementation of the IDDE program including: status of the map; status and results of the illicit discharge potential ranking and assessment; identification of problem catchments; status of all protocols described in part 2.3.4.(program responsibilities and systematic procedure); number and identifier of catchments evaluated; number and identifier of outfalls screened; number of illicit discharges located; number of illicit discharges removed; gallons of flow removed; identification of tracking indicators and measures of progress based on those indicators; and employee training.
 - Evaluation of the construction runoff management including number of project plans reviewed; number of inspections; and number of enforcement actions.
 - Evaluation of stormwater management for new development and redevelopment including status of ordinance development (2.3.6.a.ii.), review and status of the street design assessment(2.3.6.b.), assessments to barriers to green infrastructure (2.3.6.c), and retrofit inventory status (2.3.6.d.)
 - Status of the O&M Programs required by part 2.3.7.a.
 - Status of SWPPP required by part 2.3.7.b. including inspection results.
 - Any additional reporting requirements in part 3.0.
- v. All outfall screening and monitoring data collected by or on behalf of the permittee during the reporting period and cumulative for the permit term, including but not limited to all data collected pursuant to part 2.3.4. The permittee shall also provide a description of any additional monitoring data received by the permittee during the reporting period.
- vi. Description of activities for the next reporting cycle.
- vii. Description of any changes in identified BMPs or measurable goals.
- viii. Description of activities undertaken by any entity contracted for achieving any measurable goal or implementing any control measure.
- c. Reports shall be submitted to EPA at the following address:

United State Environmental Protection Agency
Stormwater and Construction Permits Section (OEP06-1)
Five Post Office Square, Suite 100
Boston, MA 02109

Massachusetts Department of Environmental Protection
One Winter Street – 5th Floor
Boston, MA 02108
ATTN: Frederick Civian

Or submitted electronically to EPA at the following email address: stormwater.reports@epa.gov. After December 21, 2020 all Annual Reports must be submitted electronically.

5.0. Non-Traditional MS4s

Non-traditional MS4s are MS4s owned and operated by the Commonwealth of Massachusetts, counties or other public agencies within the Commonwealth of Massachusetts, and properties owned and operated by the United States (Federal Facilities) within the Commonwealth of Massachusetts. This part addresses all non-traditional MS4s except MS4s that are owned or operated by transportation agencies, which are addressed in part 6.0 below.

5.1. Requirements for Non-Traditional MS4s

All requirements and conditions of parts 1 – 4 above apply to all Non-traditional MS4s, except as specifically provided below:

5.1.1. Public education

For the purpose of this permit, the audiences for a Non-traditional MS4 include the employees, clients and customers (including students at education MS4s), visitors to the property, tenants, long term contractors and any other contractors working at the facility where the MS4 is located. The permittee may use some of the educational topics included in part 2.3.2.d. as appropriate, or may focus on topics specific to the MS4. The permittee shall document the educational topics for each target audience in the SWMP and annual reports.

5.1.2. Ordinances and regulatory mechanisms

Some Non-traditional MS4s may not have authority to enact an ordinance, by-law, or other regulatory mechanisms. MS4s without the authority to enact an ordinance shall ensure that written policies or procedures are in place to address the requirements of part 2.3.4.5., part 2.3.4.6 and part 2.3.6.a.

5.1.3. Assessment of Regulations

Non-traditional MS4s do not need to meet the requirements of part 2.3.6.c.

5.1.4. New Dischargers

New MS4 facilities are subject to additional water quality-based requirements if they fall within the definition of “new discharger” under 40 CFR § 122.2: “A new discharger is any building, structure, facility or installation (a) from which there is or may be a ‘discharge of pollutants’ (b) that did not commence the ‘discharge of pollutants’ at a particular ‘site’ prior to August 13, 1979; (c) which is not a ‘new source’; and (d) which never received a finally effective NPDES permit for discharges at that ‘site.’ The term “site” is defined in § 122.2 to mean “the land or water area where any ‘facility or activity’ is physically located or conducted including adjacent land used in connection with the facility or activity.”

Consistent with these definitions, a Non-traditional MS4 is a “new discharger” if it discharges stormwater from a new facility with an entirely new separate storm sewer system that is not

physically located on the same or adjacent land as an existing facility and associated system operated by the same MS4.

Any Non-traditional MS4 facility that is a “new discharger” and discharges to a waterbody listed in category 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) due to nutrients (Total Nitrogen or Total Phosphorus), metals (Cadmium, Copper, Iron, Lead or Zinc), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enterococcus or Fecal Coliform), chloride (Chloride) or oil and grease (Petroleum Hydrocarbons or Oil and Grease), or discharges to a waterbody with an approved TMDL for any of those pollutants, is not eligible for coverage under this permit and shall apply for an individual permit.

Any Non-traditional MS4 facility that is a “new discharger” and discharges to a waterbody that is in attainment is subject to Massachusetts antidegradation regulations at 314 CMR 4.04. The permittee shall comply with the provisions of 314 CMR 4.04 including information submittal requirements and obtaining authorization for new discharges where appropriate¹⁶. Any authorization of new discharges by MassDEP shall be incorporated into the permittee's SWMP. If an applicable MassDEP approval specifies additional conditions or requirements, then those requirements are incorporated into this permit by reference. The permittee must comply with all such requirements.

6.0 Requirements for MS4s Owned or Operated by Transportation Agencies

This part applies to all MS4s owned or operated by any state or federal transportation agency (except Massachusetts Department of Transportation –MassDOT- Highway Division, which is subject to a separate individual permit). All requirements and conditions of this permit apply with the following exceptions:

6.1 Public education

For the purpose of this permit, the audiences for a transportation agency education program include the general public (users of the roadways), employees, and any contractors working at the location. The permittee may use some of the educational topics included in part 2.3.2.d. as appropriate, or may focus on topics specific to the agency. The permittee shall document the educational topics for each target audience.

6.2 Ordinances and regulatory mechanisms

The transportation agency may not have authority to enact an ordinance, by-law or other regulatory mechanisms. The agency shall ensure that written agency policies or procedures are in place to address the requirements of part 2.3.4.5., part 2.3.4.6 and part 2.3.6.a.

6.3 Assessment of regulations

Non-traditional MS4s do not need to meet the requirements of part 2.3.6.c.

6.4 New Dischargers

New MS4 facilities are subject to additional water quality-based requirements if they fall within the definition of “new dischargers” under 40 CFR § 122.2: “A new discharger is any building, structure, facility or installation (a) from which there is or may be a ‘discharge of pollutants’ (b) that did not commence the ‘discharge of pollutants’ at a particular ‘site’ prior to August 13, 1979; (c) which is not a ‘new source’; and (d) which never received a finally effective NPDES permit for discharges at that ‘site.’ The term “site” is defined

¹⁶ Contact MassDEP for guidance on compliance with 314 CMR 4.04

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in § 122.2 to mean "the land or water area where any 'facility or activity' is physically located or conducted including adjacent land used in connection with the facility or activity."

Consistent with these definitions, a new transportation MS4 is a "new discharger" if it discharges stormwater from a new facility with an entirely new separate storm sewer system that is not physically located on the same or adjacent land as an existing facility and associated system operated by the same MS4.

Any transportation MS4 facility that is a "new discharger" and discharges to a waterbody listed as impaired in category 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) due to nutrients (Total Nitrogen or Total Phosphorus), metals (Cadmium, Copper, Iron, Lead or Zinc), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enterococcus or Fecal Coliform), chloride (Chloride) or oil and grease (Petroleum Hydrocarbons or Oil and Grease), or discharges to a waterbody with an approved TMDL for any of those pollutants, is not eligible for coverage under this permit and shall apply for an individual permit.

Any transportation MS4 facility that is a "new discharger" and discharges to a waterbody that is in attainment is subject to Massachusetts antidegradation regulations at 314 CMR 4.04. The permittee shall comply with the provisions of 314 CMR 4.04 including information submittal requirements and obtaining authorization for new discharges where appropriate¹⁷. Any authorization of new discharges by MassDEP shall be incorporated into the permittee's SWMP. If an applicable MassDEP approval specifies additional conditions or requirements, then those requirements are incorporated into this permit by reference. The permittee must comply with all such requirements.

¹⁷ Contact MassDEP for guidance on compliance with 314 CMR 4.04

Appendix A

Definitions, Abbreviations and Acronyms

Definitions

Best Management Practices (BMPs) - schedules of activities, practices (and prohibitions of practices), structures, vegetation, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Common Plan of Development - A "larger common plan of development or sale" is a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan. For example, if a developer buys a 20-acre lot and builds roads, installs pipes, and runs electricity with the intention of constructing homes or other structures sometime in the future, this would be considered a larger common plan of development or sale. If the land is parceled off or sold, and construction occurs on plots that are less than one acre by separate, independent builders, this activity still would be subject to stormwater permitting requirements if the smaller plots were included on the original site plan.

Control Measure - refers to any BMP or other method (including effluent limitations) used to prevent or reduce the discharge of pollutants to waters of the United States.

Director - a Regional Administrator of the Environmental Protection Agency or an authorized representative.

Discharge - when used without qualification, means the "discharge of a pollutant."

Discharge of a pollutant - any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source," or any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. This includes additions of pollutants into waters of the United States from surface runoff which is collected or channeled by man; or discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works.

Discharge-related activities - activities which cause, contribute to, or result in stormwater and allowable non-stormwater point source discharges, and measures such as the siting, construction and operation of BMPs to control, reduce, or prevent pollution in the discharges.

Disturbance - action to alter the existing vegetation and/or underlying soil of a site, such as clearing, grading, site preparation (e.g., excavating, cutting, and filling), soil compaction, and movement and stockpiling of top soils.

Existing Discharger – an operator applying for coverage under this permit for discharges covered previously under an NPDES general or individual permit.

Facility or Activity - any NPDES “point source” or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

Federal Facility – Any buildings, installations, structures, land, public works, equipment, aircraft, vessels, and other vehicles and property, owned by, or constructed or manufactured for the purpose of leasing to, the federal government.

Illicit Discharge - any discharge to a municipal separate storm sewer that is not composed entirely of stormwater except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities.

Impaired Water – A water is impaired if it does not meet one or more of its designated use(s). For purposes of this permit, “impaired” refers to categories 4 and 5 of the five-part categorization approach used for classifying the water quality standards attainment status for water segments under the TMDL program. Impaired waters compilations are also sometimes referred to as “303(d) lists.” Category 5 waters are impaired because at least one designated use is not being supported or is threatened and a TMDL is needed. Category 4 waters indicate that at least one designated use is not being supported but a TMDL is not needed (4a indicates that a TMDL has been approved or established by EPA; 4b indicates other required control measures are expected in result in the attainment of water quality standards in a reasonable period of time; and 4c indicates that the non-attainment of the water quality standard is the result of pollution (e.g. habitat) and is not caused by a pollutant). See *USEPA’s 2006 Integrated Report Guidance, July 29, 2005* for more detail on the five part categorization of waters [under EPA National TMDL Guidance <http://www.epa.gov/owow/tmdl/policy.html>]).

Impervious Surface- Any surface that prevents or significantly impedes the infiltration of water into the underlying soil. This can include but is not limited to: roads, driveways, parking areas and other areas created using non porous material; buildings, rooftops, structures, artificial turf and compacted gravel or soil.

Industrial Activity - the ten categories of industrial activities included in the definition of “stormwater discharges associated with industrial activity,” as defined in 40 CFR 122.26(b)(14)(i)-(ix) and (xi).

Industrial Stormwater - stormwater runoff associated with the definition of “stormwater discharges associated with industrial activity.”

Interconnection – the point (excluding sheet flow over impervious surfaces) where the permittee’s MS4 discharges to another MS4 or other storm sewer system, through which the discharge is eventually conveyed to a water of the United States. Interconnections shall be treated similarly to outfalls throughout the permit.

Junction Manhole - For the purposes of this permit, a junction manhole is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

Key Junction Manhole - For the purposes of this permit, key junction manholes are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

Municipal Separate Storm Sewer - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
- (ii) Designed or used for collecting or conveying stormwater;
- (iii) Which is not a combined sewer; and
- (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Municipal Separate Storm Sewer System (MS4) - means all separate storm sewers that are defined as "large" or "medium" or "small" municipal storm sewer systems pursuant to paragraphs 40 CFR 122.26 (b)(4) and (b)(7), or designated under paragraph 40 126.26(a) (1)(v). For the purposes of this permit "MS4" may also refer to the permittee with jurisdiction over the sewer system.

New Development – any construction activities or land alteration resulting in total earth disturbances greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) on an area that has not previously been developed to include impervious cover. (see part 2.3.6. of the permit)

New Discharger – For the purposes of this permit, a new discharger is an entity that discharges stormwater from a new facility with an entirely new separate storm sewer system that is not physically located on the same or adjacent land as an existing facility and associated system operated by the same MS4.

New Source - any building, structure, facility, or installation from which there is or may be a “discharge of pollutants,” the construction of which commenced:

- S after promulgation of standards of performance under section 306 of the CWA which are applicable to such source, or
- S after proposal of standards of performance in accordance with section 306 of the CWA which are applicable to such source, but only if the standards are promulgated in accordance with section 306 within 120 days of their proposal.

New Source Performance Standards (NSPS) – Technology-based standards for facilities that qualify as new sources under 40 CFR 122.2 and 40 CFR 122.29.

No exposure - all industrial materials or activities are protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff.

One Lane Width – The width of the travel lane for a roadway. Lane width does not include shoulders, curbs, and on-street parking areas.

Outfall Catchment – The land area draining to a single outfall or interconnection. The extent of an outfall’s catchment is determined not only by localized topography and impervious cover but also by the location of drainage structures and the connectivity of MS4 pipes.

Owner or operator - the owner or operator of any “facility or activity” subject to regulation under the NPDES program.

Person - an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point source - any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

Pollutant - dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal and agricultural waste discharged into water.

Pollutant of concern – A pollutant which causes or contributes to a violation of a water quality standard, including a pollutant which is identified as causing an impairment in a State's 303(d) list.

Redevelopment – for the purposes of part 2.3.6., any construction, land alteration, or improvement of impervious surfaces resulting in total earth disturbances greater than 1

acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) that does not meet the definition of new development (see above).

Reportable Quantity Release – a release of a hazardous substance at or above the established legal threshold that requires emergency notification. Refer to 40 CFR Parts 110, 177, and 302 for complete definitions and reportable quantities for which notification is required.

Runoff coefficient - the fraction of total rainfall that will appear at the conveyance as runoff.

Significant materials - includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under section 101(14) of CERCLA; any chemical the facility is required to report pursuant to section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with stormwater discharges.

Site – for the purposes of part 2.3.6., the area extent of construction activities, including but not limited to the creation of new impervious cover and improvement of existing impervious cover (e.g. repaving not covered by 2.3.6.a.ii.4.d.)

Small Municipal Separate Storm Sewer System – all separate storm sewer systems that are (i) owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district, or drainage district, or similar entity or an Indian tribe or an authorized Indian tribal organization or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States, and (ii) not defined as “large” or “medium” municipal separate storm sewer system pursuant to paragraphs 40 CFR 122.26 (b)(4) and (b)(7), or designated under paragraph 40 126.26(a) (1)(v). This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. This term does not include separate storm sewers in very discrete areas, such as individual buildings.

Small MS4 – means a small municipal separate storm sewer system.

Stormwater - stormwater runoff, snow melt runoff, and surface runoff and drainage.

Stormwater Discharges Associated with Construction Activity - a discharge of pollutants in stormwater runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavating), construction materials, or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling), or other industrial

stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located. (See 40 CFR 122.26(b)(14)(x) and 40 CFR 122.26(b)(15).

Stormwater Discharges Associated with Industrial Activity - the discharge from any conveyance that is used for collecting and conveying stormwater and that is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program under Part 122. For the categories of industries identified in this section, the term includes, but is not limited to, stormwater discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at part 401 of this chapter); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and final products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to stormwater. For the purposes of this paragraph, material handling activities include storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product, by-product or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with stormwater drained from the above described areas. Industrial facilities include those that are federally, State, or municipally owned or operated that meet the description of the facilities listed in Appendix D of this permit. The term also includes those facilities designated under the provisions of 40 CFR 122.26(a)(1)(v).

Total Maximum Daily Loads (TMDLs) - A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL includes wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources and/or natural background, and must include a margin of safety (MOS) and account for seasonal variations. (See section 303(d) of the Clean Water Act and 40 CFR 130.2 and 130.7).

Urbanized Area – US Census designated area comprised of a densely settled core of census tracts and/or census blocks that meet minimum population density requirements, along with adjacent territory containing non-residential urban land uses as well as territory with low population density included to link outlying densely settled territory with the densely settled core. For the purposes of this permit, Urbanized Areas as defined by any Census since 2000 remain subject to stormwater regulation even if there is a change in the reach of the Urbanized Area because of a change in more recent Census data.

Water Quality Limited Water – for the purposes of this permit, a water quality limited water is any waterbody that does not meet applicable water quality standards, including but not limited to waters listed in categories 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b).

Water Quality Standards - A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States and EPA adopt WQS to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (See CWA sections 101(a)2 and 303(c)).

ABBREVIATIONS AND ACRONYMS

BMP – Best Management Practice

BPJ – Best Professional Judgment

CGP – Construction General Permit

CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 *et seq*)

DCIA – Directly Connected Impervious Area

EPA – U. S. Environmental Protection Agency

ESA – Endangered Species Act

USFWS – U. S. Fish and Wildlife Service

IA – Impervious Area

IDDE – Illicit Discharge Detection and Elimination

LA – Load Allocations

MOS – Margin of Safety

MS4 – Municipal Separate Storm Sewer System

MSGP – Multi-Sector General Permit

NHPA – National Historic Preservation Act

NMFS – U. S. National Marine Fisheries Service

NOI – Notice of Intent

NPDES – National Pollutant Discharge Elimination System

NRHP – National Register of Historic Places

NSPS – New Source Performance Standard

NTU – Nephelometric Turbidity Unit

PCP – Phosphorus Control Plan (pertaining to Charles River Watershed phosphorus

TMDL requirements only – Appendix F Part A.I)

LPCP – Lake Phosphorus Control Plan (pertaining to Lake or pond phosphorus TMDL requirements only – Appendix F Part A.II)

POTW – Publicly Owned Treatment Works

RCRA – Resource Conservation and Recovery Act

SHPO – State Historic Preservation Officer

SIC – Standard Industrial Classification

SPCC – Spill Prevention, Control, and Countermeasure

SWMP – Stormwater Management Program

SWPPP – Stormwater Pollution Prevention Plan

TMDL – Total Maximum Daily Load

TSS – Total Suspended Solids

USGS – United States Geological Survey

WLA – Wasteload Allocation

WQS – Water Quality Standard

Appendix B

Standard Permit Conditions

Standard Permit Conditions

Standard permit conditions in Appendix B are consistent with the general permit provisions required under 40 CFR 122.41.

B.1. Duty To Comply

You must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

- A. You must comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
- B. Penalties for Violations of Permit Conditions: The Director will adjust the civil and administrative penalties listed below in accordance with the Civil Monetary Penalty Inflation Adjustment Rule (61 FR 252, December 31, 1996, pp. 69359-69366, as corrected in 62 FR 54, March 20, 1997, pp.13514-13517) as mandated by the Debt Collection Improvement Act of 1996 for inflation on a periodic basis. This rule allows EPA's penalties to keep pace with inflation. The Agency is required to review its penalties at least once every 4 years thereafter and to adjust them as necessary for inflation according to a specified formula. The civil and administrative penalties following were adjusted for inflation starting in 1996.
 1. *Criminal Penalties.*
 - a. *Negligent Violations.* The CWA provides that any person who negligently violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to criminal penalties of \$2,500 to \$25,000 per day of violation, or imprisonment of not more than one year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than \$50,000 per day of violation or by imprisonment of not more than two years, or both.
 - b. *Knowing Violations.* The CWA provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than \$5,000 nor more than \$50,000 per day of violation, or by imprisonment for not more than 3 years, or both. In the case of a

second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than \$100,000 per day of violation, or imprisonment of not more than 6 years, or both.

- c. *Knowing Endangerment.* The CWA provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he or she is placing another person in imminent danger of death or serious bodily injury shall upon conviction be subject to a fine of not more than \$250,000 or by imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than \$500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the Act, shall, upon conviction of violating the imminent danger provision be subject to a fine of not more than \$1,000,000 and can fined up to \$2,000,000 for second or subsequent convictions.
 - d. *False Statement.* The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than 4 years, or both. The Act further provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.
2. *Civil Penalties.* The CWA provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed the maximum amounts authorized by Section 309(d) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently \$32,500 per day for each violation).
 3. *Administrative Penalties.* The CWA provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

- 3.1. *Class I Penalty.* Not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently \$11,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed \$32,500).
- 3.2. *Class II Penalty.* Not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently \$11,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed \$157,500).

B.2. Duty to Reapply

If you wish to continue an activity regulated by this permit after the expiration date of this permit, you must apply for and obtain a new permit.

B.3. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for you in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

B.4. Duty to Mitigate

You must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

B.5. Proper Operation and Maintenance

You must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by you to achieve compliance with the conditions of this permit, including the requirements of your SWPPP. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by you only when the operation is necessary to achieve compliance with the conditions of this permit.

B.6. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. Your filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

B.7. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privileges.

B.8. Duty to Provide Information

You must furnish to EPA or an authorized representative (including an authorized contractor acting as a representative of EPA), within a reasonable time, any information which EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. You must also furnish to EPA upon request, copies of records required to be kept by this permit.

B.9. Inspection and Entry

You must allow EPA or an authorized representative (including an authorized contractor acting as a representative of EPA), upon presentation of credentials and other documents as may be required by law, to:

- A. Enter upon your premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- D. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

B.10. Monitoring and Records

- A. Samples and measurements taken for the purpose of monitoring must be representative of the volume and nature of the monitored activity.
- B. You must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of EPA at any time.
- C. Records of monitoring information must include:
 1. The date, exact place, and time of sampling or measurements;
 2. The individual(s) who performed the sampling or measurements;
 3. The date(s) analyses were performed

4. The individual(s) who performed the analyses;
 5. The analytical techniques or methods used; and
 6. The results of such analyses.
- D. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.
- E. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

B.11. Signatory Requirements

- A. All applications, including NOIs, must be signed as follows:
1. For a corporation: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
 2. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or
 3. For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

- B. All reports, including SWPPPs, inspection reports, annual reports, monitoring reports, reports on training and other information required by this permit must be signed by a person described in Appendix B, Subsection 11.A above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
1. The authorization is made in writing by a person described in Appendix B, Subsection 11.A;
 2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 3. The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.
- C. Changes to Authorization. If an authorization under Appendix B, Subsection 11.B is no longer accurate because a different operator has responsibility for the overall operation of the industrial facility, a new NOI satisfying the requirements of Subsection 11.B must be submitted to EPA prior to or together with any reports, information, or applications to be signed by an authorized representative.
- D. Any person signing documents required under the terms of this permit must include the following 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 gathered and evaluated 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, 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.”
- E. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

B.12. Reporting Requirements

- A. Planned changes. You must give notice to EPA as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:
1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR §122.29(b); or
 2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR §122.42(a)(1).
- B. Anticipated noncompliance. You must give advance notice to EPA of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
- C. Transfers. This permit is not transferable to any person except after notice to EPA. EPA may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. (See 40 CFR §122.61; in some cases, modification or revocation and reissuance is mandatory.)
- D. Monitoring reports. Monitoring results must be reported at the intervals specified elsewhere in this permit.
1. Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms (paper or electronic) provided or specified by EPA for reporting results of monitoring of sludge use or disposal practices.
 2. If you monitor any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by EPA.
 3. Calculations for all limitations which require averaging of measurements must use an arithmetic mean and non-detected results must be incorporated in calculations as the limit of quantitation for the analysis.
- E. Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date.
- F. Twenty-four hour reporting.
1. You must report any noncompliance which may endanger health or the environment. Any information must be provided orally within 24 hours

from the time you become aware of the circumstances. A written submission must also be provided within five days of the time you become aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

2. The following shall be included as information which must be reported within 24 hours under this paragraph.
 - a. Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR §122.41(g).)
 - b. Any upset which exceeds any effluent limitation in the permit
 - c. Violation of a maximum daily discharge limitation for any of the pollutants listed by EPA in the permit to be reported within 24 hours. (See 40 CFR §122.44(g).)
 3. EPA may waive the written report on a case-by-case basis for reports under Appendix B, Subsection 12.F.2 if the oral report has been received within 24 hours.
- G. Other noncompliance. You must report all instances of noncompliance not reported under Appendix B, Subsections 12.D, 12.E, and 12.F, at the time monitoring reports are submitted. The reports must contain the information listed in Appendix B, Subsection 12.F.
- H. Other information. Where you become aware that you failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Permitting Authority, you must promptly submit such facts or information.

B.13. Bypass

- A. Definitions.
1. Bypass means the intentional diversion of waste streams from any portion of a treatment facility
 2. Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- B. Bypass not exceeding limitations. You may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential

- maintenance to assure efficient operation. These bypasses are not subject to the provisions of Appendix B, Subsections 13.C and 13.D.
- C. Notice.
1. Anticipated bypass. If you know in advance of the need for a bypass, you must submit prior notice, if possible at least ten days before the date of the bypass.
 2. Unanticipated bypass. You must submit notice of an unanticipated bypass as required in Appendix B, Subsection 12.F (24-hour notice).
- D. Prohibition of bypass.
1. Bypass is prohibited, and EPA may take enforcement action against you for bypass, unless:
 - a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
 - c. You submitted notices as required under Appendix B, Subsection 13.C.
 2. EPA may approve an anticipated bypass, after considering its adverse effects, if EPA determines that it will meet the three conditions listed above in Appendix B, Subsection 13.D.1.

B.14. Upset

- A. Definition. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond your reasonable control. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- B. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Appendix B, Subsection 14.C are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

- C. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
1. An upset occurred and that you can identify the cause(s) of the upset;
 2. The permitted facility was at the time being properly operated; and
 3. You submitted notice of the upset as required in Appendix B, Subsection 12.F.2.b (24 hour notice).
 4. You complied with any remedial measures required under Appendix B, Subsection 4.
- D. Burden of proof. In any enforcement proceeding, you, as the one seeking to establish the occurrence of an upset, has the burden of proof.

APPENDIX C ENDANGERED SPECIES GUIDANCE

A. Background

In order to meet its obligations under the Clean Water Act and the Endangered Species Act (ESA), and to promote the goals of those Acts, the Environmental Protection Agency (EPA) is seeking to ensure the activities regulated by this general permit do not adversely affect endangered and threatened species or critical habitat. Applicants applying for permit coverage must assess the impacts of their stormwater discharges and discharge-related activities on federally listed endangered and threatened species (“listed species”) and designated critical habitat (“critical habitat”) to ensure that those goals are met. Prior to obtaining general permit coverage, applicants must meet the ESA eligibility provisions of this permit by following the steps in this Appendix¹.

Applicants also have an independent ESA obligation to ensure that their activities do not result in any prohibited “take” of listed species². The term “Take” is used in the ESA to include harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. “Harm” is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. “Harass” is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Many of the measures required in this general permit and in these instructions to protect species may also assist in ensuring that the applicant’s activities do not result in a prohibited take of species in violation of section 9 of the ESA. If the applicant has plans or activities in an area where endangered and threatened species are located, they may wish to ensure that they are protected from potential take liability under ESA section 9 by obtaining an ESA section 10 permit or by requesting formal consultation under ESA section 7. Applicants that are unsure whether to pursue a section 10 permit or a section 7 consultation for takings protection should confer with the appropriate United States Fish and Wildlife Service (USFWS) office or the National Marine Fisheries Service (NMFS), (jointly the Services).

Currently, there are 20 species of concern for applicants applying for permit coverage, namely the Dwarf wedgemussel (*Alasmidonta heterodon*), Northeastern bulrush (*Scirpus ancistrochaetus*), Sandplain gerardia (*Agalinis acuta*), Piping Plover (*Charadrius melodus*), Roseate Tern (*Sterna dougallii*), Northern Red-bellied cooter (*Pseudemys rubriventis*), Bog Turtle (*Glyptemys muhlenbergii*), Small whorled Pogonia (*Isotria medeoloides*), Puritan tiger beetle (*Cicindela puritana*), American burying beetle (*Nicrophorus americanus*), Northeastern beach tiger beetle (*Cicindela dorsalis*), Northern Long-eared Bat (*Myotis septentrionalis*), Atlantic Sturgeon (*Acipenser oxyrinchus*), Shortnose Sturgeon (*Acipenser brevirostrum*), North Atlantic Right Whale (*Eubalaena glacialis*), Humpback Whale (*Megaptera novaengliae*), Fin Whale (*Balaenoptera physalus*), Kemp’s Ridley Sea Turtle (*Lepidochelys kempii*), Loggerhead Sea Turtle (*Caretta caretta*), Leatherback Sea Turtle (*Dermochelys coriacea*), and the Green Turtle (*Chelonia*

¹ EPA strongly encourages applicants to begin this process at the earliest possible stage to ensure the notification requirements for general permit coverage are complete upon Notice of Intent (NOI) submission.

² Section 9 of the ESA prohibits any person from “taking” a listed species (e.g. harassing or harming it) unless: (1) the taking is authorized through an “incidental take statement” as part of completion of formal consultation according to ESA section 7; (2) where an incidental take permit is obtained under ESA section 10 (which requires the development of a habitat conversion plan; or (3) where otherwise authorized or exempted under the ESA. This prohibition applies to all entities including private individuals, businesses, and governments.

mydas). The Atlantic Sturgeon, Shortnose Sturgeon, North Atlantic Right Whale, Humpback Whale, Fin Whale, Loggerhead Sea Turtle, Kemp's Ridley Sea Turtle, Leatherback Sea Turtle and Green Turtle are listed under the jurisdiction of NMFS. The Dwarf wedgemussel, Northeastern bulrush, Sandplain gerardia, Piping Plover, Northern Red-bellied cooter, Bog Turtle, Small whorled Pogonia, Roseate Tern, Puritan tiger beetle, Northeastern beach tiger beetle, Northern Long-eared Bat and American burying beetle are listed under the jurisdiction of the U.S. Fish and Wildlife Service.

Any applicant seeking coverage under this general permit, must consult with the Services where appropriate. When listed species are present, permit coverage is only available if EPA determines, or the applicant determines and EPA concurs, that the discharge or discharge related activities will have "no affect" on the listed species or critical habitat, or the applicant or EPA determines that the discharge or discharge related activities are "not likely to adversely affect" listed species or critical habitat and formal or informal consultation with the Services has been concluded and results in written concurrence by the Services that the discharge is "not likely to adversely affect" an endangered or threatened species or critical habitat.

EPA may designate the applicants as non-Federal representatives for the general permit for the purpose of carrying out formal or informal consultation with the Services (See 50 CFR §402.08 and §402.13). By terms of this permit, EPA has automatically designated operators as non-Federal representatives for the purpose of conducting formal or informal consultation with the U.S. Fish and Wildlife Service. EPA has not designated operators as non-Federal representatives for the purpose of conducting formal or informal consultation with the National Marine Fisheries Service. EPA has determined that discharges from MS4s are not likely to adversely affect listed species or critical habitat under the jurisdiction of the National Marine Fisheries Service. EPA has initiated informal consultation with the National Marine Fisheries Service on behalf of all permittees and no further action is required by permittees in order to fulfill ESA requirements of this permit related to species under the jurisdiction of NMFS

B. The U.S. Fish and Wildlife Service ESA Eligibility Process

Before submitting a notice of intent (NOI) for coverage by this permit, applicants must determine whether they meet the ESA eligibility criteria by following the steps in Section B of this Appendix. Applicants that cannot meet the eligibility criteria in Section B must apply for an individual permit.

The USFWS ESA eligibility requirements of this permit relating to the Dwarf wedgemussel, Northeastern bulrush, Sandplain gerardia, Piping Plover, Northern Red-bellied cooter, Bog Turtle, Small whorled Pogonia, Roseate Tern, Puritan tiger beetle, Northeastern beach tiger beetle, Northern Long-eared Bat and American burying beetle may be satisfied by documenting that one of the following criteria has been met:

USFWS Criterion A: No endangered or threatened species or critical habitat are in proximity to the stormwater discharges or discharge related activities.

USFWS Criterion B: In the course of formal or informal consultation with the Fish and Wildlife Service, under section 7 of the ESA, the consultation resulted in either a no jeopardy opinion (formal consultation) or a written concurrence by USFWS on a finding that the stormwater discharges and

discharge related activities are “not likely to adversely affect” listed species or critical habitat (informal consultation).

USFWS Criterion C: Using the best scientific and commercial data available, the effect of the stormwater discharge and discharge related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the applicant and affirmed by EPA, that the stormwater discharges and discharge related activities will have “no affect” on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the USFWS.

1. The Steps to Determine if the USFWS ESA Eligibility Criteria Can Be Met

To determine eligibility, you must assess the potential effects of your known stormwater discharges and discharge related activities on listed species or critical habitat, PRIOR to completing and submitting a Notice of Intent (NOI). You must follow the steps outlined below and document the results of your eligibility determination.

Step 1 – Determine if you can meet USFWS Criterion A

USFWS Criterion A: You can certify eligibility, according to USFWS Criterion A, for coverage by this permit if, upon completing the Information, Planning, and Conservation (IPaC) online system process, you printed and saved the preliminary determination which indicated that federally listed species or designated critical habitats are not present in the action area. See Attachment 1 to Appendix C for instructions on how to use IPaC.

If you have met USFWS Criterion A skip to Step # 4.

If you have not met USFWS Criterion A, go to Step # 2.

Step 2 – Determine if You Can Meet Eligibility USFWS Criteria B

USFWS Criterion B: You can certify eligibility according to USFWS Criteria B for coverage by this permit if you answer “Yes” to **all** of the following questions:

- 1) Does your action area contain one or more of the following species: Sandplain gerardia, Small whorled Pogonia, American burying beetle, Dwarf wedgemussel, Northeastern bulrush, Piping Plover, Northern Red-bellied cooter, Bog Turtle, Roseate Tern, Puritan tiger beetle, and Northeastern beach tiger beetle?
AND
- 2) Did your assessment of the discharge and discharge related activities indicate that the discharge or discharge related activities “may affect” or are “not likely to adversely affect” listed species or critical habitat?
AND
- 3) Did you contact the USFWS and did the formal or informal consultation result in either a “no jeopardy” opinion by the USFWS (for formal consultation) or concurrence by the

USFWS that your activities would be “not likely to adversely affect” listed species or critical habitat (for informal consultation)?

AND

- 4) Do you agree to implement all measures upon which the consultation was conditioned?
- 5) Do you agree that if, during the course of the permit term, you plan to install a structural BMP not identified in the NOI that you will re-initiate informal or formal consultation with USFWS as necessary?

Use the guidance below Step 3 to understand effects determination and to answer these questions.

If you answered “Yes” to all four questions above, you have met eligibility USFWS Criteria B. Skip to Step 4.

If you answered “No” to any of the four questions above, go to Step 3.

Step 3 – Determine if You Can Meet Eligibility USFWS Criterion C

USFWS Criterion C: You can certify eligibility according to USFWS Criterion C for coverage by this permit if you answer “Yes” to both of the following question:

- 1) Does your action area contain one or more of the following species: Northern Long-eared Bat, Sandplain gerardia, Small whorled Pogonia and/or American burying beetle and **does not** contain one any following species: Dwarf wedgemussel, Northeastern bulrush, Piping Plover, Northern Red-bellied cooter, Bog Turtle, Roseate Tern, Puritan tiger beetle, and Northeastern beach tiger beetle?³
- OR
- 2) Did the assessment of your discharge and discharge related activities and indicate that there would be “no affect” on listed species or critical habitat and EPA provided concurrence with your determination?
- 3) Do you agree that if, during the course of the permit term, you plan to install a structural BMP not identified in the NOI that you will to conduct an endangered species screening for the proposed site and contact the USFWS if you determine that the new activity “may affect” or is “not likely to adversely affect” listed species or critical habitat under the jurisdiction of the USFWS.

Use the guidance below to understand effects determination and to answer these questions.

If you answered “Yes” to both the question above, you have met eligibility USFWS Criterion C. Go to Step 4.

If you answered “No” to either of the questions above, you are not eligible for coverage by this permit. You must submit an application for an individual permit for your stormwater discharges. (See 40 CFR 122.21).

USFWS Effects Determination Guidance:

If you are unable to certify eligibility under USFWS Criterion A, you must assess whether your stormwater discharges and discharge-related activities “may affect”, will have “no affect” or are “not likely to adversely affect” listed species or critical habitat. “Discharge-related activities” include: activities which cause, contribute to, or result in point source stormwater pollutant discharges; and measures to provide treatment for stormwater discharges including the siting, construction and operational procedures to control, reduce or prevent water pollution. Please be aware that no protection from incidental take liability is provided under this criterion.

The scope of effects to consider will vary with each system. If you are having difficulty in determining whether your system is likely to cause adverse effects to a listed species or critical habitat, you should contact the USFWS for assistance. In order to complete the determination of effects it may be necessary to follow the formal or informal consultation procedures in section 7 of the ESA.

Upon completion of your assessment, document the results of your effects determination. If your results indicate that stormwater discharges or discharge related activities will have “no affect” on threatened or endangered species or critical habitat and EPA concurs with your determination, you are eligible under USFWS Criterion C of this Appendix. Your determination may be based on measures that you implement to avoid, eliminate, or minimized adverse effects.

If the determination is “May affect” or “not likely to adversely affect” you must contact the USFWS to discuss your findings and measures you could implement to avoid, eliminate, or minimize adverse effects. If you and the USFWS reach agreement on measures to avoid adverse effects, you are eligible under USFWS Criterion B. Any terms and/or conditions to protect listed species and critical habitat that you relied on in order to complete an adverse effects determination, must be incorporated into your Storm Water Management Program (required by this permit) and implemented in order to maintain permit eligibility.

If endangered species issues cannot be resolved: If you cannot reach agreement with the USFWS on measures to avoid or eliminate adverse effects then you are not eligible for coverage under this permit. You must seek coverage under an individual permit.

Effects from stormwater discharges and discharge-related activities which could pose an adverse effect include:

- *Hydrological:* Stormwater discharges may cause siltation, sedimentation, or induce other changes in receiving waters such as temperature, salinity or pH. These effects will vary with the amount of stormwater discharged and the volume and condition of the receiving water. Where a discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely.
- *Habitat:* Excavation, site development, grading and other surface disturbance activities, including the installation or placement of treatment equipment may adversely affect listed species or their habitat. Stormwater from the small MS4 may inundate a listed species habitat.

- *Toxicity*: In some cases, pollutants in the stormwater may have toxic effects on listed species.

Step 4 - Document Results of the Eligibility Determination

Once the USFWS ESA eligibility requirements have been met, you shall include documentation of USFWS ESA eligibility in the Storm Water Management Program required by the permit. Documentation for the various eligibility criteria are as follows:

- USFWS Criterion A: A copy of the IPaC generated preliminary determination letter indicating that no listed species or critical habitat is present within your action area. You shall also include a statement on how you determined that no listed species or critical habitat are in proximity to your stormwater system or discharges.
- USFWS Criterion B: A dated copy of the USFWS letter of concurrence on a finding of “no jeopardy” (for formal consultation) or “not likely to adversely affect” (for informal consultation) regarding the ESA section 7 consultation.
- USFWS Criterion C: A dated copy of the EPA concurrence with the operator’s determination that the stormwater discharges and discharge-related activities will have “no affect” on listed species or critical habitat.

C. Submittal of Notice of Intent

Once the ESA eligibility requirements of Part C of this Appendix have been met you may submit the Notice of Intent indicating which Criterion you have met to be eligible for permit coverage. Signature and submittal of the NOI constitutes your certification, under penalty of law, of eligibility for permit coverage under 40 CFR 122.21.

D. Duty to Implement Terms and Conditions upon which Eligibility was Determined

You must comply with any terms and conditions imposed under the ESA eligibility requirements to ensure that your stormwater discharges and discharge related activities do not pose adverse effects or jeopardy to listed species and/or critical habitat. You must incorporate such terms and conditions into your Storm Water Management Program as required by this permit. If the ESA eligibility requirements of this permit cannot be met, then you may not receive coverage under this permit and must apply for an individual permit.

E. Services Information

United States Fish and Wildlife Service Office

National websites for Endangered Species Information:
Endangered Species home page: <http://endangered.fws.gov>
ESA Section 7 Consultations: <http://endangered.fws.gov/consultation/index.html>
Information, Planning, and Conservation System (IPAC): <http://ecos.fws.gov/ipac/>

U.S. FWS – Region 5
Supervisor

New England Field Office
U.S. Fish and Wildlife Services
70 Commercial Street, Suite 300
Concord, NH 03301

Natural Heritage Network

The Natural Heritage Network comprises 75 independent heritage program organizations located in all 50 states, 10 Canadian provinces, and 12 countries and territories located throughout Latin America and the Caribbean. These programs gather, manage, and distribute detailed information about the biological diversity found within their jurisdictions. Developers, businesses, and public agencies use natural heritage information to comply with environmental laws and to improve the environmental sensitivity of economic development projects. Local governments use the information to aid in land use planning.

The Natural Heritage Network is overseen by NatureServe, the Network's parent organization, and is accessible on-line at: http://www.natureserve.org/nhp/us_programs.htm, which provides websites and other access to a large number of specific biodiversity centers.

U.S. Fish and Wildlife IPaC system instructions

Use the following protocol to determine if any federally listed species or designated critical habitats under USFWS jurisdiction exist in your action area:

Enter your project specific information into the “Initial Project Scoping” feature of the Information, Planning, and Conservation (IPaC) system mapping tool, which can be found at the following location:

<http://ecos.fws.gov/ipac/>

- a. Indicate the action area¹ for the MS4 by either:
 - a. Drawing the boundary on the map or by uploading a shapefile. Select “Continue”

- c. Click on the “SEE RESOURCE LIST” button and on the next screen you can export a trust resources list. This will provide a list of natural resources of concern, which will include an Endangered Species Act Species list. You may also request an official species list under “REGULATORY DOCUMENTS” Save copies and retain for your records

¹ The action area is defined by regulation as all areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action (50 CFR §402.02). This analysis is not limited to the "footprint" of the action nor is it limited by the Federal agency's authority. Rather, it is a biological determination of the reach of the proposed action on listed species. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area.

The documentation used by a Federal action agency to initiate consultation should contain a description of the action area as defined in the Services' regulations and explained in the Services' consultation handbook. If the Services determine that the action area as defined by the action agency is incorrect, the Services should discuss their rationale with the agency or applicant, as appropriate. Reaching agreement on the description of the action area is desirable but ultimately the Services can only consult when an action area is defined properly under the regulations.

For storm water discharges or discharge related activities, the action area should encompass the following:

- The immediate vicinity of, or nearby, the point of discharge into receiving waters.
- The path or immediate area through which or over which storm water flows from the municipality to the point of discharge into the receiving water. This includes areas in the receiving water downstream from the point of discharge.
- Areas that may be impacted by construction or repair activities. This extends as far as effects related to noise (from construction equipment, power tools, etc.) and light (if work is performed at night) may reach.

The action area will vary with the size and location of the outfall pipe, the nature and quantity of the storm water discharges, and the type of receiving waters, among other factors.

Appendix D National Historic Preservation Act Guidance

Background

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of Federal “undertakings” on historic properties that are either listed on, or eligible for listing on, the National Register of Historic Places. The term federal “undertaking” is defined in the NHPA regulations to include a project, activity, or program of a federal agency including those carried out by or on behalf of a federal agency, those carried out with federal financial assistance, and those requiring a federal permit, license or approval. See 36 CFR 800.16(y). Historic properties are defined in the NHPA regulations to include prehistoric or historic districts, sites, buildings, structures, or objects that are included in, or are eligible for inclusion in, the National Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within such properties. See 36 CFR 800.16(1).

EPA’s issuance of a National Pollutant Discharge Elimination System (NPDES) General Permit is a federal undertaking within the meaning of the NHPA regulations and EPA has determined that the activities to be carried out under the general permit require review and consideration, in order to be in compliance with the federal historic preservation laws and regulations. Although individual submissions for authorization under the general permit do not constitute separate federal undertakings, the screening processes provides an appropriate site-specific means of addressing historic property issues in connection with EPA’s issuance of the permit. To address any issues relating to historic properties in connection with the issuance of this permit, EPA has included a screening process for applicants to identify whether properties listed or eligible for listing on the National Register of Historic Places are within the path of their discharges or discharge-related activities (including treatment systems or any BMPs relating to the discharge or treatment process) covered by this permit.

Applicants seeking authorization under this general permit must comply with applicable, State, Tribal, and local laws concerning the protection of historic properties and places and may be required to coordinate with the State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO) and others regarding effects of their discharges on historic properties.

Activities with No Potential to Have an Effect on Historic Properties

A determination that a federal undertaking has no potential to have an effect on historic properties fulfills an agency’s obligations under NHPA. EPA has reason to believe that the vast majority of activities authorized under this general permit will have no potential effects on historic properties. This permit typically authorizes discharges from existing facilities and requires control of the pollutants discharged from the facility. EPA does not anticipate effects on historic properties from the pollutants in the authorized discharges. Thus, to the extent EPA’s issuance of this general permit authorizes discharges of such constituents, confined to existing channels, outfalls or natural drainage areas, the permitting action does not have the potential to cause effects on historical properties.

In addition, the overwhelming majority of sources covered under this permit will be facilities that are seeking renewal of previous permit authorization. These existing dischargers should have already addressed NHPA issues in the previous general permit as they were required to certify that they were either not affecting historic properties or they had obtained written agreement from

the applicable SHPO or THPO regarding methods of mitigating potential impacts. To the extent this permit authorizes renewal of prior coverage without relevant changes in operations the discharge has no potential to have an effect on historic properties.

Activities with Potential to Have an Effect on Historic Properties

EPA believes this permit may have some potential to have an effect on historic properties the applicant undertakes the construction and/or installation of control measures that involve subsurface disturbance that involves less than 1 acre of land. (Ground disturbances of 1 acre or more require coverage under the Construction General Permit.) Where there is disturbance of land through the construction and/or installation of control measures, there is a possibility that artifacts, records, or remains associated with historic properties could be impacted. Therefore, if the applicant is establishing new or altering existing control measures to manage their discharge that will involve subsurface ground disturbance of less than 1 acre, they will need to ensure (1) that historic properties will not be impacted by their activities or (2) that they are in compliance with a written agreement with the SHPO, THPO, or other tribal representative that outlines all measures the applicant will carry out to mitigate or prevent any adverse effects on historic properties.

Examples of Control Measures Which Involve Subsurface Disturbance

The type of control measures that are presumptively expected to cause subsurface ground disturbance include:

- Dikes
- Berms
- Catch basins, drainage inlets
- Ponds, bioretention areas
- Ditches, trenches, channels, swales
- Culverts, pipes
- Land manipulation; contouring, sloping, and grading
- Perimeter Drains
- Installation of manufactured treatment devices

EPA cautions applicants that this list is non-inclusive. Other control measures that involve earth disturbing activities that are not on this list must also be examined for the potential to affect historic properties.

Certification

Upon completion of this screening process the applicant shall certify eligibility for this permit using one of the following criteria on their Notice of Intent for permit coverage:

Criterion A: The discharges do not have the potential to cause effects on historic properties.

Criterion B: A historic survey was conducted. The survey concluded that no historic properties are present. Discharges do not have the potential to cause effects on historic properties.

Criterion C: The discharges and discharge related activities have the potential to have an effect on historic properties, and the applicant has obtained and is in compliance with a written agreement with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (TPHO), or other tribal representative that outlines measures the applicant will carry out to mitigate or prevent any adverse effects on historic properties.

Authorization under the general permit is available only if the applicant certifies and documents permit eligibility using one of the eligibility criteria listed above. Small MS4s that cannot meet any of the eligibility criteria in above must apply for an individual permit.

Screening Process

Applicants or their consultant need to answer the questions and follow the appropriate procedures below to assist EPA in compliance with 36 CFR 800.

Question 1: Is the facility an existing facility authorized by the previous permit or a new facility and the applicant is not undertaking any activity involving subsurface land disturbance less than an acre?

YES - The applicant should certify that fact in writing and file the statement with the EPA. This certification must be maintained as part of the records associated with the permit.

The applicant should certify eligibility for this permit using Criterion A on their Notice of Intent for permit coverage. The applicant does not need to contact the state Historic Commission. Based on that statement, EPA will document that the project has “no potential to cause effects” (36 CFR 800.3(a)(1)). There are no further obligations under the Section 106 regulations.

NO- Go to Question 2.

Question 2: Is the property listed in the National Register of Historic Places or have prior surveys or disturbances revealed the existence of a historic property or artifacts?

NO - The applicant should certify that fact in writing and file the statement with the EPA. This certification must be maintained as part of the records associated with the permit.

The applicant should certify eligibility for this permit using Criterion B on their Notice of Intent for permit coverage. The applicant does not need to contact the state Historic Commission. Based on that statement, EPA will document that the project has “no potential to cause effects” (36 CFR 800.3(a)(1)). There are no further obligations under the Section 106 regulations.

YES - The applicant or their consultant should prepare a complete information submittal to the SHPO. The submittal consists of:

- Completed Project Notification Form- forms available at <http://www.sec.state.ma.us/mhc/mhcform/formidx.htm>;

- USGS map section with the actual project boundaries clearly indicated; and
- Scaled project plans showing existing and proposed conditions.

(1) Please note that the SHPO does not accept email for review. Please mail a paper copy of your submittal (Certified Mail, Return Receipt Requested) or deliver a paper copy of your submittal (and obtain a receipt) to:

State Historic Preservation Officer
Massachusetts Historical Commission
220 Morrissey Blvd.
Boston MA 02125.

(2) Provide a copy of your submittal and the proof of MHC delivery showing the date MHC received your submittal to:

NPDES Permit Branch Chief
US EPA Region 1 (OEP06-1)
5 Post Office Square, Suite 100
Boston MA 02109-3912.

The SHPO will comment within thirty (30) days of receipt of complete submittals, and may ask for additional information. Consultation, as appropriate, will include EPA, the SHPO and other consulting parties (which includes the applicant). The steps in the federal regulations (36 CFR 800.2 to 800.6, etc.) will proceed as necessary to conclude the Section 106 review for the undertaking. **The applicant should certify eligibility for this permit using Criterion C on their Notice of Intent for permit coverage.**

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part I: General Conditions

General Information

Name of Municipality or Organization: State

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:

Fax Number:

Other Information

Check the box if your municipality or organization was covered under the 2003 MS4 General Permit

Stormwater Management Program (SWMP) Location (web address or physical location):

Eligibility Determination

Endangered Species Act (ESA) Determination Complete? Eligibility Criteria (check all that apply): A B C D E F

National Historic Preservation Act (NHPA) Determination Complete? Eligibility Criteria (check all that apply): A B C D

MS4 Infrastructure (if covered under the 2003 permit)

Estimated Percent of Outfall Map Complete? If 100% of 2003 requirements not met, enter an estimated date of completion (MM/DD/YY):

Web address where MS4 map is published:

If outfall map is unavailable on the internet an electronic or paper copy of the outfall map must be included with NOI submission (see section V for submission options)

Regulatory Authorities (if covered under the 2003 permit)

Illicit Discharge Detection and Elimination (IDDE) Authority Adopted?: Effective Date or Estimated Date of Adoption (MM/DD/YY):

Construction/Erosion and Sediment Control (ESC) Authority Adopted?: Effective Date or Estimated Date of Adoption (MM/DD/YY):

Post- Construction Stormwater Management Adopted?: Effective Date or Estimated Date of Adoption (MM/DD/YY):

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)

Part II: Summary of Receiving Waters

Please list the waterbody segments to which your MS4 discharges. For each waterbody segment, please report the number of outfalls discharging into it and, if applicable, any impairments.

For Massachusetts list of impaired waters click here: [Massachusetts 2010 List of Impaired: Waters http://www.mass.gov/dep/water/resources/10list6.pdf](http://www.mass.gov/dep/water/resources/10list6.pdf)

For New Hampshire list of impaired waters click here: [New Hampshire Final 303\(d\) Materials: http://des.nh.gov/organization/divisions/water/wmb/swqa/2010/index.htm](http://des.nh.gov/organization/divisions/water/wmb/swqa/2010/index.htm)

Source of pollutants column should be completed with a preliminary source evaluation of pollutants for discharges to impaired waterbodies (see above 303(d) lists) without an approved TMDL in accordance with Section 2.2.2a of the permit

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Pollutant list (select one at a time to add)	Click impairment at left to add, or at right to remove	Pollutant(s) causing impairment, if applicable (select one at a time to remove)
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	

		<p>Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved</p>	Add/Remove	
		<p>Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved</p>	Add/Remove	
		<p>Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved</p>	Add/Remove	
		<p>Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved</p>	Add/Remove	
		<p>Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved</p>	Add/Remove	
		<p>Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total)</p>	Add/Remove	

		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total) Oxygen, Dissolved	Add/Remove	

Click to lengthen table

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)

Part III: Stormwater Management Program Summary

MCM 2: Public Involvement and Participation

BMP Categorization	Brief BMP Description (enter your own text to override the drop down menu)	Responsible Department/ Parties	Additional Description/ Measurable Goal	Beginning Year of BMP implemen tation
Public Review	SWMP Review			
Public Participation				

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)

Part III: Stormwater Management Program Summary

MCM 3: Illicit Discharge Detection and Elimination (IDDE)

BMP Categorization (enter your own text to override the drop down menu)	BMP Description	Responsible Department/Parties (enter your own text to override the drop down menu)	Measurable Goal (all text can be overwritten)
SSO inventory			Develop SSO inventory within 1 year of effective date of permit
Storm sewer system map			Update map within 2 years of effective date of permit and complete full system map 10 years after effective date of permit
Written IDDE program development			Complete within 1.5 years of the effective date of permit
Implement IDDE Program			Implement catchment investigations according to program and permit conditions
Employee Training			Train annually
Conduct dry weather screening			Conduct in accordance with outfall screening procedure and permit conditions
Conduct wet weather screening			Conduct in accordance with outfall screening procedure and permit conditions
<input type="text"/>		<input type="text"/>	
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Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)

Part III: Stormwater Management Program Summary

MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment

BMP Categorization (enter your own text to override the drop down menu or entered text)	BMP Description	Responsible Department/ Parties (enter your own text to override the drop down menu)	Measurable Goal (all text can be overwritten)	Beginning Year of BMP implementation
As-built plans for on-site stormwater control	The procedures to require submission of as-built drawings and ensure long term operation and maintenance will be a part of the SWMP.		Require submission of as-built plans for completed projects	
Inventory and priority ranking of MS4-owned properties that may be retrofitted with BMPs	Conduct detailed inventory of MS4 owned properties and rank for retrofit potential		Complete 4 years after permit effective date	
Allow green infrastructure	Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist		Complete 4 years after permit effective date	
Street design and parking lot guidelines	Develop a report assessing requirements that affect the creation of impervious cover. The assessment will help determine if changes to design standards for streets and parking lots can be modified to support low impact design options.		Complete 4 years after permit effective date	
Ensure any stormwater controls or management practices for new development and redevelopment will prevent or minimize impacts to water quality.	Adoption, amendment or modification of a regulatory mechanism to meet permit requirements		Complete 2 years after permit effective date	

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)

Part III: Stormwater Management Program Summary

MCM 6: Municipal Good Housekeeping and Pollution Prevention

BMP Categorization (enter your own text to override the drop down menu or entered text)	BMP Description	Responsible Department/ Parties (enter your own text to override the drop down menu)	Measurable Goal (all text can be overwritten)	Beginning Year of BMP implementation
Create written O&M procedures for parks and open spaces, buildings and facilities, and vehicles and equipment			Complete 2 years after permit effective date	
Inventory all permittee-owned parks and open spaces, buildings and facilities (including their storm drains), and vehicles and equipment			Complete 2 years after permit effective date	
Establish and implement program for repair and rehabilitation of MS4 infrastructure			Complete 2 years after permit effective date	
Stormwater Pollution Prevention Plan (SWPPP) for maintenance garages, transfer stations and other waste-handling facilities			Complete 2 years after permit effective date	
Catch Basin Cleaning				
Street Sweeping Program				
Road Salt use optimization program				

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)

Part IV: Notes and additional information

Use the space below to provide any additional information about your MS4 program

Click to add text

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)**Part V: 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:

Title:

Signature Field

Date:

NOI Submission

Please submit the form electronically via email using the "submit by Email" button below or send in a CD with your completed NOI. You may also print and submit via mail at the address below if you choose not to submit electronically. Outfall map required in Part I of the NOI (if applicable) can be submitted electronically as an email attachment OR as a paper copy.

Permittees that choose to submit their NOI electronically by email or by mailing a CD with the completed NOI form to EPA, will be able to download a partially filled Year 1 Annual Report at a later date from EPA.

Submit by Email

Submit by email using this button. Or, send an email with attachments to: stormwater.reports@epa.gov

Save

Save NOI for your records

EPA Submittal Address:

United States Environmental Protection Agency
5 Post Office Square - Suite 100
Mail Code - OEP06-1
Boston, Massachusetts 02109-3912
ATTN: Newton Tedder

State Submittal Address

Massachusetts Department of Environmental Protection
One Winter Street - 5th Floor
Boston, MA 02108
ATTN: Fred Civian

APPENDIX F
Requirements for Discharges to Impaired Waters with an Approved TMDL

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A. Requirements for Discharges to Impaired Waters with an Approved MassDEP In State TMDL

I. Charles River Watershed Phosphorus TMDL Requirements

On October 17, 2007, EPA approved the *Final TMDL for Nutrients in the Lower Charles River Basin* (Lower Charles TMDL)¹ and on June 10, 2011 EPA approved the *Total Maximum Daily Load for Nutrients in the Upper/Middle Charles River* (Upper/Middle Charles TMDL)². The following phosphorus reduction requirements address phosphorus in MS4 discharges.

1. To address the discharge of phosphorus from its MS4, the permittee shall develop a Phosphorus Control Plan (PCP) designed to reduce the amount of phosphorus in stormwater (SW) discharges from its MS4 to the Charles River and its tributaries. The PCP shall be completed in phases and the permittee shall add it as an attachment to its written SWMP upon completion and report in annual reports pursuant to part 4.4 of the Permit on its progress toward achieving its Phosphorus Reduction Requirement. The PCP shall be developed and fully implemented as soon as possible but no later than 20 years after the permit effective date in accordance with the phases and schedule outlined below. Each Phase shall contain the elements required of each phase as described in parts a. through c below. The timing of each phase over 20 years from the permit effective date is:

1-5 years after permit effective date	5-10 years after permit effective date	10-15 years after permit effective date	15-20 years after permit effective date
Create Phase 1 Plan	Implement Phase 1 Plan		
	Create Phase 2 Plan	Implement Phase 2 Plan	
		Create Phase 3 Plan	Implement Phase 3 Plan

a. Phase 1

- 1) The permittee shall complete a written Phase 1 plan of the PCP five years after the permit effective date and fully implement the Phase 1 plan of the PCP as soon as possible but no longer than 10 years after the permit effective date.
- 2) The Phase 1 plan of the PCP shall contain the following elements and has the following required milestones:

Item Number	Phase 1 of the PCP Component and Milestones	Completion Date
1-1	Legal analysis	2 years after permit effective date

¹ Massachusetts Department of Environmental Protection. 2007. *Final TMDL for Nutrients in the Lower Charles River Basin*. CN 301.1

² Massachusetts Department of Environmental Protection. 2011. *Total Maximum Daily Load for Nutrients in the Upper/Middle Charles River Basin, Massachusetts*. CN 272.0

1-2	Funding source assessment.	3 years after permit effective date
1-3	Define scope of PCP (PCP Area) Baseline Phosphorus Load and Phosphorus Reduction Requirement and Allowable Phosphorus Load	4 years after permit effective date
1-4	Description of Phase 1 planned nonstructural controls	5 years after permit effective date
1-5	Description of Phase 1 planned structural controls	5 years after permit effective date
1-6	Description of Operation and Maintenance program for structural controls	5 years after permit effective date
1-7	Phase 1 implementation schedule	5 years after permit effective date
1-8	Estimated cost for implementing Phase 1 of the PCP	5 years after permit effective date
1-9	Complete Written Phase 1 PCP	5 years after permit effective date
1-10	Full implementation of nonstructural controls	6 years after permit effective date
1-11	Performance Evaluation	6, and 7 years after permit effective date
1-12	<p>1. Performance Evaluation.</p> <p>2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the PCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load (P_{allow}) plus the applicable Phosphorus Reduction Requirement (P_{RR}) multiplied by 0.80</p> $P_{exp} \leq P_{allow} + (P_{RR} \times 0.80)$	8 years after permit effective date
1-13	Performance Evaluation	9 years after permit effective date
1-14	<p>1. Performance Evaluation.</p> <p>2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the PCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load (P_{allow}) plus the applicable Phosphorus Reduction Requirement (P_{RR}) multiplied by 0.75</p>	10 years after permit effective date

	$P_{exp} \leq P_{allow} + (P_{RR} \times 0.75)$	
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Table F-1: Phase 1 of the PCP components and Milestones

3) Description of Phase 1 PCP Components

Legal Analysis- The permittee shall develop and implement an analysis that identifies existing regulatory mechanisms available to the MS4 such as by-laws and ordinances, and describes any changes to regulatory mechanisms that may be necessary to effectively implement the entire PCP. This may include the creation or amendment of financial and regulatory authorities. The permittee shall adopt necessary regulatory changes by the end of the permit term.

Funding source assessment – The permittee shall describe known and anticipated funding mechanisms (e.g. general funding, enterprise funding, stormwater utilities) that will be used to fund PCP implementation. The permittee shall describe the steps it will take to implement its funding plan. This may include but is not limited to conceptual development, outreach to affected parties, and development of legal authorities.

Scope of the PCP, Baseline Phosphorus Load (P_{base}), Phosphorus Reduction Requirement (P_{RR}) and Allowable Phosphorus Load (P_{allow}) - The permittee shall indicate the area in which it plans to implement the PCP. The permittee must choose one of the following: (1) to implement its PCP in the entire area within its jurisdiction (for municipalities this would be the municipal boundary) within the Charles River Watershed; or (2) to implement its PCP only in the urbanized area portion of the permittee’s jurisdiction within the Charles River Watershed. The implementation area selected by the permittee is known as the “PCP Area” for that permittee. Table F-2³ and Table F-3⁴ list the permittees subject to phosphorus reduction requirements along with the estimated Baseline Phosphorus Loads in mass/yr, the calculated Allowable Stormwater Phosphorus Load in mass/yr, the Stormwater Phosphorus Reduction Requirement in mass/yr and the respective percent reductions necessary. The two tables contain different reduction requirements for each permittee based on the PCP Area they choose (see above). If the permittee chooses to implement the PCP in its entire jurisdiction, the permittee may demonstrate compliance with the Phosphorus Reduction Requirement and Allowable Phosphorus Load requirements applicable to it through structural and non-structural controls on discharges that occur outside the regulated area. If the permittee chooses to implement the PCP in its regulated area only, the permittee must demonstrate compliance with the Phosphorus Reduction Requirement and Allowable Phosphorus Load requirements applicable to it through structural

³ The estimated Baseline Phosphorus Load, Allowable Phosphorus Load, Phosphorus Reduction Requirement and percent reductions presented in Table F-2 apply to the entire watershed land area that drains to the Charles River and its tributaries within the permittee’s jurisdiction.

⁴ The estimated Baseline Phosphorus Load, Allowable Phosphorus Load, Phosphorus Reduction Requirement and percent reductions presented in Table F-3 apply only to the urbanized area portion of the permittee’s jurisdiction that drains to the Charles River or its tributaries.

and non-structural controls on discharges that occur within the regulated area only.

The permittee shall select the Baseline Phosphorus Load, Stormwater Phosphorus Reduction Requirement and Allowable Phosphorus Load that corresponds to the PCP Area selected. The selected Stormwater Phosphorus Reduction Requirement and Allowable Phosphorus Load will be used to determine compliance with PCP milestones of this Phase and Phase 2 and Phase 3. If the permittee chooses to implement its PCP in all areas within its jurisdiction within the Charles River Watershed, then the permittee shall use Table F-2 to determine the Baseline Phosphorus Load, Stormwater Phosphorus Reduction Requirement and Allowable Phosphorus Load for its PCP Area. If the permittee chooses to implement its PCP only within the regulated area within the Charles River Watershed, then the permittee shall use Table F-3 to determine the Baseline Phosphorus Load, Stormwater Phosphorus Reduction Requirement and Allowable Phosphorus Load for its PCP Area.

The Permittee may submit more accurate land use data from 2005, which is the year chosen as the baseline land use for the purposes of permit compliance, for EPA to recalculate baseline phosphorus stormwater loads for use in future permit reissuances. Updated land use maps, land areas, characteristics, and MS4 area and catchment delineations shall be submitted to EPA along with the year 4 annual report in electronic GIS data layer form for consideration for future permit requirements⁵. Until such a time as future permit requirements reflect information submitted in the year 4 annual report, the permittee shall use the Baseline Phosphorus Load, Stormwater Phosphorus Reduction Requirement and Allowable Phosphorus Load Table F-2 (if its PCP Area is the permittee's entire jurisdiction) or Table F-3 (if its PCP Area is the regulated area only) to calculate compliance with milestones for Phase 1, 2, and 3 of the PCP.

Description of Phase 1 planned non-structural controls – The permittee shall describe the non-structural stormwater control measures necessary to support achievement of the phosphorus export milestones in Table F-1. The description of non-structural controls shall include the planned measures, the areas where the measures will be implemented, and the annual phosphorus reductions that are expected to result from their implementation in units of mass/yr. Annual phosphorus reduction from non-structural BMPs shall be calculated consistent with Attachment 2 to Appendix F.

Description of Phase 1 planned structural controls – The permittee shall develop a priority ranking of areas and infrastructure within the municipality for potential implementation of structural phosphorus controls during Phase 1. The ranking shall be developed through the use of available

⁵ This submission is optional and needs only be done if the permittee has more accurate land use information from 2005 than information provided by MassGIS (<http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/lus2005.html>, retrieved 10/1/2013) or the permittee has updated MS4 drainage area characteristics and the permittee would like to update the Baseline Phosphorus Load.

screening and monitoring results collected during the permit term either by the permittee or another entity and the mapping required pursuant to part 2.3.4.6 of the Permit. The permittee shall also include in this priority ranking a detailed assessment of site suitability for potential phosphorus control measures based on soil types and other factors. The permittee shall coordinate this activity with the requirements of part 2.3.6.8.b of the Permit. A description and the results of this priority ranking shall be included in Phase 1 of the PCP. The permittee shall describe the structural stormwater control measures necessary to support achievement of the phosphorus export milestones in Table F-1. The description of structural controls shall include the planned and existing measures, the areas where the measures will be implemented or are currently implemented, and the annual phosphorus reductions in units of mass/yr that are expected to result from their implementation. Structural measures to be implemented by a third party may be included in a municipal PCP. Annual phosphorus reductions from structural BMPs shall be calculated consistent with Attachment 3 to Appendix F.

Description of Operation and Maintenance (O&M) Program for all planned and existing structural BMPs – The permittee shall establish an Operation and Maintenance Program for all structural BMPs being claimed for phosphorus reduction credit as part of Phase 1 of the PCP. This includes BMPs implemented to date as well as BMPs to be implemented during Phase 1 of the PCP. The Operation and Maintenance Program shall become part of the PCP and include: (1) inspection and maintenance schedule for each BMP according to BMP design or manufacturer specification and (2) program or department responsible for BMP maintenance.

Phase 1 Implementation Schedule – A schedule for implementation of all planned Phase 1 BMPs, including, as appropriate: obtaining funding, training, purchasing, construction, inspections, monitoring, operation and maintenance activities, and other assessment and evaluation components of implementation. Implementation of planned BMPs must begin upon completion of the Phase 1 Plan, and all non-structural BMPs shall be fully implemented within six years of the permit effective date. Structural BMPs shall be designed and constructed to ensure the permittee will comply with the 8 and 10 year phosphorus load milestones established in Table F-1. The Phase 1 plan shall be fully implemented as soon as possible, but no later than 10 years after the effective date of permit.

Estimated cost for implementing Phase 1 of the PCP – The permittee shall estimate the cost of implementing the Phase 1 non-structural and structural controls and associated Operation and Maintenance Program. This cost estimate can be used to assess the validity of the funding source assessment completed by year 3 after the permit effective date and to update funding sources as necessary to complete Phase 1.

Complete written Phase 1 Plan – The permittee must complete the written Phase 1 Plan of the PCP no later than 5 years after the permit effective date. The complete Phase 1 Plan shall include Phase 1 PCP item numbers 1-1 through 1-7 in Table F-1. The permittee shall make the Phase 1 Plan

available to the public for public comment during Phase 1 Plan development. EPA encourages the permittee to post the Phase I Plan online to facilitate public involvement.

Performance Evaluation –The permittee shall evaluate the effectiveness of the PCP by tracking the phosphorus reductions achieved through implementation of structural and non-structural BMPs⁶ and tracking increases resulting from development. Phosphorus reductions shall be calculated consistent with Attachment 2 to Appendix F (non-structural BMP performance) and Attachment 3 to Appendix F (structural BMP performance) for all BMPs implemented to date. Phosphorus export increases since 2005 due to development shall be calculated consistent with Attachment 1 to Appendix F. Phosphorus loading increases and reductions in unit of mass/yr shall be added or subtracted from the applicable Baseline Phosphorus Load given in Table F-2 or Table F-3 depending on the Scope of PCP chosen to estimate the yearly phosphorous export rate from the PCP Area. The permittee shall also include all information required in part I.2 of this Appendix in each performance evaluation. Performance evaluations will be included as part of each permittee’s annual report as required by part 4.4 of the Permit.

Community Annual Stormwater Phosphorus Load Reduction by Permittee, Charles River Watershed				
Community	Baseline Phosphorus Load, kg/yr	Stormwater Phosphorus Load Reduction Requirement kg/yr	Allowable Phosphorus Load, kg/yr	Stormwater Percent Reduction in Phosphorus Load (%)
Arlington	106	57	49	53%
Ashland	67	23	44	34%
Bellingham	947	331	616	35%
Belmont	202	86	116	42%
Brookline	1,635	789	846	48%
Cambridge	512	263	249	51%
Dedham	805	325	480	40%
Dover	831	137	694	17%
Foxborough	2	0	2	0%
Franklin	2,344	818	1,526	35%

⁶ In meeting its phosphorus reduction requirements a permittee may quantify phosphorus reductions by actions undertaken by another entity, except where those actions are credited to MassDOT or another permittee identified in Appendix F Table F-2 or F-3.

Community Annual Stormwater Phosphorus Load Reduction by Permittee, Charles River Watershed				
Community	Baseline Phosphorus Load, kg/yr	Stormwater Phosphorus Load Reduction Requirement kg/yr	Allowable Phosphorus Load, kg/yr	Stormwater Percent Reduction in Phosphorus Load (%)
Holliston	1,543	395	1,148	26%
Hopedale	107	37	70	35%
Hopkinton	292	66	226	22%
Lexington	530	194	336	37%
Lincoln	593	101	492	17%
Medfield	955	277	678	29%
Medway	1,063	314	749	30%
Mendon	29	9	20	31%
Milford	1,611	663	948	41%
Millis	969	248	721	26%
Natick	1,108	385	723	35%
Needham	1,772	796	976	45%
Newton	3,884	1,941	1,943	50%
Norfolk	1,004	232	772	23%
Somerville	646	331	315	51%
Sherborn	846	131	715	16%
Walpole	159	28	131	18%
Waltham	2,901	1,461	1,400	50%
Watertown	1,127	582	545	52%
Wayland	46	15	31	33%
Wellesley	1,431	661	770	46%
Weston	1,174	281	893	24%
Westwood	376	114	262	30%
Wrentham	618	171	447	28%
Mass-DCR	421	91	330	22%

Table F-2: Baseline Phosphorus Load, Phosphorus Reduction Requirement, Allowable Phosphorus Load and Percent Reduction in Phosphorus Load from Charles River Watershed. For use when PCP Area is chosen to be the entire community within the Charles River Watershed.

Urbanized Area Annual Stormwater Phosphorus Load Reduction by Permittee, Charles River Watershed				
Community	Baseline Watershed Phosphorus Load, kg/yr	Stormwater Phosphorus Load Reduction Requirement, kg/yr	Allowable Phosphorus Load, kg/yr	Stormwater Percent Reduction in Phosphorus Load (%)
Arlington	106	57	49	53%
Ashland	67	23	44	34%
Bellingham	801	291	510	36%
Belmont	202	86	116	42%
Brookline	1,635	789	846	48%
Cambridge	512	263	249	51%
Dedham	805	325	480	40%
Dover	282	54	228	19%
Foxborough	2	0	2	0%
Franklin	2,312	813	1,499	35%
Holliston	1,359	369	990	27%
Hopedale	107	37	70	35%
Hopkinton	280	65	215	23%
Lexington	525	193	332	37%
Lincoln	366	63	303	17%
Medfield	827	267	560	33%
Medway	1,037	305	732	29%
Mendon	10	5	5	50%
Milford	1,486	653	833	44%
Millis	501	159	342	32%
Natick	994	359	635	36%
Needham	1,771	795	976	45%
Newton	3,884	1,941	1,943	50%
Norfolk	1,001	231	770	23%
Somerville	646	331	315	51%
Sherborn	203	38	165	19%
Walpole	159	28	131	18%
Waltham	2,901	1,461	1,440	50%
Watertown	1,127	582	545	52%
Wayland	46	15	31	33%
Wellesley	1,431	661	770	46%

Urbanized Area Annual Stormwater Phosphorus Load Reduction by Permittee, Charles River Watershed				
Community	Baseline Watershed Phosphorus Load, kg/yr	Stormwater Phosphorus Load Reduction Requirement, kg/yr	Allowable Phosphorus Load, kg/yr	Stormwater Percent Reduction in Phosphorus Load (%)
Weston	1,174	281	893	24%
Westwood	346	108	238	31%
Wrentham	556	159	397	29%
Mass DCR	396	89	307	22%

Table F-3: Baseline Phosphorus Load, Phosphorus Reduction Requirement, Allowable Phosphorus Load and Percent Reduction in Phosphorus Load from Charles River Watershed. For use when PCP Area is chosen to be only the urbanized area portion of a permittee’s jurisdiction within the Charles River Watershed.

b. Phase 2

- 1) The permittee shall complete the Phase 2 Plan of the PCP 10 years after the permit effective date and fully implement the Phase 2 plan of the PCP as soon as possible but no longer than 15 years after the permit effective date.
- 2) The Phase 2 plan of the PCP shall be added to the Phase 1 Plan and contain the following elements and has the following required milestones:

Item Number	Phase 2 of the PCP Component and Milestones	Completion Date
2-1	Update Legal analysis	As necessary
2-2	Description of Phase 2 planned nonstructural controls	10 years after permit effective date
2-3	Description of Phase 2 planned structural controls	10 years after permit effective date
2-4	Updated description of Operation and Maintenance Program	10 years after permit effective date
2-5	Phase 2 implementation schedule	10 years after permit effective date
2-6	Estimated cost for implementing Phase 2 of the PCP	10 years after permit effective date

2-7	Complete written Phase 2 Plan	10 years after permit effective date
2-8	Performance Evaluation.	11, and 12 years after permit effective date
2-9	<ol style="list-style-type: none"> 1. Performance Evaluation. 2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the PCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load(P_{allow}) plus the applicable Phosphorus Reduction Requirement (P_{RR}) multiplied by 0.65 $P_{exp} \leq P_{allow} + (P_{RR} \times 0.65)$ 	13 years after permit effective date
2-10	Performance Evaluation	14 years after permit effective date
2-11	<ol style="list-style-type: none"> 1. Performance Evaluation. 2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the PCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load(P_{allow}) plus the applicable Phosphorus Reduction Requirement (P_{RR}) multiplied by 0.50 $P_{exp} \leq P_{allow} + (P_{RR} \times 0.50)$ 	15 years after permit effective date

Table F-4: Phase 2 of the PCP components and Milestones

3) Description of Phase 2 PCP Components

Updated Legal Analysis- The permittee shall update the legal analysis completed during Phase 1 of the PCP as necessary to include any new or augmented bylaws, ordinances or funding mechanisms the permittee has deemed necessary to implement the PCP. The permittee shall use experience gained during Phase 1 to inform the updated legal analysis. The permittee shall adopt necessary regulatory changes as soon as possible to implement the Phase 2 Plan.

Description of Phase 2 planned non-structural controls – The permittee shall describe the non-structural stormwater control measures necessary to support achievement of the phosphorus export milestones in Table F-4. The description of non-structural controls shall include the planned measures, the areas where the measures will be implemented, and the annual phosphorus reductions that are expected to result from their implementation in units of mass/yr. Annual phosphorus reduction from non-structural BMPs shall be calculated consistent with Attachment 2 to Appendix F.

Description of planned Phase 2 structural controls – The permittee shall develop a priority ranking of areas and infrastructure within the municipality for potential implementation of phosphorus control practices during Phase 2. The ranking shall build upon the ranking developed for Phase 1. The permittee shall describe the structural stormwater control measures necessary to support achievement of the phosphorus export milestones in Table F-4. The description of structural controls shall include the planned measures, the areas where the measures will be implemented, and the annual phosphorus reductions in units of mass/yr that are expected to result from their implementation. Structural measures to be implemented by a third party⁷ may be included in a municipal PCP. Annual phosphorus reductions from structural BMPs shall be calculated consistent with Attachment 3 to Appendix F.

Updated description of Operation and Maintenance (O&M) Program for all planned and existing structural BMPs – The permittee shall establish an Operation and Maintenance Program for all structural BMPs being claimed for phosphorus reduction credit as part of Phase 1 and 2 of the PCP. This includes BMPs implemented to date as well as BMPs to be implemented during Phase 2 of the PCP. The Operation and Maintenance Program shall become part of the PCP and include: (1) inspection and maintenance schedule for each BMP according to BMP design or manufacturer specification and (2) program or department responsible for BMP maintenance.

Phase 2 Implementation Schedule – A schedule for implementation of all planned Phase 2 BMPs, including, as appropriate: funding, training, purchasing, construction, inspections, monitoring, O&M activities and other assessment and evaluation components of implementation. Implementation of planned BMPs must begin upon completion of the Phase 2 Plan. Structural BMPs shall be designed and constructed to ensure the permittee will comply with the 13 and 15 year milestones established in Table F-4. The Phase 2 plan shall be fully implemented as soon as possible, but no later than 15 years after the effective date of permit.

Estimated cost for implementing Phase 2 of the PCP – The permittee shall estimate the cost of implementing the Phase 2 non-structural and structural controls and associated Operation and Maintenance Program. This cost estimate can be used to plan for the full implementation of Phase 2.

Complete written Phase 2 Plan – The permittee must complete a written Phase 2 Plan of the PCP no later than 10 years after the permit effective date. The complete Phase 2 Plan shall include Phase 2 PCP item numbers 2-1 through 2-6 in Table F-4. The permittee shall make the Phase 2 Plan available to the public for public comment during Phase 2 plan development. EPA encourages the permittee to post the Phase 2 Plan online to facilitate public involvement.

⁷ See footnote 6

Performance Evaluation – The permittee shall evaluate the effectiveness of the PCP by tracking the phosphorus reductions achieved through implementation of structural and non-structural BMPs⁸ and tracking increases resulting from development. Phosphorus reductions shall be calculated consistent with Attachment 2 to Appendix F (non-structural BMP performance) and Attachment 3 to Appendix F (structural BMP performance) for all BMPs implemented to date. Phosphorus export increases due to development shall be calculated consistent with Attachment 1 to Appendix F. Phosphorus loading increases and reductions in unit of mass/yr shall be added or subtracted from the applicable Baseline Phosphorus Load given in Table F-2 or Table F-3 depending on the Scope of PCP chosen to estimate the yearly phosphorous export rate from the PCP Area. The permittee shall also include all information required in part I.2 of this Appendix in each performance evaluation. Performance evaluations will be included as part of each permittee’s annual report as required by part 4.4 of the Permit.

c. Phase 3

- 1) The permittee shall complete the Phase 3 Plan of the PCP 15 years after the permit effective date and fully implement the Phase 3 plan of the PCP as soon as possible but no longer than 20 years after the permit effective date.
- 2) The Phase 3 plan of the PCP shall be added to the Phase 1 Plan and the Phase 2 Plan to create the comprehensive PCP and contain the following elements and has the following required milestones:

Item Number	Phase 3 of the PCP Component and Milestones	Completion Date
3-1	Update Legal analysis	As necessary
3-2	Description of Phase 3 planned nonstructural controls	15 years after permit effective date
3-3	Description of Phase 3 planned structural controls	15 years after permit effective date
3-4	Updated description of Operation and Maintenance (O&M) Program	15 years after permit effective date
3-5	Phase 3 implementation schedule	15 years after permit effective date
3-6	Estimated cost for implementing Phase 3 of the PCP	15 years after permit effective date
3-7	Complete written Phase 3 Plan	15 years after permit effective date

⁸ See footnote 9

3-8	Performance Evaluation.	16, and 17 years after permit effective date
3-9	<ol style="list-style-type: none"> 1. Performance Evaluation. 2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the PCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load (P_{allow}) plus the applicable Phosphorus Reduction Requirement (P_{RR}) multiplied by 0.30 $P_{exp} \leq P_{allow} + (P_{RR} \times 0.30)$ 	18 years after permit effective date
3-10	Performance Evaluation	19 years after permit effective date
3-11	<ol style="list-style-type: none"> 1. Performance Evaluation. 2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the PCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load (P_{allow}) $P_{exp} \leq P_{allow}$ 	20 years after permit effective date

Table F-5:Phase 3 of the PCP components and Milestones

3) Description of Phase 3 PCP Components

Updated Legal Analysis- The permittee shall update the legal analysis completed during Phase 1 and Phase 2 of the PCP as necessary to include any new or augmented bylaws, ordinances or funding mechanisms the permittee has deemed necessary to implement the PCP. The permittee shall use experience gained during Phase 1 and Phase 2 to inform the updated legal analysis. The permittee shall adopt necessary regulatory changes as soon as possible to implement the Phase 3 Plan.

Description of Phase 3 planned non-structural controls – The permittee shall describe the non-structural stormwater control measures necessary to support achievement of the phosphorus export milestones in Table F-5. The description of non-structural controls shall include the planned measures, the areas where the measures will be implemented, and the annual phosphorus reductions that are expected to result from their implementation in units of mass/yr. Annual phosphorus reduction from non-structural BMPs shall be calculated consistent with Attachment 2 to Appendix F.

Description of planned Phase 3 structural controls – The permittee shall develop a priority ranking of areas and infrastructure within the municipality for potential implementation of phosphorus control practices during Phase 3. The ranking shall build upon the ranking developed for

Phase 1 and 2. The permittee shall describe the structural stormwater control measures necessary to support achievement of the phosphorus export milestones in Table F-5. The description of structural controls shall include the planned measures, the areas where the measures will be implemented, and the annual phosphorus reductions in units of mass/yr that are expected to result from their implementation. Structural measures to be implemented by a third party may be included in a municipal PCP. Annual phosphorus reduction from structural BMPs shall be calculated consistent with Attachment 3 to Appendix F.

Updated description of Operation and Maintenance (O&M) Program for all planned and existing structural BMPs – The permittee shall establish an Operation and Maintenance Program for all structural BMPs being claimed for phosphorus reduction credit as part of Phase 1, 2 and 3 of the PCP. This includes BMPs implemented to date as well as BMPs to be implemented during Phase 3 of the PCP. The Operation and Maintenance Program shall become part of the PCP and include: (1) inspection and maintenance schedule for each BMP according to BMP design or manufacturer specification and (2) program or department responsible for BMP maintenance.

Phase 3 Implementation Schedule – A schedule for implementation of all planned Phase 3 BMPs, including, as appropriate: funding, training, purchasing, construction, inspections, monitoring, O&M activities and other assessment and evaluation components of implementation. Implementation of planned BMPs must begin upon completion of the Phase 3 Plan. Structural BMPs shall be designed and constructed to ensure the permittee will comply with the 18 and 20 year milestones established in Table F-5. The Phase 3 plan shall be fully implemented as soon as possible, but no later than 20 years after the effective date of permit.

Estimated cost for implementing Phase 3 of the PCP – The permittee shall estimate the cost of implementing the Phase 3 non-structural and structural controls and associated Operation and Maintenance Program. This cost estimate can be used to plan for the full implementation of Phase 3.

Complete written Phase 3 Plan – The permittee must complete the written Phase 3 Plan of the PCP no later than 15 years after the permit effective date. The complete Phase 3 Plan shall include Phase 3 PCP item numbers 3-1 through 3-6 in Table F-5. The permittee shall make the Phase 3 Plan available to the public for public comment during Phase 3 Plan development. EPA encourages the permittee to post the Phase 3 Plan online to facilitate public involvement.

Performance Evaluation – The permittee shall evaluate the effectiveness of the PCP by tracking the phosphorus reductions achieved through implementation of structural and non-structural BMPs⁹ and tracking increases resulting from development. Phosphorus reductions shall be calculated consistent with Attachment 2 to Appendix F (non-structural BMP

⁹ See footnote 9

performance) and Attachment 3 to Appendix F (structural BMP performance) for all BMPs implemented to date. Phosphorus export increases due to development shall be calculated consistent with Attachment 1 to Appendix F. Phosphorus loading increases and reductions in unit of mass/yr shall be added or subtracted from the applicable Baseline Phosphorus Load given in Table F-2 or Table F-3 depending on the Scope of PCP chosen to estimate the yearly phosphorous export rate from the PCP Area. The permittee shall also include all information required in part I.2 of this Appendix in each performance evaluation. Performance evaluations will be included as part of each permittee’s annual report as required by part 4.4 of the Permit.

2. Reporting

Beginning 1 year after the permit effective date, the permittee shall include a progress report in each annual report on the planning and implementation of the PCP.

Beginning five (5) years after the permit effective date, the permittee shall include the following in each annual report submitted pursuant to part 4.4 of the Permit:

- a. All non-structural control measures implemented during the reporting year along with the phosphorus reduction in mass/yr (P_{NSred}) calculated consistent with Attachment 2 to Appendix F
- b. Structural controls implemented during the reporting year and all previous years including:
 - a. Location information of structural BMPs (GPS coordinates or street address)
 - b. Phosphorus reduction from all structural BMPs implemented to date in mass/yr (P_{Sred}) calculated consistent with Attachment 3 to Appendix F
 - c. Date of last completed maintenance and inspection for each Structural control
- c. Phosphorus load increases due to development over the previous reporting period and incurred since 2005 (P_{DEVinc}) calculated consistent with Attachment 1 to Appendix F.
- d. Estimated yearly phosphorus export rate (P_{exp}) from the PCP Area calculated using Equation 2. Equation 2 calculates the yearly phosphorus export rate by subtracting yearly phosphorus reductions through implemented nonstructural controls and structural controls to date from the Baseline Phosphorus Load and adding loading increases incurred through development to date. This equation shall be used to demonstrate compliance with the phosphorus reduction milestones required as part of each phase of the PCP.

$$P_{exp} \left(\frac{mass}{yr} \right) = P_{base} \left(\frac{mass}{yr} \right) - \left(P_{Sred} \left(\frac{mass}{yr} \right) + P_{NSred} \left(\frac{mass}{yr} \right) \right) + P_{DEVinc} \left(\frac{mass}{yr} \right)$$

Equation 1. Equation used to calculate yearly phosphorus export rate from the chosen PCP Area. P_{exp} =Current phosphorus export rate from the PCP Area in mass/year. P_{base} =baseline phosphorus export rate from LPCP Area in mass/year. P_{Sred} = yearly phosphorus reduction from implemented structural controls in the PCP Area in mass/year. P_{NSred} = yearly phosphorus reduction from implemented non-structural controls in the PCP Area in mass/year. P_{DEVinc} = yearly phosphorus increase resulting from development since 2005 in the PCP Area in mass/year.

- e. Certification that all structural BMPs are being inspected and maintained according to the O&M program specified as part of the PCP. The certification statement shall be:

I certify under penalty of law that all source control and treatment Best Management Practices being claimed for phosphorus reduction credit have been inspected, maintained and repaired in accordance with manufacturer or design specification. I certify that, to the best of my knowledge, all Best Management Practices being claimed for a phosphorus reduction credit are performing as originally designed.

- f. Certification that all municipally owned and maintained turf grass areas are being managed in accordance with Massachusetts Regulation 331 CMR 31 pertaining to proper use of fertilizers on turf grasses (see <http://www.mass.gov/courts/docs/lawlib/300-399cmr/330cmr31.pdf>).

3. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part A.I.1. as follows.

- a. The permittee is relieved of its additional requirements as of the date when the following conditions are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control of phosphorus are necessary for the permittee's discharge based on wasteload allocations in the newly approved TMDL
- b. When the criteria in Appendix F part A.I.3.a. are met, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any remaining requirements of Appendix F part A.I.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part A.I.1 to date to reduce phosphorus in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix F part A.I.1 required to be implemented prior to the date of the newly approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications, and the reporting requirements of Appendix F part I.2. remain in place.

II. Lake and Pond Phosphorus TMDL Requirements

Between 1999 and 2010 EPA has approved 13 Lake TMDLs¹⁰ completed by MassDEP covering 78 lakes and ponds within the Commonwealth of Massachusetts. Any permittee (traditional or non-traditional) that discharges to a waterbody segment in Table F-6 is subject to the requirements of this part.

1. Permittees that operate regulated MS4s (traditional and non-traditional) that discharge to the identified impaired waters or their tributaries must reduce phosphorus discharges to support achievement of phosphorus load reductions identified in the TMDLs. To address phosphorus, all permittees with a phosphorus reduction requirement greater than 0% shall develop a Lake Phosphorus Control Plan (LPCP) designed to reduce the amount of phosphorus in stormwater discharges from its MS4 to the impaired waterbody or its tributaries in accordance with the phosphorus load reduction requirements set forth in Table F-6 below. Permittees discharging to waterbodies in Table F-6 with an associated 0% Phosphorus Required Percent Reduction are subject to Appendix F part II.2.f and are relieved of the requirements of Appendix F part II.1.i through Appendix F part II.2.e Table F-6 identifies the primary municipalities¹¹ located within the watershed of the respective lake or pond and the percent phosphorus reductions necessary from urban stormwater sources. Any permittee (traditional or non-traditional) that discharges to a lake or pond listed in Table F-6 or its tributaries is subject to the same phosphorus percent reduction requirements associated with that lake or pond.

Primary Municipality	Waterbody Name	Required Percent Reduction
Auburn	Leesville Pond	31%
	Auburn Pond	24%
	Eddy Pond	0%
	Pondville Pond	8%
	Stoneville Pond	3%
Charlton	Buffumville Lake	28%
	Dresser Hill Pond	17%
	Gore Pond	14%
	Granite Reservoir	11%
	Jones Pond	13%
	Pierpoint Meadow Pond	27%
Dudley	Gore Pond	14%

¹⁰ Final TMDLs for lakes and ponds in the Northern Blackstone River Watershed, Chicopee Basin, Connecticut Basin, French Basin, Millers Basin and Bare Hill Pond, Flint Pond, Indian Lake, Lake Boon, Leesville Pond, Salisbury Pond, White Island Pond, Quaboag Pond and Quacumquasit Pond can be found here: <http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdl.html>

¹¹ Primary municipalities indicate the municipality in which the majority of the lake or pond is located but does not necessarily indicate each municipality that has urbanized area that discharges to the lake or pond or its tributaries.

Primary Municipality	Waterbody Name	Required Percent Reduction
	Larner Pond	55%
	New Pond	56%
	Pierpoint Meadow Pond	27%
	Shepherd Pond	25%
	Tobins Pond	62%
	Wallis Pond	54%
	Gardner	Hilchey Pond
Parker Pond		47%
Bents Pond		52%
Ramsdall Pond		49%
Grafton	Flint Pond/Lake Quinsigamond	59%
Granby	Aldrich Lake East	0%
Hadley	Lake Warner	24%
Harvard	Bare Hill Pond	2%
Hudson	Lake Boon	28%
Leicester	Smiths Pond	30%
	Southwick Pond	64%
	Cedar Meadow Pond	17%
	Dutton Pond	23%
	Greenville Pond	14%
	Rochdale Pond	8%
Ludlow	Minechoag Pond	48%
Millbury	Brierly Pond	14%
	Dorothy Pond	1%
	Howe Reservoir	48%
Oxford	Buffumville Lake	28%
	Hudson Pond	37%
	Lowes Pond	51%
	McKinstry Pond	79%
	Robinson Pond	8%
	Texas Pond	21%
Shrewsbury	Flint Pond/Lake Quinsigamond	49%
	Jordan Pond	60%
	Mill Pond	43%
	Newton Pond	19%
	Shirley Street Pond	30%
Spencer	Quaboag Pond	29%

Primary Municipality	Waterbody Name	Required Percent Reduction
	Quacumquasit Pond	2%
	Jones Pond	13%
	Sugden Reservoir	31%
Springfield	Loon Pond	10%
	Long Pond	56%
	Mona Lake	57%
Stow	Lake Boon	28%
Templeton	Brazell Pond	62%
	Depot Pond	50%
	Bourn-Hadley Pond	49%
	Greenwood Pond 2	56%
Wilbraham	Spectacle Pond	45%
Winchendon	Lake Denison	22%
	Stoddard Pond	24%
	Whitney Pond	16%
	Whites Mill Pond	21%

Table F-6: Phosphorus impaired Lakes or Ponds subject to a TMDL along with primary municipality and required percent reduction of phosphorus from urban stormwater sources

- i. The LPCP shall be implemented in accordance with the following schedule and contain the following elements:
 - a. LPCP Implementation Schedule – The permittee shall complete its LPCP and fully implement all of the control measures in its LPCP as soon as possible but no later than 15 years after the effective date of the permit.
 - b. The LPCP shall be implemented in accordance with the following schedule and contain the following elements:

Number	LPCP Component and Milestones	Completion Date
1	Legal Analysis	2 years after permit effective date
2	Funding source assessment	3 years after permit effective date
3	Define LPCP scope (LPCP Area)	4 years after permit effective date
4	Calculate Baseline Phosphorus, Allowable Phosphorus Load and Phosphorus Reduction Requirement	4 years after permit effective date

5	Description of planned nonstructural and structural controls	5 years after permit effective date
6	Description of Operation and Maintenance (O&M) Program	5 years after permit effective date
7	Implementation schedule	5 years after permit effective date
8	Cost and Funding Source Assessment	5 years after permit effective date
9	Complete written LPCP	5 years after permit effective date
10	Full implementation of nonstructural controls.	6 years after permit effective date
11	Performance Evaluation.	6 and 7 years after permit effective date
12	<ol style="list-style-type: none"> 1. Performance Evaluation. 2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the LPCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load(P_{allow}) plus the applicable Phosphorus Reduction Requirement (P_{RR}) multiplied by 0.80 $P_{exp} \leq P_{allow} + (P_{RR} \times 0.80)$ 	8 years after permit effective date
13	Performance Evaluation	9 years after permit effective date
14	<ol style="list-style-type: none"> 1. Performance Evaluation. 2. Update LPCP 3. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the LPCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load(P_{allow}) plus the applicable Phosphorus Reduction Requirement (P_{RR}) multiplied by 0.60 $P_{exp} \leq P_{allow} + (P_{RR} \times 0.60)$ OR that the permittee has reduced their phosphorus export rate by 30kg/year (whichever is greater, unless full Phosphorus Reduction Requirement has been met) 	10years after permit effective date
15	Performance Evaluation	11 and 12 years after permit effective date
16	<ol style="list-style-type: none"> 1. Performance Evaluation. 2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the LPCP Area in mass/yr is equal to or less than the applicable Allowable 	13years after permit effective date

	Phosphorus Load(P_{allow}) plus the applicable Phosphorus Reduction Requirement (P_{RR}) multiplied by 0.30 $P_{exp} \leq P_{allow} + (P_{RR} \times 0.30)$	
17	Performance Evaluation	14 years after permit effective date
18	1. Performance Evaluation. 2. Full implementation of all structural controls used to demonstrate that the total phosphorus export rate (P_{exp}) from the LPCP Area in mass/yr is equal to or less than the applicable Allowable Phosphorus Load(P_{allow}) $P_{exp} \leq P_{allow}$	15 years after permit effective date

Table F-7: LPCP components and milestones

c. Description of LPCP Components:

Legal Analysis- The permittee shall develop and implement an analysis that identifies existing regulatory mechanisms available to the MS4 such as by-laws and ordinances and describes any changes to these regulatory mechanisms that may be necessary to effectively implement the LPCP. This may include the creation or amendment of financial and regulatory authorities. The permittee shall adopt necessary regulatory changes by the end of the permit term.

Scope of the LPCP (LPCP Area) - The permittee shall indicate the area in which the permittee plans to implement the LPCP, this area is known as the “LPCP Area”. The permittee must choose one of the following: 1) to implement its LPCP in the entire area within its jurisdiction discharging to the impaired waterbody (for a municipality this would be the municipal boundary) or 2) to implement its LPCP in only the urbanized area portion of its jurisdiction discharging to the impaired waterbody. If the permittee chooses to implement the LPCP in its entire jurisdiction discharging to the impaired waterbody, the permittee may demonstrate compliance with the Phosphorus Reduction Requirement and Allowable Phosphorus Load requirements applicable to it through structural and non-structural controls on discharges that occur both inside and outside the urbanized area. If the permittee chooses to implement the LPCP in its urbanized area only discharging to the impaired waterbody, the permittee must demonstrate compliance with the Phosphorus Reduction Requirement and Allowable Phosphorus Load requirements applicable to it through structural and non-structural controls on discharges that occur within the urbanized area only.

Calculate Baseline Phosphorus Load (P_{base}), Phosphorus Reduction Requirement (P_{RR}) and Allowable Phosphorus Load (P_{allow}) –Permittees shall calculate their numerical Allowable Phosphorus Load and Phosphorus Reduction Requirement in mass/yr by first estimating their Baseline Phosphorus Load in mass/yr from its LPCP Area consistent with the methodology in Attachment 1 to Appendix F, the baseline shall only be estimated using land use phosphorus export coefficients in Attachment 1 to Appendix F and not account for phosphorus reductions resulting from implemented structural BMPs completed to date. Table F-6 contains the

percent phosphorus reduction required from urban stormwater consistent with the TMDL of each impaired waterbody. The permittee shall apply the applicable required percent reduction in Table F-6 to the calculated Baseline Phosphorus Load to obtain the permittee specific Allowable Phosphorus Load. The Allowable Phosphorus Load shall then be subtracted from the Baseline Phosphorus Load to obtain the permittee specific Phosphorus Reduction Requirement in mass/yr.

Description of planned non-structural controls – The permittee shall describe the non-structural stormwater control measures to be implemented to support the achievement of the milestones in Table F-7. The description of non-structural controls shall include the planned measures, the areas where the measures will be implemented, and the annual phosphorus reductions that are expected to result from their implementation. Annual phosphorus reduction from non-structural BMPs shall be calculated consistent with Attachment 2 to Appendix F. The permittee shall update the description of planned non-structural controls as needed to support the achievement of the milestones in Table F-7, including an update in the updated written LPCP 10 years after the permit effective date.

Description of planned structural controls – The permittee shall develop a priority ranking of areas and infrastructure within the municipality for potential implementation of phosphorus control practices. The ranking shall be developed through the use of available screening and monitoring results collected during the permit term either by the permittee or another entity and the mapping required pursuant to part 2.3.4.6 of the Permit. The permittee shall also include in this prioritization a detailed assessment of site suitability for potential phosphorus control measures based on soil types and other factors. The permittee shall coordinate this activity with the requirements of part 2.3.6.8.b of the Permit. A description and the result of this priority ranking shall be included in the LPCP. The permittee shall describe the structural stormwater control measures necessary to support achievement of the milestones in Table F-7. The description of structural controls shall include the planned measures, the areas where the measures will be implemented, and the annual phosphorus reductions in units of mass/yr that are expected to result from their implementation. Structural measures to be implemented by a third party may be included in the LPCP. Annual phosphorus reduction from structural BMPs shall be calculated consistent with Attachment 3 to Appendix F. The permittee shall update the description of planned structural controls as needed to support the achievement of the milestones in Table F-7, including an update in the updated written LPCP 10 years after the permit effective date.

Description of Operation and Maintenance (O&M) Program for all planned and existing structural BMPs – The permittee shall establish an Operation and Maintenance Program for all structural BMPs being claimed for phosphorus reduction credit as part of Phase 1 and 2 of the PCP. This includes BMPs implemented to date as well as BMPs to be implemented during Phase 2 of the PCP. The Operation and Maintenance Program shall become part of the PCP and include: (1) inspection and maintenance schedule for each BMP according to BMP design or manufacturer specification and (2) program or department responsible for BMP maintenance.

Implementation Schedule – An initial schedule for implementing the BMPs, including, as appropriate: funding, training, purchasing, construction, inspections, monitoring, O&M and other assessment and evaluation components of implementation. Implementation of planned BMPs must begin upon completion of the LPCP, and all non-structural BMPs shall be fully implemented within six years of the permit effective date. Where planned structural BMP retrofits or major drainage infrastructure projects are expected to take additional time to construct, the permittee shall within four years of the effective date of the permit have a schedule for completion of construction consistent with the reduction requirements in Table F-7. The permittee shall complete the implementation of its LPCP as soon as possible or at a minimum in accordance with the milestones set forth in Table F-7. The implementation schedule shall be updated as needed to support the achievement of the milestones in Table F-7, including an update in the updated written LPCP 10 years after the permit effective date.

Cost and funding source assessment – The permittee shall estimate the cost for implementing its LPCP and describe known and anticipated funding mechanisms. The permittee shall describe the steps it will take to implement its funding plan. This may include but is not limited to conceptual development, outreach to affected parties, and development of legal authorities.

Complete written LPCP – The permittee must complete the written LPCP 5 years after permit effective date. The complete LPCP shall include item numbers 1-8 in Table F-7. The permittee shall make the LPCP available to the public for public comment during the LPCP development. EPA encourages the permittee to post the LPCP online to facilitate public involvement. The LPCP shall be updated as needed with an update 10 years after the permit effective date at a minimum to reflect changes in BMP implementation to support achievement of the phosphorus export milestones in Table F-7. The updated LPCP shall build upon the original LPCP and include additional or new BMPs the permittee will use to support the achievement of the milestones in Table F-7.

Performance Evaluation – The permittee shall evaluate the effectiveness of the LPCP by tracking the phosphorus reductions achieved through implementation of structural and non-structural BMPs¹² and tracking increases in phosphorus loading from the LPCP Area beginning six years after the effective date of the permit. Phosphorus reductions shall be calculated consistent with Attachment 2 (non-structural BMP performance), Attachment 3 (structural BMP performance) and Attachment 1 (reductions through land use change), to Appendix F for all BMPs implemented to date¹³. Phosphorus load increases resulting from development shall be calculated consistent with Attachment 1 to Appendix F. Phosphorus

¹² In meeting its phosphorus reduction requirements a permittee may quantify phosphorus reductions by actions undertaken by another entity, except where those actions are credited to MassDOT or another permittee identified in Appendix F Table F-7

¹³ Annual phosphorus reductions from structural BMPs installed in the LPCP Area prior to the effective date of this permit shall be calculated consistent with Attachment 3 to Appendix F. Phosphorus Reduction Credit for previously installed BMPs will only be given if the Permittee demonstrates that the BMP is performing up to design specifications and certifies that the BMP is properly maintained and inspected according to manufacturer design or specifications. This certification shall be part of the annual performance evaluation during the year credit is claimed for the previously installed BMP.

loading increases and reductions in units of mass/yr shall be added or subtracted from the calculated Baseline Phosphorus Load to estimate the yearly phosphorous export rate from the LPCP Area in mass/yr. The permittee shall also include all information required in part II.2 of this Appendix in each performance evaluation.

2. Reporting

Beginning 1 year after the permit effective date, the permittee shall include a progress report in each annual report on the planning and implementation of the LPCP.

Beginning five (5) years after the permit effective date, the permittee shall include the following in each annual report submitted pursuant to part 4.4 of the Permit:

- a. All non-structural control measures implemented during the reporting year along with the phosphorus reduction in mass/yr (P_{NSred}) calculated consistent with Attachment 2 to Appendix F
- b. Structural controls implemented during the reporting year and all previous years including:
 - a. Location information of structural BMPs (GPS coordinates or street address)
 - b. Phosphorus reduction from all structural BMPs implemented to date in mass/yr (P_{Sred}) calculated consistent with Attachment 3 to Appendix F
 - c. Date of last completed maintenance for each Structural control
- c. Phosphorus load increases due to development over the previous reporting period and incurred to date (P_{DEVinc}) calculated consistent with Attachment 1 to Appendix F.
- d. Estimated yearly phosphorus export rate (P_{exp}) from the LPCP Area calculated using Equation 2. Equation 2 calculates the yearly phosphorus export rate by subtracting yearly phosphorus reductions through implemented nonstructural controls and structural controls to date from the Baseline Phosphorus Load and adding loading increases incurred through development to date. This equation shall be used to demonstrate compliance with the phosphorus reduction milestones required as part of each phase of the LPCP.

$$P_{exp} \left(\frac{\text{mass}}{\text{yr}} \right) = P_{base} \left(\frac{\text{mass}}{\text{yr}} \right) - \left(P_{Sred} \left(\frac{\text{mass}}{\text{yr}} \right) + P_{NSred} \left(\frac{\text{mass}}{\text{yr}} \right) \right) + P_{DEVinc} \left(\frac{\text{mass}}{\text{yr}} \right)$$

Equation 2. Equation used to calculate yearly phosphorus export rate from the chosen LPCP Area. P_{exp} =Current phosphorus export rate from the LPCP Area in mass/year. P_{base} =baseline phosphorus export rate from LPCP Area in mass/year. P_{Sred} = yearly phosphorus reduction from implemented structural controls in the LPCP Area in mass/year. P_{NSred} = yearly phosphorus reduction from implemented non-structural controls in the LPCP Area in mass/year. Area in mass/year. P_{DEVinc} = yearly phosphorus increase resulting from development since the year baseline loading was calculated in the LPCP Area in mass/year.

- e. Certification that all structural BMPs are being inspected and maintained according to the O&M program specified as part of the PCP. The certification statement shall be:

I certify under penalty of law that all source control and treatment Best Management Practices being claimed for phosphorus reduction credit have been inspected, maintained and repaired in accordance with manufacturer or design specification. I certify that, to the best of my knowledge, all Best Management

Practices being claimed for a phosphorus reduction credit are performing as originally designed.

- f. Certification that all municipally owned and maintained turf grass areas are being managed in accordance with Massachusetts Regulation 331 CMR 31 pertaining to proper use of fertilizers on turf grasses (see <http://www.mass.gov/courts/docs/lawlib/300-399cmr/330cmr31.pdf>).
3. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part A.II.1. as follows:
 - a. The permittee is relieved of its additional requirements as of the date when the following conditions are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control of phosphorus are necessary for the permittee's discharge based on wasteload allocations in the newly approved TMDL
 - b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any additional remaining requirements of Appendix F part A.II.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part A.II.1 to date to reduce phosphorus in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix F part A.I.1 required to be implemented prior to the date of the newly approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications, and the reporting requirements of Appendix F part A.II.2. remain in place.

III. Bacteria and Pathogen TMDL Requirements

There are currently approved 16 approved bacteria (fecal coliform bacteria) or mixed pathogen (fecal coliform, E. coli, and/or enterococcus bacteria) TMDLs for certain waterbodies in Massachusetts.¹⁴ Any permittee (traditional or non-traditional) that discharges to a waterbody segment in Table F-8 is subject to the requirements of this part.

1. Traditional and non-traditional MS4s operating in the municipalities listed in Table F-8 and/or that discharge to a waterbody listed on Table F-8 shall comply with the following BMPs in addition to the requirements of part 2.3 of the Permit, as described below:

- a. Enhanced BMPs

- i. Enhancement of BMPs required by part 2.3 of the permit that shall be implemented during this permit term:

1. part 2.3.3. Public Education: The permittee shall supplement its Residential program with an annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate. The permittee or its agents shall disseminate educational materials to dog owners at the time of issuance or renewal of a dog license, or other appropriate time. Education materials shall describe the detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for non-compliance. The permittee shall also provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria or pathogens. All public education messages can be combined with requirements of Appendix H part I, II and III as well as Appendix F part A.IV, A.V, B.I, B.II and B.III where appropriate.
2. part 2.3.4 Illicit Discharge: Catchments draining to any waterbody impaired for bacteria or pathogens shall be designated either Problem Catchments or HIGH priority in implementation of the IDDE program.

Primary Municipality	Segment ID	Waterbody Name	Indicator Organism
Abington	MA62-09	Beaver Brook	Escherichia Coli (E. Coli)
Abington	MA62-33	Shumatuscant River	Escherichia Coli (E. Coli)
Acushnet	MA95-31	Acushnet River	Escherichia Coli (E. Coli)
Acushnet	MA95-32	Acushnet River	Escherichia Coli (E. Coli)
Acushnet	MA95-33	Acushnet River	Fecal Coliform

¹⁴ Final bacteria or pathogen TMDLs can be found here: <http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdls.html>

Andover	MA83-04	Rogers Brook	Fecal Coliform
Andover	MA83-15	Unnamed Tributary	Fecal Coliform
Andover	MA83-18	Shawsheen River	Fecal Coliform
Andover	MA83-19	Shawsheen River	Fecal Coliform
Avon	MA62-07	Trout Brook	Escherichia Coli (E. Coli)
Barnstable	MA96-01	Barnstable Harbor	Fecal Coliform
Barnstable	MA96-02	Bumps River	Fecal Coliform
Barnstable	MA96-04	Centerville River	Fecal Coliform
Barnstable	MA96-05	Hyannis Harbor	Fecal Coliform
Barnstable	MA96-06	Maraspin Creek	Fecal Coliform
Barnstable	MA96-07	Prince Cove	Fecal Coliform
Barnstable	MA96-08	Shoestring Bay	Fecal Coliform
Barnstable	MA96-36	Lewis Bay	Fecal Coliform
Barnstable	MA96-37	Mill Creek	Fecal Coliform
Barnstable	MA96-63	Cotuit Bay	Fecal Coliform
Barnstable	MA96-64	Seapuit River	Fecal Coliform
Barnstable	MA96-66	North Bay	Fecal Coliform
Barnstable	MA96-81	Snows Creek	Fecal Coliform
Barnstable	MA96-82	Hyannis Inner Harbor	Fecal Coliform
Barnstable	MA96-92	Santuit River	Fecal Coliform
Barnstable	MA96-93	Halls Creek	Fecal Coliform
Barnstable	MA96-94	Stewarts Creek	Fecal Coliform
Bedford	MA83-01	Shawsheen River	Fecal Coliform
Bedford	MA83-05	Elm Brook	Fecal Coliform
Bedford	MA83-06	Vine Brook	Fecal Coliform
Bedford	MA83-08	Shawsheen River	Fecal Coliform
Bedford	MA83-10	Kiln Brook	Fecal Coliform
Bedford	MA83-14	Spring Brook	Fecal Coliform
Bedford	MA83-17	Shawsheen River	Fecal Coliform
Bellingham	MA72-03	Charles River	Pathogens
Bellingham	MA72-04	Charles River	Pathogens
Belmont	MA72-28	Beaver Brook	Pathogens
Berkley	MA62-02	Taunton River	Fecal Coliform
Berkley	MA62-03	Taunton River	Fecal Coliform
Berkley	MA62-20	Assonet River	Fecal Coliform
Beverly	MA93-08	Bass River	Fecal Coliform
Beverly	MA93-09	Danvers River	Fecal Coliform
Beverly	MA93-20	Beverly Harbor	Fecal Coliform
Beverly	MA93-25	Salem Sound	Fecal Coliform
Billerica	MA83-14	Spring Brook	Fecal Coliform
Billerica	MA83-17	Shawsheen River	Fecal Coliform

Billerica	MA83-18	Shawsheen River	Fecal Coliform
Bourne	MA95-01	Buttermilk Bay	Fecal Coliform
Bourne	MA95-14	Cape Cod Canal	Fecal Coliform
Bourne	MA95-15	Phinneys Harbor	Fecal Coliform
Bourne	MA95-16	Pocasset River	Fecal Coliform
Bourne	MA95-17	Pocasset Harbor	Fecal Coliform
Bourne	MA95-18	Red Brook Harbor	Fecal Coliform
Bourne	MA95-47	Back River	Fecal Coliform
Bourne	MA95-48	Eel Pond	Fecal Coliform
Brewster	MA96-09	Quivett Creek	Fecal Coliform
Brewster	MA96-27	Namskaket Creek	Fecal Coliform
Bridgewater	MA62-32	Matfield River	Escherichia Coli (E. Coli)
Brockton	MA62-05	Salisbury Plain River	Escherichia Coli (E. Coli)
Brockton	MA62-06	Salisbury Plain River	Escherichia Coli (E. Coli)
Brockton	MA62-07	Trout Brook	Escherichia Coli (E. Coli)
Brockton	MA62-08	Salisbury Brook	Escherichia Coli (E. Coli)
Brockton	MA62-09	Beaver Brook	Escherichia Coli (E. Coli)
Brookline	MA72-11	Muddy River	Pathogens
Burlington	MA83-06	Vine Brook	Fecal Coliform
Burlington	MA83-11	Long Meadow Brook	Fecal Coliform
Burlington	MA83-13	Sandy Brook	Fecal Coliform
Cambridge	MA72-36	Charles River	Pathogens
Cambridge	MA72-38	Charles River	Pathogens
Canton	MA73-01	Neponset River	Fecal Coliform
Canton	MA73-01	Neponset River	Escherichia Coli (E. Coli)
Canton	MA73-02	Neponset River	Fecal Coliform
Canton	MA73-05	East Branch	Fecal Coliform
Canton	MA73-20	Beaver Meadow Brook	Fecal Coliform
Canton	MA73-22	Pequid Brook	Fecal Coliform
Canton	MA73-25	Pecunit Brook	Escherichia Coli (E. Coli)
Canton	MA73-27	Ponkapog Brook	Fecal Coliform
Chatham	MA96-11	Stage Harbor	Fecal Coliform
Chatham	MA96-41	Mill Creek	Fecal Coliform
Chatham	MA96-42	Taylors Pond	Fecal Coliform
Chatham	MA96-43	Harding Beach Pond	Fecal Coliform
Chatham	MA96-44	Bucks Creek	Fecal Coliform
Chatham	MA96-45	Oyster Pond	Fecal Coliform
Chatham	MA96-46	Oyster Pond River	Fecal Coliform
Chatham	MA96-49	Frost Fish Creek	Pathogens
Chatham	MA96-50	Ryder Cove	Fecal Coliform
Chatham	MA96-51	Muddy Creek	Pathogens

Chatham	MA96-79	Cockle Cove Creek	Fecal Coliform
Chatham	MA96-79	Cockle Cove Creek	Enterococcus Bacteria
Cohasset	MA94-01	Cohasset Harbor	Fecal Coliform
Cohasset	MA94-19	The Gulf	Fecal Coliform
Cohasset	MA94-20	Little Harbor	Fecal Coliform
Cohasset	MA94-32	Cohasset Cove	Fecal Coliform
Concord	MA83-05	Elm Brook	Fecal Coliform
Danvers	MA93-01	Waters River	Fecal Coliform
Danvers	MA93-02	Crane Brook	Escherichia Coli (E. Coli)
Danvers	MA93-04	Porter River	Fecal Coliform
Danvers	MA93-09	Danvers River	Fecal Coliform
Danvers	MA93-36	Frost Fish Brook	Escherichia Coli (E. Coli)
Danvers	MA93-41	Crane River	Fecal Coliform
Dartmouth	MA95-13	Buttonwood Brook	Escherichia Coli (E. Coli)
Dartmouth	MA95-34	Slocums River	Fecal Coliform
Dartmouth	MA95-38	Clarks Cove	Fecal Coliform
Dartmouth	MA95-39	Apponagansett Bay	Fecal Coliform
Dartmouth	MA95-40	East Branch Westport River	Escherichia Coli (E. Coli)
Dartmouth	MA95-62	Buzzards Bay	Fecal Coliform
Dedham	MA72-07	Charles River	Pathogens
Dedham	MA72-21	Rock Meadow Brook	Pathogens
Dedham	MA73-02	Neponset River	Fecal Coliform
Dennis	MA96-09	Quivett Creek	Fecal Coliform
Dennis	MA96-12	Bass River	Fecal Coliform
Dennis	MA96-13	Sesuit Creek	Fecal Coliform
Dennis	MA96-14	Swan Pond River	Fecal Coliform
Dennis	MA96-35	Chase Garden Creek	Fecal Coliform
Dighton	MA62-02	Taunton River	Fecal Coliform
Dighton	MA62-03	Taunton River	Fecal Coliform
Dighton	MA62-50	Broad Cove	Fecal Coliform
Dighton	MA62-51	Muddy Cove Brook	Fecal Coliform
Dighton	MA62-55	Segreganset River	Fecal Coliform
Dighton	MA62-56	Three Mile River	Escherichia Coli (E. Coli)
Dighton	MA62-57	Three Mile River	Fecal Coliform
Dover	MA72-05	Charles River	Pathogens
Dover	MA72-06	Charles River	Pathogens
Duxbury	MA94-15	Duxbury Bay	Fecal Coliform
Duxbury	MA94-30	Bluefish River	Fecal Coliform
East Bridgewater	MA62-06	Salisbury Plain River	Escherichia Coli (E. Coli)
East Bridgewater	MA62-09	Beaver Brook	Escherichia Coli (E. Coli)
East Bridgewater	MA62-32	Matfield River	Escherichia Coli (E. Coli)

East Bridgewater	MA62-33	Shumatuscacant River	Escherichia Coli (E. Coli)
East Bridgewater	MA62-38	Meadow Brook	Escherichia Coli (E. Coli)
Eastham	MA96-15	Boat Meadow River	Fecal Coliform
Eastham	MA96-16	Rock Harbor Creek	Fecal Coliform
Eastham	MA96-34	Wellfleet Harbor	Fecal Coliform
Eastham	MA96-68	Town Cove	Fecal Coliform
Essex	MA93-11	Essex River	Fecal Coliform
Essex	MA93-16	Essex Bay	Fecal Coliform
Essex	MA93-45	Alewife Brook	Escherichia Coli (E. Coli)
Essex	MA93-46	Alewife Brook	Fecal Coliform
Everett	MA93-51	Unnamed Tributary	Enterococcus Bacteria
Fairhaven	MA95-33	Acushnet River	Fecal Coliform
Fairhaven	MA95-42	New Bedford Inner Harbor	Fecal Coliform
Fairhaven	MA95-62	Buzzards Bay	Fecal Coliform
Fairhaven	MA95-63	Outer New Bedford Harbor	Fecal Coliform
Fairhaven	MA95-64	Little Bay	Fecal Coliform
Fairhaven	MA95-65	Nasketucket Bay	Fecal Coliform
Fall River	MA61-06	Mount Hope Bay	Fecal Coliform
Fall River	MA62-04	Taunton River	Fecal Coliform
Falmouth	MA95-20	Wild Harbor	Fecal Coliform
Falmouth	MA95-21	Herring Brook	Fecal Coliform
Falmouth	MA95-22	West Falmouth Harbor	Fecal Coliform
Falmouth	MA95-23	Great Sippewisset Creek	Fecal Coliform
Falmouth	MA95-24	Little Sippewisset Marsh	Fecal Coliform
Falmouth	MA95-25	Quissett Harbor	Fecal Coliform
Falmouth	MA95-46	Harbor Head	Fecal Coliform
Falmouth	MA96-17	Falmouth Inner Harbor	Fecal Coliform
Falmouth	MA96-18	Great Harbor	Fecal Coliform
Falmouth	MA96-19	Little Harbor	Fecal Coliform
Falmouth	MA96-20	Quashnet River	Fecal Coliform
Falmouth	MA96-21	Waquoit Bay	Fecal Coliform
Falmouth	MA96-53	Perch Pond	Fecal Coliform
Falmouth	MA96-54	Great Pond	Fecal Coliform
Falmouth	MA96-55	Green Pond	Fecal Coliform
Falmouth	MA96-56	Little Pond	Fecal Coliform
Falmouth	MA96-57	Bournes Pond	Fecal Coliform
Falmouth	MA96-58	Hamblin Pond	Fecal Coliform
Falmouth	MA96-62	Oyster Pond	Fecal Coliform
Foxborough	MA62-39	Rumford River	Escherichia Coli (E. Coli)
Foxborough	MA62-47	Wading River	Escherichia Coli (E. Coli)
Foxborough	MA73-01	Neponset River	Fecal Coliform

Foxborough	MA73-01	Neponset River	Escherichia Coli (E. Coli)
Franklin	MA72-04	Charles River	Pathogens
Freetown	MA62-04	Taunton River	Fecal Coliform
Freetown	MA62-20	Assonet River	Fecal Coliform
Gloucester	MA93-12	Annisquam River	Fecal Coliform
Gloucester	MA93-16	Essex Bay	Fecal Coliform
Gloucester	MA93-18	Gloucester Harbor	Fecal Coliform
Gloucester	MA93-28	Mill River	Fecal Coliform
Hanover	MA94-05	North River	Fecal Coliform
Hanover	MA94-21	Drinkwater River	Escherichia Coli (E. Coli)
Hanover	MA94-24	Iron Mine Brook	Escherichia Coli (E. Coli)
Hanover	MA94-27	Third Herring Brook	Escherichia Coli (E. Coli)
Hanson	MA62-33	Shumatuscant River	Escherichia Coli (E. Coli)
Harwich	MA96-22	Herring River	Fecal Coliform
Harwich	MA96-23	Saquatucket Harbor	Fecal Coliform
Harwich	MA96-51	Muddy Creek	Pathogens
Holliston	MA72-16	Bogastow Brook	Pathogens
Hopedale	MA72-03	Charles River	Pathogens
Hopkinton	MA72-01	Charles River	Pathogens
Ipswich	MA93-16	Essex Bay	Fecal Coliform
Kingston	MA94-14	Jones River	Fecal Coliform
Kingston	MA94-15	Duxbury Bay	Fecal Coliform
Lawrence	MA83-19	Shawsheen River	Fecal Coliform
Lexington	MA72-28	Beaver Brook	Pathogens
Lexington	MA83-06	Vine Brook	Fecal Coliform
Lexington	MA83-10	Kiln Brook	Fecal Coliform
Lincoln	MA83-05	Elm Brook	Fecal Coliform
Lincoln	MA83-08	Shawsheen River	Fecal Coliform
Lynn	MA93-24	Nahant Bay	Fecal Coliform
Lynn	MA93-44	Saugus River	Fecal Coliform
Lynn	MA93-52	Lynn Harbor	Fecal Coliform
Lynnfield	MA93-30	Beaverdam Brook	Escherichia Coli (E. Coli)
Lynnfield	MA93-32	Hawkes Brook	Escherichia Coli (E. Coli)
Lynnfield	MA93-34	Saugus River	Escherichia Coli (E. Coli)
Lynnfield	MA93-35	Saugus River	Escherichia Coli (E. Coli)
Malden	MA93-51	Unnamed Tributary	Enterococcus Bacteria
Manchester	MA93-19	Manchester Harbor	Fecal Coliform
Manchester	MA93-25	Salem Sound	Fecal Coliform
Manchester	MA93-29	Cat Brook	Escherichia Coli (E. Coli)
Manchester	MA93-47	Causeway Brook	Escherichia Coli (E. Coli)
Mansfield	MA62-39	Rumford River	Escherichia Coli (E. Coli)

Mansfield	MA62-47	Wading River	Escherichia Coli (E. Coli)
Mansfield	MA62-49	Wading River	Escherichia Coli (E. Coli)
Marblehead	MA93-21	Salem Harbor	Fecal Coliform
Marblehead	MA93-22	Marblehead Harbor	Fecal Coliform
Marblehead	MA93-25	Salem Sound	Fecal Coliform
Marion	MA95-05	Weweantic River	Fecal Coliform
Marion	MA95-07	Sippican River	Fecal Coliform
Marion	MA95-08	Sippican Harbor	Fecal Coliform
Marion	MA95-09	Aucoot Cove	Fecal Coliform
Marion	MA95-56	Hammett Cove	Fecal Coliform
Marshfield	MA94-05	North River	Fecal Coliform
Marshfield	MA94-06	North River	Fecal Coliform
Marshfield	MA94-09	South River	Fecal Coliform
Marshfield	MA94-11	Green Harbor	Fecal Coliform
Mashpee	MA96-08	Shoestring Bay	Fecal Coliform
Mashpee	MA96-21	Waquoit Bay	Fecal Coliform
Mashpee	MA96-24	Mashpee River	Fecal Coliform
Mashpee	MA96-39	Popponeset Creek	Fecal Coliform
Mashpee	MA96-58	Hamblin Pond	Fecal Coliform
Mashpee	MA96-61	Little River	Fecal Coliform
Mashpee	MA96-92	Santuit River	Fecal Coliform
Mattapoisett	MA95-09	Aucoot Cove	Fecal Coliform
Mattapoisett	MA95-10	Hiller Cove	Fecal Coliform
Mattapoisett	MA95-35	Mattapoisett Harbor	Fecal Coliform
Mattapoisett	MA95-60	Mattapoisett River	Fecal Coliform
Mattapoisett	MA95-61	Eel Pond	Fecal Coliform
Mattapoisett	MA95-65	Nasketucket Bay	Fecal Coliform
Medfield	MA72-05	Charles River	Pathogens
Medfield	MA72-10	Stop River	Pathogens
Medfield	MA73-09	Mine Brook	Fecal Coliform
Medway	MA72-04	Charles River	Pathogens
Medway	MA72-05	Charles River	Pathogens
Melrose	MA93-48	Bennetts Pond Brook	Escherichia Coli (E. Coli)
Mendon	MA72-03	Charles River	Pathogens
Milford	MA72-01	Charles River	Pathogens
Millis	MA72-05	Charles River	Pathogens
Millis	MA72-16	Bogastow Brook	Pathogens
Milton	MA73-02	Neponset River	Fecal Coliform
Milton	MA73-03	Neponset River	Fecal Coliform
Milton	MA73-04	Neponset River	Fecal Coliform
Milton	MA73-26	Unquity Brook	Fecal Coliform

Milton	MA73-29	Pine Tree Brook	Fecal Coliform
Milton	MA73-30	Gulliver Creek	Fecal Coliform
Nahant	MA93-24	Nahant Bay	Fecal Coliform
Nahant	MA93-52	Lynn Harbor	Fecal Coliform
Nahant	MA93-53	Lynn Harbor	Fecal Coliform
Natick	MA72-05	Charles River	Pathogens
Natick	MA72-06	Charles River	Pathogens
Needham	MA72-06	Charles River	Pathogens
Needham	MA72-07	Charles River	Pathogens
Needham	MA72-18	Fuller Brook	Pathogens
Needham	MA72-21	Rock Meadow Brook	Pathogens
Needham	MA72-25	Rosemary Brook	Pathogens
New Bedford	MA95-13	Buttonwood Brook	Escherichia Coli (E. Coli)
New Bedford	MA95-33	Acushnet River	Fecal Coliform
New Bedford	MA95-38	Clarks Cove	Fecal Coliform
New Bedford	MA95-42	New Bedford Inner Harbor	Fecal Coliform
New Bedford	MA95-63	Outer New Bedford Harbor	Fecal Coliform
Newton	MA72-07	Charles River	Pathogens
Newton	MA72-23	Sawmill Brook	Pathogens
Newton	MA72-24	South Meadow Brook	Pathogens
Newton	MA72-29	Cheese Cake Brook	Pathogens
Newton	MA72-36	Charles River	Pathogens
Norfolk	MA72-05	Charles River	Pathogens
Norfolk	MA72-10	Stop River	Pathogens
North Andover	MA83-19	Shawsheen River	Fecal Coliform
Norton	MA62-49	Wading River	Escherichia Coli (E. Coli)
Norton	MA62-56	Three Mile River	Escherichia Coli (E. Coli)
Norwell	MA94-05	North River	Fecal Coliform
Norwell	MA94-27	Third Herring Brook	Escherichia Coli (E. Coli)
Norwell	MA94-31	Second Herring Brook	Fecal Coliform
Norwood	MA73-01	Neponset River	Fecal Coliform
Norwood	MA73-01	Neponset River	Escherichia Coli (E. Coli)
Norwood	MA73-02	Neponset River	Fecal Coliform
Norwood	MA73-15	Germany Brook	Fecal Coliform
Norwood	MA73-16	Hawes Brook	Fecal Coliform
Norwood	MA73-17	Traphole Brook	Fecal Coliform
Norwood	MA73-24	Purgatory Brook	Fecal Coliform
Norwood	MA73-33	Unnamed Tributary	Escherichia Coli (E. Coli)
Orleans	MA96-16	Rock Harbor Creek	Fecal Coliform
Orleans	MA96-26	Little Namskaket Creek	Fecal Coliform
Orleans	MA96-27	Namskaket Creek	Fecal Coliform

Orleans	MA96-68	Town Cove	Fecal Coliform
Orleans	MA96-72	Paw Wah Pond	Fecal Coliform
Orleans	MA96-73	Pochet Neck	Fecal Coliform
Orleans	MA96-76	The River	Fecal Coliform
Orleans	MA96-78	Little Pleasant Bay	Fecal Coliform
Peabody	MA93-01	Waters River	Fecal Coliform
Peabody	MA93-05	Goldthwait Brook	Escherichia Coli (E. Coli)
Peabody	MA93-39	Proctor Brook	Escherichia Coli (E. Coli)
Pembroke	MA94-05	North River	Fecal Coliform
Plymouth	MA94-15	Duxbury Bay	Fecal Coliform
Plymouth	MA94-16	Plymouth Harbor	Fecal Coliform
Plymouth	MA94-34	Ellisville Harbor	Fecal Coliform
Raynham	MA62-02	Taunton River	Fecal Coliform
Rehoboth	MA53-03	Palmer River	Pathogens
Rehoboth	MA53-04	Palmer River	Pathogens
Rehoboth	MA53-05	Palmer River	Pathogens
Rehoboth	MA53-07	Palmer River - West Branch	Pathogens
Rehoboth	MA53-08	Palmer River - East Branch	Pathogens
Rehoboth	MA53-09	Rumney Marsh Brook	Pathogens
Rehoboth	MA53-10	Beaver Dam Brook	Pathogens
Rehoboth	MA53-11	Bad Luck Brook	Pathogens
Rehoboth	MA53-12	Fullers Brook	Pathogens
Rehoboth	MA53-13	Clear Run Brook	Pathogens
Rehoboth	MA53-14	Torrey Creek	Pathogens
Rehoboth	MA53-15	Old Swamp Brook	Pathogens
Rehoboth	MA53-16	Rocky Run	Pathogens
Revere	MA93-15	Pines River	Fecal Coliform
Revere	MA93-44	Saugus River	Fecal Coliform
Revere	MA93-51	Unnamed Tributary	Enterococcus Bacteria
Revere	MA93-52	Lynn Harbor	Fecal Coliform
Revere	MA93-53	Lynn Harbor	Fecal Coliform
Rockland	MA94-03	French Stream	Escherichia Coli (E. Coli)
Rockport	MA93-17	Rockport Harbor	Fecal Coliform
Salem	MA93-09	Danvers River	Fecal Coliform
Salem	MA93-20	Beverly Harbor	Fecal Coliform
Salem	MA93-21	Salem Harbor	Fecal Coliform
Salem	MA93-25	Salem Sound	Fecal Coliform
Salem	MA93-39	Proctor Brook	Escherichia Coli (E. Coli)
Salem	MA93-40	Proctor Brook	Enterococcus Bacteria
Salem	MA93-42	North River	Fecal Coliform
Sandwich	MA95-14	Cape Cod Canal	Fecal Coliform

Sandwich	MA96-30	Scorton Creek	Fecal Coliform
Sandwich	MA96-84	Old Harbor Creek	Fecal Coliform
Sandwich	MA96-85	Mill Creek	Fecal Coliform
Sandwich	MA96-86	Dock Creek	Fecal Coliform
Sandwich	MA96-87	Springhill Creek	Fecal Coliform
Saugus	MA93-15	Pines River	Fecal Coliform
Saugus	MA93-33	Hawkes Brook	Escherichia Coli (E. Coli)
Saugus	MA93-35	Saugus River	Escherichia Coli (E. Coli)
Saugus	MA93-43	Saugus River	Fecal Coliform
Saugus	MA93-44	Saugus River	Fecal Coliform
Saugus	MA93-48	Bennetts Pond Brook	Escherichia Coli (E. Coli)
Saugus	MA93-49	Shute Brook	Fecal Coliform
Saugus	MA93-50	Shute Brook	Escherichia Coli (E. Coli)
Scituate	MA94-01	Cohasset Harbor	Fecal Coliform
Scituate	MA94-02	Scituate Harbor	Fecal Coliform
Scituate	MA94-05	North River	Fecal Coliform
Scituate	MA94-06	North River	Fecal Coliform
Scituate	MA94-07	Herring River	Fecal Coliform
Scituate	MA94-09	South River	Fecal Coliform
Scituate	MA94-19	The Gulf	Fecal Coliform
Scituate	MA94-32	Cohasset Cove	Fecal Coliform
Scituate	MA94-33	Musquashcut Pond	Fecal Coliform
Seekonk	MA53-01	Runnins River	Fecal Coliform
Seekonk	MA53-12	Fullers Brook	Pathogens
Seekonk	MA53-13	Clear Run Brook	Pathogens
Seekonk	MA53-14	Torrey Creek	Pathogens
Sharon	MA62-39	Rumford River	Escherichia Coli (E. Coli)
Sharon	MA73-17	Traphole Brook	Fecal Coliform
Sharon	MA73-31	Unnamed Tributary	Fecal Coliform
Sherborn	MA72-05	Charles River	Pathogens
Somerset	MA61-01	Lee River	Fecal Coliform
Somerset	MA61-02	Lee River	Fecal Coliform
Somerset	MA61-06	Mount Hope Bay	Fecal Coliform
Somerset	MA62-03	Taunton River	Fecal Coliform
Somerset	MA62-04	Taunton River	Fecal Coliform
Somerset	MA62-50	Broad Cove	Fecal Coliform
Stoughton	MA73-20	Beaver Meadow Brook	Fecal Coliform
Stoughton	MA73-32	Unnamed Tributary	Escherichia Coli (E. Coli)
Swampscott	MA93-24	Nahant Bay	Fecal Coliform
Swansea	MA53-03	Palmer River	Pathogens
Swansea	MA53-06	Warren River Pond	Fecal Coliform

Swansea	MA53-16	Rocky Run	Pathogens
Swansea	MA61-01	Lee River	Fecal Coliform
Swansea	MA61-02	Lee River	Fecal Coliform
Swansea	MA61-04	Cole River	Fecal Coliform
Swansea	MA61-07	Mount Hope Bay	Fecal Coliform
Swansea	MA61-08	Kickemuit River	Pathogens
Taunton	MA62-02	Taunton River	Fecal Coliform
Taunton	MA62-56	Three Mile River	Escherichia Coli (E. Coli)
Taunton	MA62-57	Three Mile River	Fecal Coliform
Tewksbury	MA83-07	Strong Water Brook	Fecal Coliform
Tewksbury	MA83-15	Unnamed Tributary	Fecal Coliform
Tewksbury	MA83-18	Shawsheen River	Fecal Coliform
Wakefield	MA93-31	Mill River	Escherichia Coli (E. Coli)
Wakefield	MA93-34	Saugus River	Escherichia Coli (E. Coli)
Wakefield	MA93-35	Saugus River	Escherichia Coli (E. Coli)
Walpole	MA72-10	Stop River	Pathogens
Walpole	MA73-01	Neponset River	Fecal Coliform
Walpole	MA73-01	Neponset River	Escherichia Coli (E. Coli)
Walpole	MA73-06	School Meadow Brook	Fecal Coliform
Walpole	MA73-09	Mine Brook	Fecal Coliform
Walpole	MA73-17	Traphole Brook	Fecal Coliform
Waltham	MA72-07	Charles River	Pathogens
Waltham	MA72-28	Beaver Brook	Pathogens
Wareham	MA95-01	Buttermilk Bay	Fecal Coliform
Wareham	MA95-02	Onset Bay	Fecal Coliform
Wareham	MA95-03	Wareham River	Fecal Coliform
Wareham	MA95-05	Weweantic River	Fecal Coliform
Wareham	MA95-07	Sippican River	Fecal Coliform
Wareham	MA95-29	Agawam River	Fecal Coliform
Wareham	MA95-49	Broad Marsh River	Fecal Coliform
Wareham	MA95-50	Wankinco River	Fecal Coliform
Wareham	MA95-51	Crooked River	Fecal Coliform
Wareham	MA95-52	Cedar Island Creek	Fecal Coliform
Wareham	MA95-53	Beaverdam Creek	Fecal Coliform
Watertown	MA72-07	Charles River	Pathogens
Watertown	MA72-30	Unnamed Tributary	Pathogens
Watertown	MA72-32	Unnamed Tributary	Pathogens
Watertown	MA72-36	Charles River	Pathogens
Wellesley	MA72-06	Charles River	Pathogens
Wellesley	MA72-07	Charles River	Pathogens
Wellesley	MA72-18	Fuller Brook	Pathogens

Wellesley	MA72-25	Rosemary Brook	Pathogens
Wellfleet	MA96-32	Duck Creek	Fecal Coliform
Wellfleet	MA96-33	Herring River	Fecal Coliform
Wellfleet	MA96-34	Wellfleet Harbor	Fecal Coliform
West Bridgewater	MA62-06	Salisbury Plain River	Escherichia Coli (E. Coli)
Weston	MA72-07	Charles River	Pathogens
Westport	MA95-37	West Branch Westport River	Fecal Coliform
Westport	MA95-40	East Branch Westport River	Escherichia Coli (E. Coli)
Westport	MA95-41	East Branch Westport River	Fecal Coliform
Westport	MA95-44	Snell Creek	Escherichia Coli (E. Coli)
Westport	MA95-45	Snell Creek	Escherichia Coli (E. Coli)
Westport	MA95-54	Westport River	Fecal Coliform
Westport	MA95-58	Bread And Cheese Brook	Escherichia Coli (E. Coli)
Westport	MA95-59	Snell Creek	Fecal Coliform
Westwood	MA72-21	Rock Meadow Brook	Pathogens
Westwood	MA73-02	Neponset River	Fecal Coliform
Westwood	MA73-15	Germany Brook	Fecal Coliform
Westwood	MA73-24	Purgatory Brook	Fecal Coliform
Westwood	MA73-25	Pecunit Brook	Escherichia Coli (E. Coli)
Westwood	MA73-27	Ponkapog Brook	Fecal Coliform
Whitman	MA62-09	Beaver Brook	Escherichia Coli (E. Coli)
Whitman	MA62-33	Shumatuscasant River	Escherichia Coli (E. Coli)
Whitman	MA62-38	Meadow Brook	Escherichia Coli (E. Coli)
Wilmington	MA83-18	Shawsheen River	Fecal Coliform
Winthrop	MA93-53	Lynn Harbor	Fecal Coliform
Yarmouth	MA96-12	Bass River	Fecal Coliform
Yarmouth	MA96-35	Chase Garden Creek	Fecal Coliform
Yarmouth	MA96-36	Lewis Bay	Fecal Coliform
Yarmouth	MA96-37	Mill Creek	Fecal Coliform
Yarmouth	MA96-38	Parkers River	Fecal Coliform
Yarmouth	MA96-80	Mill Creek	Fecal Coliform
Yarmouth	MA96-82	Hyannis Inner Harbor	Fecal Coliform

Table F-8: Bacteria or pathogens impaired waterbody names and segment IDs along with primary municipality and indicator organism identified by the applicable TMDL. The term primary municipality indicates the municipality in which the majority of the segment is located, but does not necessarily indicate each municipality that has regulated discharges to the waterbody segment.

2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part A.III.1. as follows:
 - a. The permittee is relieved of additional requirements as of the date when the following conditions are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable to the receiving water

- that indicates that no additional stormwater controls for bacteria/pathogens are necessary for the permittee's discharge based on wasteload allocations in the newly approved TMDL
- b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any additional remaining requirements of Appendix F part A.III.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part A.III.1 to date to reduce bacteria/pathogens in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix F part A.III.1 required to be implemented prior to the date of the newly approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

IV. Cape Cod Nitrogen TMDL Requirements

There are 19 approved TMDLs for nitrogen for various watersheds, ponds and bays on Cape Cod.¹⁵ The following measures are needed to ensure that current nitrogen loads from MS4 stormwater discharged into the impaired waterbodies do not increase.

1. The operators of traditional and non-traditional MS4s located in municipalities listed in Table F-9 or any other MS4 (traditional and non-traditional) that discharges to any waterbody listed in Table F-9 or their tributaries shall comply with the following BMPs in addition to the requirements of part 2.3 of the Permit, as described below:
 - a. Enhanced BMPs
 - i. Enhancement of BMPs required by part 2.3 of the permit that shall be implemented during this permit term:
 1. part 2.3.2, Public education and outreach: The permittee shall supplement its Residential and Business/Commercial/Institution program with annual timed messages on specific topics. The permittee shall distribute an annual message in the spring (April/May) timeframe that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release 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 nitrogen to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP. All public education messages can be combined with requirements of Appendix H part I, II and III as well as Appendix F part A.III, A.V, B.I, B.II and B.III where appropriate.
 2. part 2.3.6, Stormwater Management in New Development and Redevelopment: the requirement for adoption/amendment of the permittee's ordinance or other regulatory mechanism shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for nitrogen removal; retrofit inventory and priority ranking under 2.3.6.1.b shall include consideration of BMPs to reduce nitrogen discharges.

¹⁵ Final nitrogen TMDLs for Cape Cod can be found here:
<http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdls.html>

3. part 2.3.7, Good House Keeping and Pollution Prevention for Permittee Owned Operations: establish requirements for use of slow release fertilizers on permittee owned property currently using fertilizer, in addition to reducing and managing fertilizer use as provided in in part 2.3.7.1; establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces; 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 (2) times per year, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall).

Municipality	Waterbody Name
Barnstable	Centerville River
Barnstable	Popponeset Bay
Barnstable	Shoestring Bay
Barnstable	Cotuit Bay
Barnstable	North Bay
Barnstable	Prince Cove
Barnstable	West Bay
Barnstable	Hyannis Inner Harbor
Barnstable	Lewis Bay
Bourne	Phinneys Harbor
Chatham	Crows Pond
Chatham	Bucks Creek
Chatham	Harding Beach Pond
Chatham	Mill Creek
Chatham	Mill Pond
Chatham	Oyster Pond
Chatham	Oyster Pond River
Chatham	Stage Harbor
Chatham	Taylor's Pond
Chatham	Frost Fish Creek
Chatham	Ryder Cove
Falmouth	Bournes Pond
Falmouth	Great Pond
Falmouth	Green Pond
Falmouth	Perch Pond
Falmouth	Little Pond
Falmouth	Oyster Pond
Falmouth	Quashnet River
Falmouth	Inner West Falmouth Harbor

Municipality	Waterbody Name
Falmouth	West Falmouth Harbor
Falmouth	Snug Harbor
Falmouth	Harbor Head
Harwich	Muddy Creek - Lower
Harwich	Muddy Creek - Upper
Harwich	Round Cove
Mashpee	Mashpee River
Mashpee	Great River
Mashpee	Hamblin Pond
Mashpee	Jehu Pond
Mashpee	Little River
Orleans	Areys Pond
Orleans	Little Pleasant Bay
Orleans	Namequoit River
Orleans	Paw Wah Pond
Orleans	Pleasant Bay
Orleans	Pochet Neck
Orleans	Quanset Pond
Yarmouth	Mill Creek
Yarmouth	Hyannis Inner Harbor
Yarmouth	Lewis Bay

Table F-9: Waterbodies subject to a Cape Cod nitrogen TMDL and the primary municipalities

2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part A.IV.1. applicable to it when in compliance with this part.
 - a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control of nitrogen are necessary for the permittee’s discharge based on wasteload allocations in the newly approved TMDL
 - b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any remaining requirements of Appendix F part A.IV.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part A.IV.1 to date to reduce nitrogen in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix F part A.IV.1 required to be implemented prior to the date of the newly approved TMDL, including ongoing

implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

V. Assabet River Phosphorus TMDL Requirements

On September 23, 2004 EPA approved the *Assabet River Total Maximum Daily Load for Total Phosphorus*¹⁶. The following measures are needed to ensure that current phosphorus loads from MS4 stormwater discharged directly or indirectly via tributaries into the Assabet River do not increase.

1. The operators of traditional and non-traditional MS4s located in municipalities listed in Table F-10 within the Assabet River Watershed shall comply with the following BMPs in addition to the requirements of part 2.3 of the Permit, as described below:
 - a. Enhanced BMPs
 - i. Enhancement of BMPs required by part 2.3 of the permit that shall be implemented during this permit term:
 1. part 2.3.2, Public education and outreach: The permittee shall supplement its Residential and Business/Commercial/Institution program with annual timed messages on specific topics. 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 phosphorous-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 phosphorous to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP. All public education messages can be combined with requirements of Appendix H part I, II and III as well as Appendix F part A.III, A.IV, B.I, B.II and B.III where appropriate.
 2. part 2.3.6, Stormwater Management in New Development and Redevelopment: the requirement for adoption/amendment of the permittee's ordinance or other regulatory mechanism shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal; retrofit inventory and priority ranking under 2.3.6.1.b shall include consideration of BMPs that infiltrate stormwater where feasible.
 3. part 2.3.7, Good House Keeping and Pollution Prevention for Permittee Owned Operations: Establish program to properly

¹⁶ Massachusetts Department of Environmental Protection, 2004. *Assabet River Total Maximum Daily Load for Total Phosphorus*. CN 201.0

manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces; 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, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall).

Municipality
Acton
Berlin
Bolton
Boxborough
Boylston
Carlisle
Clinton
Concord
Grafton
Harvard
Hudson
Littleton
Marlborough
Maynard
Northborough
Shrewsbury
Stow
Westborough
Westford

Table F-10: Municipalities located in the Assabet River Watershed

2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part A.V.1. as follows.
 - a. The permittee is relieved of its additional requirements as of the date when following conditions are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control of phosphorus are necessary for the permittee’s discharge based on wasteload allocations in the newly approved TMDL
 - b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any remaining requirements of Appendix F part A.V.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part A.V.1 to

date to reduce phosphorus in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs

- ii. The permittee shall continue to implement all requirements of Appendix F part A.V.1 required to be implemented prior to the date of the newly approved TMDL including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

B. Requirements for Discharges to Impaired Waters with an Approved Out of State TMDL

I. Nitrogen TMDL Requirements

Discharges from MS4s in Massachusetts to waters that are tributaries to the Long Island Sound, which has an approved TMDL for nitrogen¹⁷, are subject to the requirements of this part.

1. The operators of traditional and non-traditional MS4s located in municipalities listed in Table F-11 shall comply with the following BMPs in addition to the requirements of part 2.3 of the Permit, as described below:
 - a. Enhanced BMPs
 - i. Enhancement of BMPs required by part 2.3 of the permit that shall be implemented during this permit term:
 1. part 2.3.2, Public education and outreach: The permittee shall supplement its Residential and Business/Commercial/Institution program with annual timed messages on specific topics. The permittee shall distribute an annual message in the spring (April/May) timeframe that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release 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 nitrogen to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP. All public education messages can be combined with requirements of Appendix H part I, II and III as well as Appendix F part A.III, A.IV, A.V, B.II and B.III where appropriate.
 2. part 2.3.6, Stormwater Management in New Development and Redevelopment: the requirement for adoption/amendment of the permittee's ordinance or other regulatory mechanism shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for nitrogen removal; retrofit inventory and priority ranking under 2.3.6.1.b shall include consideration of BMPs to reduce nitrogen discharges.
 3. part 2.3.7, Good House Keeping and Pollution Prevention for Permittee Owned Operations: establish requirements for use of

¹⁷ Connecticut Department of Environmental Protection. 2000. *A Total Maximum Daily Load Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound*

slow release fertilizers on permittee owned property currently using fertilizer, in addition to reducing and managing fertilizer use as provided in in part 2.3.7.1; establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces; 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 (2) times per year, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall).

b. Nitrogen Source Identification Report

- i. Within four years of the permit effective date the permittee shall complete a Nitrogen Source Identification Report. The report shall include the following elements:
 1. Calculation of total urbanized area within the permittee's jurisdiction that is within the Connecticut River Watershed, the Housatonic River Watershed, or the Thames River Watershed, incorporating updated mapping of the MS4 and catchment delineations produced pursuant to part 2.3.4.6,
 2. All screening and monitoring results pursuant to part 2.3.4.7.d., targeting the receiving water segment(s)
 3. Impervious area and DCIA for the target catchment
 4. Identification, delineation and prioritization of potential catchments with high nitrogen loading
 5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during re-development
- ii. The final Nitrogen Source Identification Report shall be submitted to EPA as part of the year 4 annual report.

c. Structural BMPs

- i. Within five years of the permit effective date, the permittee shall 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 Nitrogen Source Identification Report. The evaluation shall include:
 1. The next planned infrastructure, resurfacing or redevelopment activity planned for the property (if applicable) OR planned retrofit date;
 2. The estimated cost of redevelopment or retrofit BMPs; and
 3. The engineering and regulatory feasibility of redevelopment or retrofit BMPs.
- ii. The permittee shall provide a listing of planned structural BMPs and a plan and schedule for implementation in the year 5 annual

report. The permittee shall plan and install a minimum of one structural BMP as a demonstration project within six years of the permit effective date. The demonstration project shall be installed targeting a catchment with high nitrogen load potential. The permittee shall install the remainder of the structural BMPs in accordance with the plan and schedule provided in the year 5 annual report.

- iii. Any structural BMPs listed in Table 4-3 of Attachment 1 to Appendix H installed in the urbanized area by the permittee or its agents shall be tracked and the permittee shall estimate the nitrogen removal by the BMP consistent with Attachment 1 to Appendix H. The permittee shall document the BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated nitrogen removed in mass per year by the BMP in each annual report.

Adams	North Adams
Agawam	Northampton
Amherst	Oxford
Ashburnham	Palmer
Ashby	Paxton
Auburn	Pelham
Belchertown	Pittsfield
Charlton	Richmond
Cheshire	Russell
Chicopee	Rutland
Dalton	South Hadley
Douglas	Southampton
Dudley	Southbridge
East Longmeadow	Southwick
Easthampton	Spencer
Gardner	Springfield
Granby	Sturbridge
Hadley	Sutton
Hampden	Templeton
Hatfield	Ware
Hinsdale	Webster
Holyoke	West Springfield
Lanesborough	Westfield
Leicester	Westhampton
Lenox	Westminster
Longmeadow	Wilbraham
Ludlow	Williamsburg
Millbury	Winchendon

Monson	
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Table F-11: Massachusetts municipalities in which MS4 discharges are within the Connecticut River Watershed, the Housatonic River Watershed, or the Thames River Watershed.

2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part B.I.1. as follows:
 - a. The permittee is relieved of its additional requirements as of the date when the following conditions are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control of nitrogen are necessary for the permittee’s discharge based on wasteload allocations in the newly approved TMDL
 - b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any remaining requirements of Appendix F part B.I.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part B.I.1 to date to reduce nitrogen in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix F part B.I.1 required to be implemented prior to the date of the newly approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

II. Phosphorus TMDL Requirements

There are currently eight approved phosphorus TMDLs for certain waterbody segments in Rhode Island that identify urban stormwater discharges in Massachusetts as sources that are contributing phosphorus to the impaired segments. The TMDLs include the Kickemuit Reservoir, Upper Kickemuit River, Kickemuit River, Ten Mile River, Central Pond, Turner Reservoir, Lower Ten Mile River, and Omega Pond TMDLs¹⁸. Table F-12 lists municipalities in Massachusetts identified in the TMDLs as containing MS4s contributing phosphorus to the impaired waterbody segments in Rhode Island, the impaired receiving water, and the approved TMDL name. Any permittee (traditional or non-traditional) that operates an MS4 in a municipality listed in Table F-12 and that discharges to a waterbody or tributary of a waterbody listed on Table F-12 is subject to the requirements of this part.

1. The operators of traditional and non-traditional MS4s located in municipalities listed in Table F-12 and that discharge to a waterbody or a tributary of a waterbody identified on Table F-12 shall comply with the following BMPs in addition to the requirements of part 2.3 of the Permit, as described below:
 - a. Enhanced BMPs
 - i. Enhancement of BMPs required by part 2.3 of the permit that shall be implemented during this permit term:
 1. part 2.3.2, Public education and outreach: The permittee shall supplement its Residential and Business/Commercial/Institution program with annual timed messages on specific topics. 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 phosphorous-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 phosphorous to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP. All public education messages can be combined with requirements of Appendix H part I, II and III as well as Appendix F part A.III, A.IV, A.V, B.I, and B.III where appropriate.
 2. part 2.3.6, Stormwater Management in New Development and Redevelopment: the requirement for

¹⁸ See <http://www.dem.ri.gov/programs/benviron/water/quality/rest/reports.htm> for all RI TMDL documents. (retrieved 6/30/2014)

adoption/amendment of the permittee's ordinance or other regulatory mechanism shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal; retrofit inventory and priority ranking under 2.3.6.1.b shall include consideration of BMPs that infiltrate stormwater where feasible.

3. part 2.3.7, Good House Keeping and Pollution Prevention for Permittee Owned Operations: Establish program to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces; 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, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall).

b. Phosphorus Source Identification Report

- i. Within four years of the permit effective date the permittee shall complete a Phosphorus Source Identification Report. The report shall include the following elements:
 1. Calculation of total urbanized 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,
 2. All screening and monitoring results pursuant to part 2.3.4.7.d., targeting the receiving water segment(s)
 3. Impervious area and DCIA for the target catchment
 4. Identification, delineation and prioritization of potential catchments with high phosphorus loading
 5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during re development, including the removal of impervious area of permittee owned properties
- ii. The phosphorus source identification report shall be submitted to EPA as part of the year 4 annual report.

c. Structural BMPs

- i. Within five years of the permit effective date, the permittee shall evaluate all permittee owned 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 that are within the drainage area of the water quality limited water or its tributaries. The evaluation shall include:

1. The next planned infrastructure, resurfacing or redevelopment activity planned for the property (if applicable) OR planned retrofit date;
 2. The estimated cost of redevelopment or retrofit BMPs; and
 3. The engineering and regulatory feasibility of redevelopment or retrofit BMPs.
- ii. The permittee shall provide a listing of planned structural BMPs and a plan and schedule for implementation in the year 5 annual report. The permittee shall plan and install a minimum of one structural BMP as a demonstration project within the drainage area of the water quality limited water or its tributaries within six years of the permit effective date. The demonstration project shall be installed targeting a catchment with high phosphorus load potential. The permittee shall install the remainder of the structural BMPs in accordance with the plan and schedule provided in the year 5 annual report.
- iii. Any structural BMPs installed in the urbanized area by the permittee or its agents shall be tracked and the permittee shall estimate the phosphorus removal by the BMP consistent with Attachment 3 to Appendix F. The permittee shall document 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 in each annual report.

Municipality	Receiving Water	TMDL Name
Attleboro	Upper Ten Mile River, Lower Ten Mile River, Central Pond, Omega Pond and Turner Reservoir	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
North Attleborough	Upper Ten Mile River, Lower Ten Mile River, Central Pond, Omega Pond and Turner Reservoir	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
Plainville	Upper Ten Mile River, Lower Ten Mile River, Central Pond, Omega Pond and Turner Reservoir	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
Rehoboth	Upper Kikemuit River, Kickemuit River, Kickemuit Reservoir	Fecal Coliform and Total Phosphorus TMDLs:

Municipality	Receiving Water	TMDL Name
		Kickemuit Reservoir, Rhode Island (RI0007034L-01) Upper Kickemuit River (RI 0007034R-01) Kickemuit River (MA 61-08 2004)
Seekonk	Upper Ten Mile River, Lower Ten Mile River, Central Pond, Omega Pond and Turner Reservoir	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
Swansea	Upper Kikemuit River, Kickemuit River, Kickemuit Reservoir	Fecal Coliform and Total Phosphorus TMDLs: Kickemuit Reservoir, Rhode Island (RI0007034L-01) Upper Kickemuit River (RI 0007034R-01) Kickemuit River (MA 61-08 2004)

Table F-12: Municipalities in Massachusetts identified in the TMDLs as containing MS4s contributing phosphorus to the impaired waterbody segments in Rhode Island, the impaired receiving water, and the approved TMDL name.

2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part B.II.1. as follows:
 - a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control of phosphorus are necessary for the permittee’s discharge based on wasteload allocations in the newly approved TMDL
 - b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any remaining requirements of Appendix F part B.II.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part B.II.1 to date to reduce phosphorus in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix F part B.II.1 required to be implemented prior to the date of the newly approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

III. Bacteria and Pathogen TMDL Requirements

There are currently six approved bacteria (fecal coliform bacteria) or pathogen (fecal coliform and/or enterococcus bacteria) TMDLs for certain waterbody segments in Rhode Island that identify urban stormwater discharges in Massachusetts as sources that are contributing bacteria or pathogens to the impaired segments. The TMDLs include the Kickemuit Reservoir, Upper Kickemuit River, Ten Mile River, Lower Ten Mile River and Omega Pond TMDLs¹⁹ Table F-13 lists municipalities in Massachusetts identified in the TMDLs as containing MS4s contributing bacteria or pathogens to the impaired waterbody segments in Rhode Island, the impaired receiving water, and the approved TMDL name. Any permittee (traditional or non-traditional) that operates an MS4 in a municipality listed in Table F-13 and that discharges to a waterbody or a tributary of a waterbody listed on Table F-13 is subject to the requirements of this part.

- 1) Traditional and non-traditional MS4s operating in the municipalities identified in Table F-13 and that discharge to a waterbody or a tributary of a waterbody identified on Table F-13 shall comply with the following BMPs in addition to the requirements of part 2.3 of the Permit, as described below::
 - a. Enhanced BMPs
 - i. Enhancement of BMPs required by part 2.3 of the permit that shall be implemented during this permit term:
 1. part 2.3.3. Public Education: The permittee shall supplement its Residential program with an annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate. The permittee or its agents shall disseminate educational materials to dog owners at the time of issuance or renewal of a dog license, or other appropriate time. Education materials shall describe the detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for non-compliance. The permittee shall also provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria or pathogens. All public education messages can be combined with requirements of Appendix H part I, II and III as well as Appendix F part A.III, A.IV, A.V, B.I, and B.II where appropriate.
 2. part 2.3.4 Illicit Discharge: Catchments draining to any waterbody impaired for bacteria or pathogens shall be designated either Problem Catchments or HIGH priority in implementation of the IDDE program.

¹⁹ See <http://www.dem.ri.gov/programs/benviron/water/quality/rest/reports.htm> for all RI TMDL documents. (retrieved 6/30/2014)

Municipality	Receiving Water	TMDL Name
Attleboro	Upper Ten Mile River, Lower Ten Mile River, Omega Pond	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
North Attleborough	Upper Ten Mile River, Lower Ten Mile River, Omega Pond	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
Plainville	Upper Ten Mile River, Lower Ten Mile River, Omega Pond	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
Rehoboth	Upper Kikemuit River, Kickemuit Reservoir	Fecal Coliform and Total Phosphorus TMDLs: Kickemuit Reservoir, Rhode Island (RI0007034L-01) Upper Kickemuit River (RI 0007034R-01) Kickemuit River (MA 61-08_2004)
Seekonk	Upper Ten Mile River, Lower Ten Mile River, Omega Pond	Total Maximum Daily Load Analysis For The Ten Mile River Watershed

Table F-13: Municipalities in Massachusetts identified in the TMDLs as containing MS4s contributing bacteria or pathogens to the impaired waterbody segments in Rhode Island,, the impaired receiving water, and the approved TMDL name

2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part B.III.1. applicable to it when in compliance with this part.
 - a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control of bacteria/pathogens are necessary for the permittee’s discharge based on wasteload allocations in the newly approved TMDL
 - b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any remaining requirements of Appendix F part B.III.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part B.III.1 to date to reduce bacteria/pathogens in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix F part B.III.1 required to be implemented prior to the date of the newly approved TMDL, including ongoing implementation

of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

IV. Metals TMDL Requirements

There are currently five approved metals TMDL for a waterbody segment in Rhode Island that identifies urban stormwater discharges in Massachusetts as sources that are contributing metals (Cadmium, Lead, Aluminum, Iron) to the impaired segment. The TMDLs include the Upper Ten Mile River, Lower Ten Mile River, Central Pond, Turner Reservoir and Omega Pond TMDLs.²⁰ Table F-14 lists municipalities in Massachusetts identified in the TMDLs as containing MS4s contributing metals to the impaired waterbody segments in Rhode Island, the impaired receiving water, the approved TMDL name, and the pollutant of concern. Any permittee (traditional or non-traditional) that operates an MS4 in a municipality listed in Table F-14 and the discharge is to a waterbody or tributary of a waterbody listed on Table F-14 is subject to the requirements of this part.

- 1) Traditional and non-traditional MS4s operating in the municipalities identified in Table F-14 and that discharge to a waterbody or a tributary of a waterbody identified on Table F-14 shall identify and implement BMPs designed to reduce metals discharges from its MS4. To address metals discharges, each permittee shall comply with the following BMPs in addition to the requirements of part 2.3 of the Permit, as described below:
 - a. Enhanced BMPs
 - i. The permittee remains subject to the requirements of part 2.3. of the permit and shall include the following enhancements to the BMPs required by part 2.3 of the permit:
 1. part 2.3.6, Stormwater Management in New Development and Redevelopment: stormwater management systems designed on commercial and industrial land use area draining to the water quality limited waterbody shall incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event. EPA also encourages the permittee to require any stormwater management system designed to infiltrate stormwater on commercial or industrial sites to provide the level of pollutant removal equal to or greater than the level of pollutant removal provided through the use of biofiltration of the same volume of runoff to be infiltrated, prior to infiltration.
 2. part 2.3.7, Good House Keeping and Pollution Prevention for Permittee Owned Operations: increased street sweeping frequency of all municipal owned streets and parking lots to a schedule determined by the permittee to target areas with potential for high pollutant loads. This may include, but is not limited to, increased street sweeping frequency in commercial areas and high density residential areas, or

²⁰ See <http://www.dem.ri.gov/programs/benviron/water/quality/rest/reports.htm> for all RI TMDL documents. (retrieved 6/30/2014)

drainage areas with a large amount of impervious area. Prioritize inspection and maintenance for catch basins to ensure that no sump shall be more than 50 percent full. Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings. Each annual report shall include the street sweeping schedule determined by the permittee to target high pollutant loads.

Municipality	Receiving Water	TMDL Name
Attleboro	Upper Ten Mile River, Lower Ten Mile River, Central Pond, Turner Reservoir, Omega Pond	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
North Attleborough	Upper Ten Mile River, Lower Ten Mile River, Central Pond, Turner Reservoir, Omega Pond	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
Plainville	Upper Ten Mile River, Lower Ten Mile River, Central Pond, Turner Reservoir, Omega Pond	Total Maximum Daily Load Analysis For The Ten Mile River Watershed
Seekonk	Upper Ten Mile River, Lower Ten Mile River, Central Pond, Turner Reservoir, Omega Pond	Total Maximum Daily Load Analysis For The Ten Mile River Watershed

Table F-14: Municipalities in Massachusetts identified in the TMDLs as containing MS4s contributing metals to the impaired waterbody segments in Rhode Island, the impaired receiving water, the approved TMDL name, and the pollutant of concern.

2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix F part B.IV.1. applicable to it when in compliance with this part.
 - a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
 - i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control of metals (Cadmium, Lead, Aluminum, Iron) are necessary for the permittee’s discharge based on wasteload allocations in the newly approved TMDL

- b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any remaining requirements of Appendix F part B.IV.1 as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F part B.IV.1 to date to reduce metals (Cadmium, Lead, Aluminum, Iron) in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix F part B.IV.1 required to be implemented prior to the date of the newly approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

C. Requirements for Discharges to Impaired Waters with a Regional TMDL**I. The “Northeast Regional Mercury TMDL (2007)”**

The Northeast Regional Mercury TMDL does not specify a wasteload allocation or other requirements either individually or categorically for the MS4 discharges and specifies that load reductions are to be achieved through reduction in atmospheric deposition sources. No requirements related to this TMDL are imposed on MS4 discharges under this part. However, if the permittee becomes aware, or EPA or MassDEP determines, that an MS4 discharge is causing or contributing to such impairment to an extent that cannot be explained by atmospheric deposition (e.g. chemical spill, acid landfill leachate or other sources), the permittee shall comply with the requirements of part 2.1.1.d and 2.3.4 of the permit.

ATTACHMENT 1 TO APPENDIX F

Method to Calculate Baseline Phosphorus Load (Baseline), Phosphorus Reduction Requirements and Phosphorus load increases due to development (P_{DEVinc})

The methods and annual phosphorus load export rates presented in Attachments 1, 2 and 3 are for the purpose of measuring load reductions for various stormwater BMPs treating runoff from different site conditions (i.e. impervious or pervious) and land uses (e.g. commercial, industrial, residential). The estimates of annual phosphorus load and load reductions due to BMPs are intended for use by the permittee to measure compliance with its Phosphorus Reduction Requirement under the permit.

This attachment provides the method to calculate a baseline phosphorus load discharging in stormwater for the impaired municipalities subject to Lakes and Ponds TMDL. A complete list of municipalities subject to these TMDLs is presented in Appendix F, Table F-6. This method shall be used to calculate the following annual phosphorus loads:

- 1) Baseline Phosphorus Load for Permittees
- 2) Phosphorus Reduction Requirement

This attachment also provides the method to calculate stormwater phosphorus load increases due to development for the municipalities subject to the Charles River TMDL requirements and the Lakes & Ponds TMDL requirements:

- 3) Phosphorus Load Increases due to Development

The **Baseline Phosphorus Load** is a measure of the annual phosphorus load discharging in stormwater from the impervious and pervious areas of the impaired Lake Phosphorus Control Plan (LPCP) Area.

The **Baseline Phosphorus Pounds Reduction** referred to as the permittee's **Phosphorus Reduction Requirement** represents the required reduction in annual phosphorus load in stormwater to meet the WLA for the impaired watershed. The percent phosphorus reduction for each watershed (identified in Appendix F, Table F-6) is applied to the Baseline Phosphorus Load to calculate the Phosphorus Pounds Reduction.

The **Phosphorus load increases due to development (P_{DEVinc})** is the stormwater phosphorus load increases due to development over the previous reporting period and incurred to date. Increases in stormwater phosphorus load from development will increase the permittee's baseline phosphorus load and therefore, the phosphorus reduction requirement.

Examples are provided to illustrate use of the methods. Table 1-1 below provides annual composite phosphorus load export rates (PLERs) by land use category for the Baseline Load and Phosphorus Reduction Requirement calculations. The permittee shall select the land use category that most closely represents the actual use of the watershed. For watersheds with institutional type uses, such as government properties, hospitals, and schools, the permittee shall use the commercial land use category for the purpose of calculating phosphorus loads. Table 1-2 provides annual PLERs by land use category for impervious and pervious areas. The permittee shall select the land use category that most closely represents the actual use of the watershed. For pervious areas, if the hydrologic soil group (HSG) is known, use the appropriate value. If the HSG is not known, assume HSG C conditions for the phosphorus load export rate. For watersheds with

institutional type uses, such as government properties, hospitals, and schools, the permittee shall use the commercial/industrial land use category for the purpose of calculating phosphorus loads. Table 1-3 provides a crosswalk table of land use codes between Tables 1-1 and 1-2 and the codes used by MassGIS.

The composite PLERs in Table 1-1 to be used for calculating Baseline Phosphorus Load are based on the specified directly connected impervious area (DCIA). If the permittee determines through mapping and site investigations that the overall DCIA for the collective area for each land use category is different than the corresponding values in Table 1-1, then the permittee is encouraged to submit this information in its annual report and request EPA to recalculate the composite PLERs for the permittees to use in refining the Baseline Phosphorus Load calculation for the LPCP.

(1) Baseline Phosphorus Load: The permittee shall calculate the **Baseline Phosphorus Load** by the following procedure:

- 1) Determine the total area (acre) associated with the impaired watershed;
- 2) Sort the total area associated with the watershed into land use categories;
- 3) Calculate the annual phosphorus load associated with each land use category by multiplying the total area of land use by the appropriate land use-based composite phosphorus load export rate provided in Table 1-1; and
- 4) Determine the Baseline Phosphorus Load by summing the land use loads.

Example 1-1 to determine Baseline Phosphorus Load:

Watershed A is 18.0 acres, with 11.0 acres of industrial area (e.g. access drives, buildings, and parking lots), 3.0 acres of medium-density residential and 4.0 acres of unmanaged wooded area.

The **Baseline Phosphorus Load** = (Baseline P Load_{IND}) + (Baseline P Load_{MDR}) + (Baseline P Load_{FOR})

Where:

$$\begin{aligned} \text{Baseline P Load}_{\text{IND}} &= (\text{TA}_{\text{IND}}) \times (\text{PLER for industrial use (Table 1-1)}) \\ &= 11.0 \text{ acre} \times 1.27 \text{ lbs/acre/year} \\ &= 14.0 \text{ lbs P/year} \end{aligned}$$

$$\begin{aligned} \text{Baseline P Load}_{\text{MDR}} &= (\text{TA}_{\text{MDR}}) \times (\text{PLER for medium density residential (Table 1-1)}) \\ &= 3.0 \text{ acre} \times 0.49 \text{ lbs/acre/year} \\ &= 1.5 \text{ lbs P/year} \end{aligned}$$

$$\begin{aligned} \text{Baseline P Load}_{\text{FOR}} &= (\text{TA}_{\text{FOR}}) \times (\text{PLER for forest (Table 1-1)}) \\ &= 4.0 \text{ acre} \times 0.12 \text{ lbs/acre/year} \\ &= 0.5 \text{ lbs P/year} \end{aligned}$$

$$\begin{aligned} \text{Baseline Phosphorus Load} &= 14.0 \text{ lbs P/year} + 1.5 \text{ lbs P/year} + 0.5 \text{ lbs P/year} \\ &= \mathbf{16.0 \text{ lbs P/year}} \end{aligned}$$

(2) Baseline Phosphorus Pounds Reduction (Phosphorus Reduction Requirement): The Baselines Phosphorus Reduction requirement is the amount of reduction in annual phosphorus load (in pounds) that the permittee is required to achieve in the Watershed. The permittee shall calculate the **Phosphorus Reduction Requirement** by multiplying the **Baseline Phosphorus Load** by the applicable percent phosphorus reduction for that watershed specified in Table F-6 (Appendix F).

Example 1-2 to determine Watershed Phosphorus Reduction Requirement:
 Table F-6 identifies Watershed A’s percent phosphorus reduction as 45%; therefore the Watershed Phosphorus Reduction Requirement is:

Phosphorus Reduction Requirement = (Baseline Phosphorus Load) x (0.45)
 = (16.0 lbs P/year) x (0.45)
 = **7.2 lbs P/year**

(3) Phosphorus load increases due to development (P_{DEVinc}): To estimate the increases in stormwater phosphorus load due to development in the Watershed (either PCP or LPCP Area), the permittee will use the following procedure:

- 1) Determine the total area of development by land use category and calculate the baseline load from that area using the composite PLERs in Table 1-1;
- 2) Distribute the total development area into impervious and pervious subareas by land use category;
- 3) Calculate the phosphorus load due to development (P_{DEV}) for each land use-based impervious and pervious subarea by multiplying the subarea by the appropriate phosphorus load export rate provided in Table 1-2; and
- 4) Determine the phosphorus load increase (P_{DEVinc}) by subtracting the baseline phosphorus load from the increased phosphorus load due to development.

Note: If structural BMPs are installed as part of new development, the P_{DEVinc} will be reduced by the amount of BMP load treated by that BMP as calculated in Attachment 3.

Example 1-3 to determine Phosphorus Load Increases: For the same 15.11 acre Watershed A as specified in Example 1-1, a permittee has tracked development in the LPCP Area in the last year that resulted in 1.5 acres of medium density residential area and 0.5 acres of forest land being converted to high density residential impervious area as detailed below. The undeveloped MDR area is pervious area, HSG C soil and the undeveloped forest area is pervious, HSG B soil.

Land Use Category	Baseline Area (acres)	P export rate (lbs P/acre/yr)*	Baseline area unchanged (acres)	P export rate (lbs P/acre/yr)**	Developed Area converted to HDR IA (acres)	P export rate (lbs P/acre/yr)**
Industrial	11.0	1.27	No change	--	No change	--
MDR	3.0	0.49	1.5	0.21	1.5	2.32

Forest	4.0	0.12	3.5	0.12	0.5	2.32
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*From Table 1-1; ** From Table 1-2

The phosphorus load increase is calculated as:

$$\begin{aligned} \text{Baseline Load} &= (\text{Baseline P Load}_{\text{IND}}) + \\ &\quad (\text{Baseline P Load}_{\text{MDR}}) + \\ &\quad (\text{Baseline P Load}_{\text{FOR}}) \\ &= \mathbf{16.0 \text{ lb/year}} \text{ (determined in Example 1-1)} \end{aligned}$$

$$\begin{aligned} P_{\text{DEV}} &= (T_{\text{AIND}} \times \text{PLER}_{\text{IND}}) + (I_{\text{AHDR}} \times \text{PLER}_{\text{HDR}}) + (P_{\text{AMDR}} \times \text{PLER}_{\text{MDR}}) + (P_{\text{AFOR}} \times \\ &\quad \text{PLER}_{\text{FOR}}) \\ &= (11.0 \text{ acres} \times 1.27) + (2.0 \text{ acres} \times 2.32) + (1.5 \text{ acres} \times 0.21) + (3.5 \times \\ &\quad 0.12) \\ &= \mathbf{19.0 \text{ lbs P/year}} \end{aligned}$$

$$\begin{aligned} P_{\text{DEVinc}} &= P_{\text{DEV}} - \text{Baseline Load} \\ &= 19.0 - 16.0 \\ &= \mathbf{3.0 \text{ lbs/year}} \end{aligned}$$

Table 1-1. Annual composite phosphorus load export rates

Land Cover	Representative DCIA, %	Composite PLERs, lb/ac/yr	Composite PLERs, kg/ha/yr
Commercial	57	1.13	1.27
Industrial	67	1.27	1.42
High Density Residential	36	1.04	1.16
Medium Density Residential	16	0.49	0.55
Low Density Residential	11	0.30	0.34
Freeway	44	0.73	0.82
Open Space	8	0.26	0.29
Agriculture	0.4	0.45	0.50
Forest	0.1	0.12	0.13

Table 1-2: Proposed average annual distinct P Load export rates for use in estimating P Load reduction credits the MA MS4 Permit

Phosphorus Source Category by Land Use	Land Surface Cover	P Load Export Rate, lbs/acre/year	P Load Export Rate, kg/ha/yr
Commercial (Com) and Industrial (Ind)	Directly connected impervious	1.78	2.0
	Pervious	See* DevPERV	See* DevPERV
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	2.6
	Pervious	See* DevPERV	See* DevPERV
Medium -Density Residential (MDR)	Directly connected impervious	1.96	2.2
	Pervious	See* DevPERV	See* DevPERV
Low Density Residential (LDR) - "Rural"	Directly connected impervious	1.52	1.7
	Pervious	See* DevPERV	See* DevPERV
Highway (HWY)	Directly connected impervious	1.34	1.5
	Pervious	See* DevPERV	See* DevPERV
Forest (For)	Directly connected impervious	1.52	1.7
	Pervious	0.13	0.13
Open Land (Open)	Directly connected impervious	1.52	1.7
	Pervious	See* DevPERV	See* DevPERV
Agriculture (Ag)	Directly connected impervious	1.52	1.7
	Pervious	0.45	0.5
*Developed Land Pervious (DevPERV)- Hydrologic Soil Group A	Pervious	0.03	0.03
*Developed Land Pervious (DevPERV)- Hydrologic Soil Group B	Pervious	0.12	0.13
*Developed Land Pervious (DevPERV) - Hydrologic Soil Group C	Pervious	0.21	0.24
*Developed Land Pervious (DevPERV) - Hydrologic Soil Group C/D	Pervious	0.29	0.33
*Developed Land Pervious (DevPERV) - Hydrologic Soil Group D	Pervious	0.37	0.41

Table 1-3: Crosswalk of MassGIS land-use categories to land-use groups for P Load Calculations

Mass GIS Land Use LU_CODE	Description	Land Use group for calculating P Load - 2013/14 MA MS4
1	Crop Land	Agriculture
2	Pasture (active)	Agriculture
3	Forest	Forest
4	Wetland	Forest
5	Mining	Industrial
6	Open Land includes inactive pasture	open land
7	Participation Recreation	open land
8	spectator recreation	open land
9	Water Based Recreation	open land
10	Multi-Family Residential	High Density Residential
11	High Density Residential	High Density Residential
12	Medium Density Residential	Medium Density Residential
13	Low Density Residential	Low Density Residential
14	Saltwater Wetland	Water
15	Commercial	Commercial
16	Industrial	Industrial
17	Urban Open	open land
18	Transportation	Highway
19	Waste Disposal	Industrial
20	Water	Water
23	cranberry bog	Agriculture
24	Powerline	open land
25	Saltwater Sandy Beach	open land
26	Golf Course	Agriculture
29	Marina	Commercial
31	Urban Public	Commercial
34	Cemetery	open land
35	Orchard	Forest
36	Nursery	Agriculture
37	Forested Wetland	Forest
38	Very Low Density residential	Low Density Residential
39	Junkyards	Industrial
40	Brush land/Successional	Forest

ATTACHMENT 2 TO APPENDIX F

Phosphorus Reduction Credits for Selected Enhanced Non-Structural BMPs

The permittee shall use the following methods to calculate phosphorus load reduction credits for the following enhanced non-structural control practices implemented in the Watershed:

- 1) Enhanced Sweeping Program;
- 2) Catch Basin Cleaning;
and
- 3) Organic Waste and Leaf Litter Collection program

The methods include the use of default phosphorus reduction factors that EPA has determined are acceptable for calculating phosphorus load reduction credits for these practices.

The methods and annual phosphorus load export rates presented in this attachment are for the purpose of counting load reductions for various BMPs treating storm water runoff from varying site conditions (i.e., impervious or pervious surfaces) and different land uses (e.g. industrial and commercial) within the impaired watershed. Table 2-1 below provides annual phosphorus load export rates by land use category for impervious and pervious areas. The estimates of annual phosphorus load and load reductions resulting from BMP implementation are intended for use by the permittee to measure compliance with its Phosphorus Reduction Requirement under the permit.

Examples are provided to illustrate use of the methods. In calculating phosphorus export rates, the permittee shall select the land use category that most closely represents the actual use for the area in question. For watersheds with institutional type uses, such as government properties, hospitals, and schools, the permittee shall use the commercial land use category for the purpose of calculating phosphorus loads. Table 2-2 provides a crosswalk table of land use codes between land use groups in Table 2-1 and the codes used by Mass GIS. For pervious areas, permittees should use the appropriate value for the hydrologic soil group (HSG) if known, otherwise, assume HSG C conditions.

Alternative Methods and/or Phosphorus Reduction Factors: A permittee may propose alternative methods and/or phosphorus reduction factors for calculating phosphorus load reduction credits for these non-structural practices. EPA will consider alternative methods and/or phosphorus reduction factors, provided that the permittee submits adequate supporting documentation to EPA. At a minimum, supporting documentation shall consist of a description of the proposed method, the technical basis of the method, identification of alternative phosphorus reduction factors, supporting calculations, and identification of references and sources of information that support the use of the alternative method and/or factors in the Watershed. If EPA determines that the alternative methods and/or factors are not adequately supported, EPA will notify the permittee and the permittee may receive no phosphorus reduction credit other than a reduction credit calculated by the permittee following the methods in this attachment for the identified practices.

Table 2-1: Proposed average annual distinct P Load export rates for use in estimating P Load reduction credits in the MA MS4 Permit

Phosphorus Source Category by Land Use	Land Surface Cover	P Load Export Rate, lbs/acre/year	P Load Export Rate, kg/ha/yr
Commercial (Com) and Industrial (Ind)	Directly connected impervious	1.78	2.0
	Pervious	See* DevPERV	See* DevPERV
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	2.6
	Pervious	See* DevPERV	See* DevPERV
Medium -Density Residential (MDR)	Directly connected impervious	1.96	2.2
	Pervious	See* DevPERV	See* DevPERV
Low Density Residential (LDR) - "Rural"	Directly connected impervious	1.52	1.7
	Pervious	See* DevPERV	See* DevPERV
Highway (HWY)	Directly connected impervious	1.34	1.5
	Pervious	See* DevPERV	See* DevPERV
Forest (For)	Directly connected impervious	1.52	1.7
	Pervious	0.13	0.13
Open Land (Open)	Directly connected impervious	1.52	1.7
	Pervious	See* DevPERV	See* DevPERV
Agriculture (Ag)	Directly connected impervious	1.52	1.7
	Pervious	0.45	0.5
*Developed Land Pervious (DevPERV) – HSG A	Pervious	0.03	0.03
*Developed Land Pervious (DevPERV) – HSG B	Pervious	0.12	0.13
*Developed Land Pervious (DevPERV) – HSG C	Pervious	0.21	0.24
*Developed Land Pervious (DevPERV) – HSG C/D	Pervious	0.29	0.33
*Developed Land Pervious (DevPERV) – HSG D	Pervious	0.37	0.41
Notes:			
<ul style="list-style-type: none"> For pervious areas, if the hydrologic soil group (HSG) is known, use the appropriate value from this table. If the HSG is not known, assume HSG C conditions for the phosphorus load export rate. Agriculture includes row crops. Actively managed hay fields and pasture lands. Institutional land uses such as government properties, hospitals and schools are to be included in the commercial and industrial land use grouping for the purpose of calculating phosphorus loading. Impervious surfaces within the forest land use category are typically roadways adjacent to forested pervious areas. 			

**Table 2-2: Crosswalk of Mass GIS land use categories
to land use groups for P load calculations**

Mass GIS Land Use LU_CODE	Description	Land Use group for calculating P Load - 2013/14 MA MS4
1	Crop Land	Agriculture
2	Pasture (active)	Agriculture
3	Forest	Forest
4	Wetland	Forest
5	Mining	Industrial
6	Open Land includes inactive pasture	open land
7	Participation Recreation	open land
8	spectator recreation	open land
9	Water Based Recreation	open land
10	Multi-Family Residential	High Density Residential
11	High Density Residential	High Density Residential
12	Medium Density Residential	Medium Density Residential
13	Low Density Residential	Low Density Residential
14	Saltwater Wetland	Water
15	Commercial	Commercial
16	Industrial	Industrial
17	Urban Open	open land
18	Transportation	Highway
19	Waste Disposal	Industrial
20	Water	Water
23	cranberry bog	Agriculture
24	Powerline	open land
25	Saltwater Sandy Beach	open land
26	Golf Course	Agriculture
29	Marina	Commercial
31	Urban Public	Commercial
34	Cemetery	open land
35	Orchard	Forest
36	Nursery	Agriculture
37	Forested Wetland	Forest
38	Very Low Density residential	Low Density Residential
39	Junkyards	Industrial
40	Brush land/Successional	Forest

(1) Enhanced Sweeping Program: The permittee may earn a phosphorus reduction credit for conducting an enhanced sweeping program of impervious surfaces. Table 2-2 below outlines the default phosphorus removal factors for enhanced sweeping programs. The credit shall be calculated by using the following equation:

$$\text{Credit}_{\text{sweeping}} = \text{IA}_{\text{swept}} \times \text{PLE}_{\text{IC-land use}} \times \text{PRF}_{\text{sweeping}} \times \text{AF} \quad \text{(Equation 2-1)}$$

Where:

$\text{Credit}_{\text{sweeping}}$	=	Amount of phosphorus load removed by enhanced sweeping program (lb/year)
IA_{swept}	=	Area of impervious surface that is swept under the enhanced sweeping program (acres)
$\text{PLE}_{\text{IC-land use}}$	=	Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr) (see Table 2-1)
$\text{PRF}_{\text{sweeping}}$	=	Phosphorus Reduction Factor for sweeping based on sweeper type and frequency (see Table 2-3).
AF	=	Annual Frequency of sweeping. For example, if sweeping does not occur in Dec/Jan/Feb, the AF would be 9 mo./12 mo. = 0.75. For year-round sweeping, AF=1.0 ¹

As an alternative, the permittee may apply a credible sweeping model of the Watershed and perform continuous simulations reflecting build-up and wash-off of phosphorus using long-term local rainfall data.

Table 2-3: Phosphorus reduction efficiency factors ($\text{PRF}_{\text{sweeping}}$) for sweeping impervious areas

Frequency ¹	Sweeper Technology	$\text{PRF}_{\text{sweeping}}$
2/year (spring and fall) ²	Mechanical Broom	0.01
2/year (spring and fall) ²	Vacuum Assisted	0.02
2/year (spring and fall) ²	High-Efficiency Regenerative Air-Vacuum	0.02
Monthly	Mechanical Broom	0.03
Monthly	Vacuum Assisted	0.04
Monthly	High Efficiency Regenerative Air-Vacuum	0.08
Weekly	Mechanical Broom	0.05
Weekly	Vacuum Assisted	0.08
Weekly	High Efficiency Regenerative Air-Vacuum	0.10

¹For full credit for monthly and weekly frequency, sweeping must be conducted year round. Otherwise, the credit should be adjusted proportionally based on the duration of the sweeping season (using AF factor).

² In order to earn credit for semi-annual sweeping the sweeping must occur in the spring following snow-melt and road sand applications to impervious surfaces and in the fall after leaf-fall and prior to the onset to the snow season.

Example 2-1: Calculation of enhanced sweeping program credit (Credit_{sweeping}): A permittee proposes to implement an enhanced sweeping program and perform weekly sweeping from March 1 – December 1 (9 months) in their Watershed, using a vacuum assisted sweeper on 20.3 acres of parking lots and roadways in a high-density residential area of the Watershed. For this site the needed information is:

- IA_{swept} = 20.3 acres
- PLE_{IC-HDR} = 2.32 lb/acre/yr (from Table 2-1)
- PRF_{sweeping} = 0.08 (from Table 2-3)
- AF = (9 months / 12 months) = 0.75

Substitution into equation 2-1 yields a Credit_{sweeping} of 3.2 pounds of phosphorus removed per year.

$$\begin{aligned} \text{Credit}_{\text{sweeping}} &= \text{IA}_{\text{swept}} \times \text{PLE}_{\text{land use}} \times \text{PRF}_{\text{sweeping}} \times \text{AF} \\ &= 20.3 \text{ acres} \times 2.32 \text{ lbs/acre/yr} \times 0.08 \times 0.75 \\ &= \mathbf{2.8 \text{ lbs/yr}} \end{aligned}$$

(2) Catch Basin Cleaning: The permittee may earn a phosphorus reduction credit, Credit_{CB}, by removing accumulated materials from catch basins (i.e., catch basin cleaning) in the Watershed such that a minimum sump storage capacity of 50% is maintained throughout the year. The credit shall be calculated by using the following equation:

$$\text{Credit}_{\text{CB}} = \text{IA}_{\text{CB}} \times \text{PLE}_{\text{IC-land use}} \times \text{PRF}_{\text{CB}} \quad \text{(Equation 2-2)}$$

Where:

- Credit_{CB} = Amount of phosphorus load removed by catch basin cleaning (lb/year)
- IA_{CB} = Impervious drainage area to catch basins (acres)
- PLE_{IC-and use} = Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr) (see Table 2-1)
- PRF_{CB} = Phosphorus Reduction Factor for catch basin cleaning (see Table 2-4)

Table 2-4: Phosphorus reduction efficiency factor (PRF_{CB}) for semi-annual catch basin cleaning

Frequency	Practice	PRF _{CB}
Semi-annual	Catch Basin Cleaning	0.02

Example 2-2: Calculation for catch basin cleaning credit (Credit_{CB}):

A permittee proposes to clean catch basins in their Watershed (i.e., remove accumulated sediments and contaminants captured in the catch basins) that drain runoff from 15.3 acres of medium-density residential impervious area. For this site the needed information is:

IA _{CB}	= 15.3 acre
PLE _{IC-MDR}	= 1.96 lbs/acre/yr (from Table 2-1)
PRF _{CB}	= 0.02 (from Table 2-4)

Substitution into equation 2-2 yields a Credit_{CB} of 0.6 pounds of phosphorus removed per year:

$$\begin{aligned} \text{Credit}_{CB} &= \text{IA}_{CB} \times \text{PLE}_{IC-MDR} \times \text{PRF}_{CB} \\ &= 15.3 \text{ acre} \times 1.96 \text{ lbs/acre/yr} \times 0.02 \\ &= \mathbf{0.6 \text{ lbs/yr}} \end{aligned}$$

(3) Enhanced Organic Waste and Leaf Litter Collection program: The permittee may earn a phosphorus reduction credit by performing regular gathering, removal and disposal of landscaping wastes, organic debris, and leaf litter from impervious surfaces from which runoff discharges to the TMDL waterbody or its tributaries. In order to earn this credit (Credit_{leaf litter}), the permittee must gather and remove all landscaping wastes, organic debris, and leaf litter from impervious roadways and parking lots at least once per week during the period of September 1 to December 1 of each year. Credit can only be earned for those impervious surfaces that are cleared of organic materials in accordance with the description above. The gathering and removal shall occur immediately following any landscaping activities in the Watershed and at additional times when necessary to achieve a weekly cleaning frequency. The permittee must ensure that the disposal of these materials will not contribute pollutants to any surface water discharges. The permittee may use an enhanced sweeping program (e.g., weekly frequency) as part of earning this credit provided that the sweeping is effective at removing leaf litter and organic materials. The Credit_{leaf litter} shall be determined by the following equation:

$$\text{Credit}_{\text{leaf litter}} = (\text{Watershed Area}) \times (\text{PLE}_{IC\text{-land use}}) \times (0.05) \quad \text{(Equation 2-3)}$$

Where:

Credit _{leaf litter}	= Amount of phosphorus load reduction credit for organic waste and leaf litter collection program (lb/year)
Watershed Area	= All impervious area (acre) from which runoff discharges to the TMDL waterbody or its tributaries in the Watershed
PLE _{IC-land use}	= Phosphorus Load Export Rate for impervious cover and specified land use (lbs/acre/yr) (see Table 2-1)
0.05	= 5% phosphorus reduction factor for organic waste and leaf litter collection program in the Watershed

Example 2-3: Calculation for organic waste and leaf litter collection program credit

(Credit_{leaf litter}): A permittee proposes to implement an organic waste and leaf litter collection program by sweeping the parking lots and access drives at a minimum of once per week using a mechanical broom sweeper for the period of September 1 to December 1 over 12.5 acres of impervious roadways and parking lots in an industrial/commercial area of the Watershed. Also, the permittee will ensure that organic materials are removed from impervious areas immediately following all landscaping activities at the site. For this site the needed information to calculate the Credit_{leaf litter} is:

$$\begin{aligned} \text{Watershed Area} &= 12.5 \text{ acres; and} \\ \text{PLE}_{\text{IC-commercial}} &= 1.78 \text{ lbs/acre/yr (from Table 2-1)} \end{aligned}$$

Substitution into equation 2-4 yields a Credit_{leaf litter} of 1.1 pounds of phosphorus removed per year:

$$\begin{aligned} \text{Credit}_{\text{leaf litter}} &= (12.5 \text{ acre}) \times (1.78 \text{ lbs/acre/yr}) \times (0.05) \\ &= 1.1 \text{ lbs/yr} \end{aligned}$$

The permittee also may earn a phosphorus reduction credit for enhanced sweeping of roads and parking lot areas (i.e., Credit_{sweeping}) for the three months of use. Using equation 2-1, Credit_{sweeping} is:

$$\begin{aligned} \text{Credit}_{\text{sweeping}} &= \text{IA}_{\text{swept}} \times \text{PLE}_{\text{IC-land use}} \times \text{PRF}_{\text{sweeping}} \times \text{AF} && \text{(Equation 2-1)} \\ \text{IA}_{\text{swept}} &= 12.5 \text{ acre} \\ \text{PLE}_{\text{IC-commercial}} &= 1.78 \text{ lbs/acre/yr (from Table 2-1)} \\ \text{PRF}_{\text{sweeping}} &= 0.05 \text{ (from Table 2-3)} \\ \text{AF} &= 3 \text{ mo./12 mo.} = 0.25 \end{aligned}$$

Substitution into equation 2-1 yields a Credit_{sweeping} of 0.28 pounds of phosphorus removed per year.

$$\begin{aligned} \text{Credit}_{\text{sweeping}} &= \text{IA}_{\text{swept}} \times \text{PLE}_{\text{IC-commercial}} \times \text{PRF}_{\text{sweeping}} \times \text{AF} \\ &= 12.5 \text{ acre} \times 1.78 \text{ lbs/acre/yr} \times 0.05 \times 0.25 \\ &= \mathbf{0.3 \text{ lbs/yr}} \end{aligned}$$

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Methods to Calculate Phosphorus Load Reductions for Structural Stormwater Best Management Practices

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Methods to Calculate Phosphorus Load Reductions for Structural Stormwater Best Management Practices in the Watershed

This attachment provides methods to determine design storage volume capacities and to calculate phosphorus load reductions for the following structural Best Management Practices (structural BMPs) for a Watershed:

- 1) Infiltration Trench;
- 2) Infiltration Basin or other surface infiltration practice;
- 3) Bio-filtration Practice;
- 4) Gravel Wetland System;
- 5) Porous Pavement;
- 6) Wet Pond or wet detention basin;
- 7) Dry Pond or detention basin; and
- 8) Dry Water Quality Swale/ Grass Swale.

Additionally, this attachment provides methods to design and quantify associated phosphorus load reduction credits for the following four types of semi-structural/non-structural BMPs

- 9) Impervious Area Disconnection through Storage (e.g., rain barrels, cisterns, etc);
- 10) Impervious Area Disconnection;
- 11) Conversions of Impervious Area to Permeable Pervious Area; and
- 12) Soil Amendments to Enhance Permeability of Pervious Areas.

Methods and examples are provided in this Attachment to calculate phosphorus load reductions for structural BMPs for the four following purposes:

- 1) To determine the design volume of a structural BMP to achieve a known phosphorus load reduction target when the contributing drainage area is 100% impervious;
- 2) To determine the phosphorus load reduction for a structural BMP with a known design volume when the contributing drainage area is 100% impervious;
- 3) To determine the design volume of a structural BMP to achieve a known phosphorus load reduction target when the contributing drainage area has impervious and pervious surfaces; and
- 4) To determine the phosphorus load reduction for a structural BMP with a known design volume when the contributing drainage area has impervious and pervious surfaces.

Examples are also provided for estimating phosphorus load reductions associated with the four semi-structural/non-structural BMPs.

Also, this attachment provides the methodology for calculating the annual stormwater phosphorus load that will be delivered to BMPs for treatment (BMP Load) and to be used for quantifying phosphorus load reduction credits. The methods and annual phosphorus export load rates presented in this attachment are for the purpose of counting load reductions for various BMPs treating storm water runoff from varying site conditions (i.e., impervious or pervious surfaces) and different land uses (e.g. commercial and industrial). The estimates of annual phosphorus load and load reductions by BMPs are to demonstrate compliance with the permittee's Phosphorus Reduction Requirement under the permit.

Appendix F Attachment 3

Structural BMP performance credits: For each structural BMP type identified above (BMPs 1-8), long-term cumulative performance information is provided to calculate phosphorus load reductions or to determine needed design storage volumes to achieve a specified reduction target (e.g., 65% phosphorus load reduction). The performance information is expressed as cumulative phosphorus load removed (% removed) depending on the physical storage capacity of the structural BMP (expressed as inches of runoff from impervious area) and is provided at the end of this Attachment (see Tables 3-1 through 3-18 and performance curves Figures 3-1 through 3-17). Multiple tables and performance curves are provided for the infiltration practices to represent cumulative phosphorus load reduction performance for six infiltration rates (IR), 0.17, 0.27, 0.53, 1.02, 2.41, and 8.27 inches/hour. These infiltration rates represent the saturated hydraulic conductivity of the soils. The permittee may use the performance curves provided in this attachment to interpolate phosphorus load removal reductions for field measured infiltration rates that are different than the infiltration rates used to develop the performance curves. Otherwise, the permittee shall use the performance curve for the IR that is nearest, but less than, the field measured rate. Physical storage capacity equals the total physical storage volume of the control structure to contain water at any instant in time. Typically, this storage capacity is comprised of the surface ponding storage volume prior to overflow and subsurface storage volumes in storage units and pore spaces of coarse filter media. Table 3-30 provides the formulae to calculate physical storage capacities for the structural control types for using the performance curves.

Semi-Structural/Non-structural BMP performance credits: For each semi-structural/non-structural BMP type identified above (BMPs 9-12), long-term cumulative performance information is provided to calculate phosphorus load reductions or to determine needed design specifications to achieve a desired reduction target (e.g., 50% phosphorus load reduction). The performance information is expressed as cumulative runoff volume reduction (% removed) depending on the design specifics and actual field conditions. Cumulative percent runoff volume reduction is being used to estimate the cumulative phosphorus load reduction credit for these BMPs. To represent a wide range of potential conditions for implementing these types of BMPs, numerous performance tables and curves have been developed to reflect a wide range of potential conditions and designs such as varying storage volumes (expressed in terms of varying ratios of storage volume to impervious area (0.1 to 2.0 inches)); varying ratios of impervious source area to receiving pervious area based on hydrologic soil groups (HSGs) A, B, C and D (8:1, 6:1, 4:1, 2: 1 and 1:1); and varying discharge time periods for temporary storage (1, 2 or 3 days) . The default credits are provided at the end of this Attachment (see Tables 3-19 through 3-26 and performance curves Figures 3-18 through 3-38).

EPA will consider phosphorus load reductions calculated using the methods provided below to be valid for the purpose of complying with the terms of this permit for BMPs that have not been explicitly modeled if the desired BMP has functionality that is similar to one of the simulated BMP types. Please note that only the surface infiltration and the infiltration trench BMP types were simulated to direct storm water runoff into the ground (i.e., infiltration). All of the other simulated BMPs represent practices that have either under-drains or impermeable liners and therefore, are not hydraulically connected to the sub-surface soils (i.e., no infiltration). Following are some simple guidelines for selecting the BMP type and/or determining whether the results of any of the BMP types provided are appropriate for another BMP of interest.

Infiltration Trench is a practice that provides temporary storage of runoff using the void spaces within the soil/sand/gravel mixture that is used to backfill the trench for subsequent infiltration into the surrounding sub-soils. Performance results for the infiltration trench can be used for all subsurface infiltration practices including systems that include pipes and/or chambers that provide temporary storage. Also, the results for this BMP type can be used for bio-retention systems that rely on infiltration when the majority of the temporary storage capacity is provided in the void spaces of the soil filter media and porous pavements that allow infiltration to occur.

Surface Infiltration represents a practice that provides temporary surface storage of runoff (e.g., ponding) for subsequent infiltration into the ground. Appropriate practices for use of the surface infiltration performance estimates include infiltration basins, infiltration swales, rain gardens and bio-retention systems that rely on infiltration and provide the majority of storage capacity through surface-ponding. If an infiltration system includes both surface storage through ponding and a lesser storage volume within the void spaces of a coarse filter media, then the physical storage volume capacity used to determine the long-term cumulative phosphorus removal efficiency from the infiltration basin performance curves would be equal to the sum of the surface storage volume and the void space storage volume. General design specifications for various surface infiltration systems are provided in the most recent version of *the Massachusetts Stormwater Handbook, Volume 2/Chapter2* (<http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/v2c2.pdf>).

Bio-filtration is a practice that provides temporary storage of runoff for filtering through an engineered soil media. The storage capacity is typically made of void spaces in the filter media and temporary ponding at the surface of the practice. Once the runoff has passed through the filter media it is collected by an under-drain pipe for discharge. The performance curve for this control practice assumes zero infiltration. If a filtration system has subsurface soils that are suitable for infiltration, then user should use the either performance curves for the infiltration trench or the infiltration basin depending on the predominance of storage volume made up by free standing storage or void space storage. Depending on the design of the filter media manufactured or packaged bio-filter systems such as tree box filters may be suitable for using the bio-filtration performance results. Design specifications for bio-filtration systems are provided in the most recent version of *the Massachusetts Stormwater Handbook, Volume 2/Chapter2* (<http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/v2c2.pdf>).

Gravel Wetland performance results should be used for practices that have been designed in accordance or share similar features with the design specifications for gravel wetland systems provided in the most recent version of *the Massachusetts Stormwater Handbook, Volume 2/Chapter2* (<http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/v2c2.pdf>).

Porous Pavement performance results represent systems with an impermeable under-liner and an under-drain. *If porous pavement systems do not have an impermeable under-liner so that filtered runoff can infiltrate into sub-soils then the performance results for an infiltration trench may be used for these systems.* Design specifications for porous pavement systems are provided in the most recent version of *the Massachusetts Stormwater Handbook, Volume 2/Chapter2* (<http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/v2c2.pdf>).

Extended Dry Detention Pond performance results should only be used for practices that have been designed in accordance with the design specifications for extended dry detention ponds provided in the most recent version of *the Massachusetts Stormwater Handbook, Volume 2/Chapter2* (<http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/v2c2.pdf>)

Dry Water Quality Swale/ Grass Swale performance results should only be used for practices that have been designed in accordance with the design specifications for a water quality dry swale provided in the most recent version of *the Massachusetts Stormwater Handbook, Volume 2/Chapter2* (<http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/v2c2.pdf>)

Impervious Area Disconnection using Storage (e.g., rain barrels, cistern, etc) performance results are for collecting runoff volumes from impervious areas such as roof tops, providing temporary storage of runoff volume using rain barrels, cisterns or other storage containers, and discharging stored volume to adjacent permeable pervious surfaces over an extended period of time.

Impervious Area Disconnection performance results are for diverting runoff volumes from impervious areas such as roadways, parking lots and roof tops, and discharging it to adjacent vegetated permeable surfaces that are of sufficient size with adequate soils to receive the runoff without causing negative impacts to adjacent down-gradient properties. Careful consideration must be given to the ratio of impervious area to the pervious area that will receive the discharge. Also, devices such as level spreaders to disperse the discharge and provide sheet flow should be employed whenever needed to increase recharge and avoid flow concentration and short circuiting through the pervious area. Soil testing is needed to classify the permeability of the receiving pervious area in terms of HSG.

Conversion of Impervious Area to Permeable Pervious Area phosphorus load reduction credits are for replacing existing impervious surfaces (such as traditional pavements and buildings with roof tops) with permeable surfaces. To be eligible for credit, it is essential that the area previously covered with impervious surface be restored to provide natural or enhanced hydrologic functioning so that the surface is permeable. Sub-soils beneath pavements are typically highly compacted and will require reworking to loosen the soil and the possible addition of soil amendments to restore permeability. Soil testing is needed to classify the permeability (in terms of HSG) of the restored pervious area.

Soil Amendments to Increase Permeability of Pervious Areas performance results are for the practice of improving the permeability of pervious areas through incorporation of soil amendments, tilling and establishing dense vegetation. This practice may be used to complement other practices such as impervious area disconnection to improve overall performance and increase reduction credits earned. Soil testing is needed to classify the permeability (in terms of HSG) of the restored pervious area.

Alternative Methods:

Appendix F Attachment 3

A permittee may propose alternative long-term cumulative performance information or alternative methods to calculate phosphorus load reductions for the structural BMPs identified above or for other structural BMPs not identified in this Attachment.

EPA will consider alternative long-term cumulative performance information and alternative methods to calculate phosphorus load reductions for structural BMPs provided that the permittee provides EPA with adequate supporting documentation. At a minimum, the supporting documentation shall include:

- 1) Results of continuous BMP model simulations representing the structural BMP, using a verified BMP model and representative long-term (i.e., 10 years) climatic data including hourly rainfall data;
- 2) Supporting calculations and model documentation that justify use of the model, model input parameters, and the resulting cumulative phosphorus load reduction estimate;
- 3) If pollutant removal performance data are available for the specific BMP, model calibration results should be provided; and
- 4) Identification of references and sources of information that support the use of the alternative information and method.

If EPA determines that the long-term cumulative phosphorus load reductions developed based on alternative information are not adequately supported, EPA will notify the permittee in writing, and the permittee may receive no phosphorus reduction credit other than a reduction credit calculated by the permittee using the default phosphorus reduction factors provided in this attachment for the identified practices. The permittee is required to submit to EPA valid phosphorus load reductions for structural BMPs in the watershed in accordance with the submission schedule requirements specified in the permit and Appendix F.

Method to Calculate Annual Phosphorus Load Delivered to BMPs (BMP Load)

The **BMP Load** is the annual phosphorus load from the drainage area to each proposed or existing BMP used by permittee to claim credit against its stormwater phosphorus load reduction requirement (i.e., Phosphorus Reduction Requirement). The BMP Load is the starting point from which the permittee calculates the reduction in phosphorus load achieved by each existing and proposed BMP.

Examples are provided to illustrate use of the methods. Table 3-1 below provides annual phosphorus load export rates (PLERs) by land use category for impervious and pervious areas. The permittee shall select the land use category that most closely represents the actual use of the watershed. For pervious areas, if the hydrologic soil group (HSG) is known, use the appropriate value. If the HSG is not known, assume HSG C conditions for the phosphorus load export rate. For watersheds with institutional type uses, such as government properties, hospitals, and schools, the permittee shall use the commercial/industrial land use category for the purpose of calculating phosphorus loads. Table 3-2 provides a crosswalk table of land use codes between land use groups in Table 3-1 and the codes used by MassGIS.

Appendix F Attachment 3

BMP Load: To estimate the annual phosphorus load reduction that a storm water BMP can achieve, it is first necessary to estimate the amount of annual phosphorus load that the BMP will receive or treat (BMP Load).

For a given BMP:

- 1) Determine the total drainage area to the BMP;
- 2) Distribute the total drainage area into impervious and pervious subareas by land use category as defined by Tables 3-1 and 3-2;
- 3) Calculate the phosphorus load for each land use-based impervious and pervious subarea by multiplying the subarea by the appropriate phosphorus load export rate provided in Table 3-1; and
- 4) Determine the total annual phosphorus load to the BMP by summing the calculated impervious and pervious subarea phosphorus loads.

Example 3-1 to determine phosphorus load to a proposed BMP: A permittee is proposing a surface stormwater infiltration system that will treat runoff from an industrial site with an area of 12.87 acres (5.21 hectares) and is made up of 10.13 acres of impervious cover (e.g., roadways, parking areas and rooftops), 1.85 acres of landscaped pervious area and 0.89 acres of wooded area both with HSG C soils. The drainage area information for the proposed BMP is:

BMP Subarea ID	Land Use Category	Cover Type	Area (acres)	P export rate (lb/acre/yr)*
1	Industrial	impervious	10.13	1.78
2	Landscaped (HSG C)	pervious	1.85	0.21
3	Forest (HSG C)	pervious	0.89	0.12

*From Table 3-1

The phosphorus load to the proposed BMP (BMP Load) is calculated as:

$$\begin{aligned}
 \text{BMP Load} &= (IA_{\text{Ind}} \times \text{PLER}_{\text{Ind}}) + (PA_{\text{Ind}} \times \text{PLER}_{\text{Ind}}) + (PA_{\text{FOREST}} \times \text{PLER}_{\text{For}}) \\
 &= (10.13 \times 1.78) + (1.85 \times 0.21) + (0.89 \times 0.12) \\
 &= \mathbf{18.53 \text{ lbs P/year}}
 \end{aligned}$$

Appendix F Attachment 3

Table 3-1: Average annual distinct phosphorus load (P Load) export rates for use in estimating phosphorus load reduction credits the MA MS4 Permit

Phosphorus Source Category by Land Use	Land Surface Cover	P Load Export Rate, lbs/acre/year	P Load Export Rate, kg/ha/yr
Commercial (Com) and Industrial (Ind)	Directly connected impervious	1.78	2.0
	Pervious	See* DevPERV	See* DevPERV
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	2.6
	Pervious	See* DevPERV	See* DevPERV
Medium -Density Residential (MDR)	Directly connected impervious	1.96	2.2
	Pervious	See* DevPERV	See* DevPERV
Low Density Residential (LDR) - "Rural"	Directly connected impervious	1.52	1.7
	Pervious	See* DevPERV	See* DevPERV
Highway (HWY)	Directly connected impervious	1.34	1.5
	Pervious	See* DevPERV	See* DevPERV
Forest (For)	Directly connected impervious	1.52	1.7
	Pervious	0.13	0.13
Open Land (Open)	Directly connected impervious	1.52	1.7
	Pervious	See* DevPERV	See* DevPERV
Agriculture (Ag)	Directly connected impervious	1.52	1.7
	Pervious	0.45	0.5
*Developed Land Pervious (DevPERV)- Hydrologic Soil Group A	Pervious	0.03	0.03
*Developed Land Pervious (DevPERV)- Hydrologic Soil Group B	Pervious	0.12	0.13
*Developed Land Pervious (DevPERV) - Hydrologic Soil Group C	Pervious	0.21	0.24
*Developed Land Pervious (DevPERV) - Hydrologic Soil Group C/D	Pervious	0.29	0.33
*Developed Land Pervious (DevPERV) - Hydrologic Soil Group D	Pervious	0.37	0.41

Appendix F Attachment 3

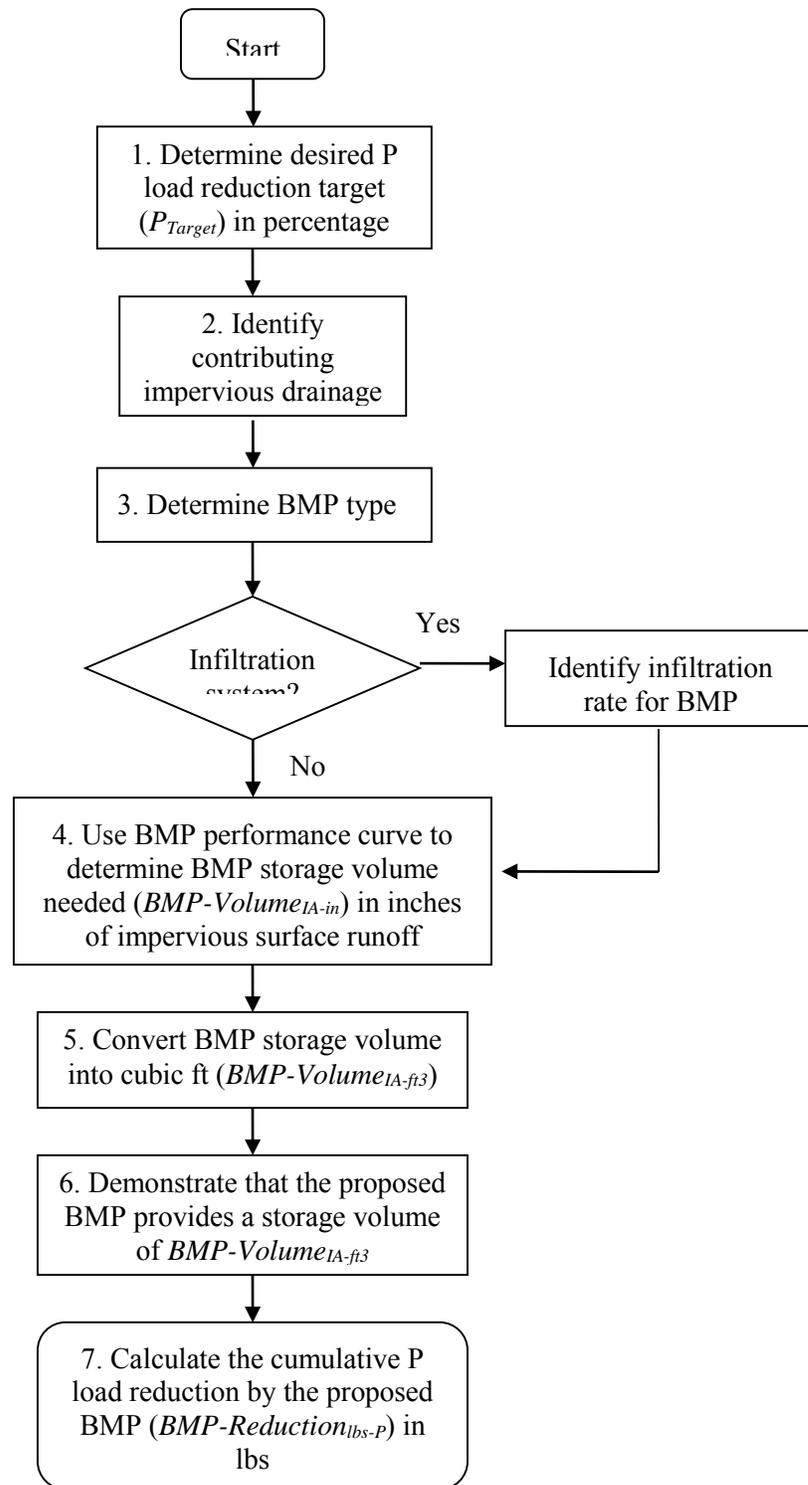
Table 3- 2: MassGIS land-use categories with associated land-use groups for phosphorus load calculations

Mass GIS Land Use LU_CODE	Description	Land Use group for calculating P Load - 2013/14 MA MS4
1	Crop Land	Agriculture
2	Pasture (active)	Agriculture
3	Forest	Forest
4	Wetland	Forest
5	Mining	Industrial
6	Open Land includes inactive pasture	open land
7	Participation Recreation	open land
8	spectator recreation	open land
9	Water Based Recreation	open land
10	Multi-Family Residential	High Density Residential
11	High Density Residential	High Density Residential
12	Medium Density Residential	Medium Density Residential
13	Low Density Residential	Low Density Residential
14	Saltwater Wetland	Water
15	Commercial	Commercial
16	Industrial	Industrial
17	Urban Open	open land
18	Transportation	Highway
19	Waste Disposal	Industrial
20	Water	Water
23	cranberry bog	Agriculture
24	Powerline	open land
25	Saltwater Sandy Beach	open land
26	Golf Course	Agriculture
29	Marina	Commercial
31	Urban Public	Commercial
34	Cemetery	open land
35	Orchard	Forest
36	Nursery	Agriculture
37	Forested Wetland	Forest
38	Very Low Density residential	Low Density Residential
39	Junkyards	Industrial
40	Brush land/Successional	Forest

(1) Method to determine the design volume of a structural BMP to achieve a known phosphorus load reduction target when the contributing drainage area is 100% impervious:

Appendix F Attachment 3

Flow Chart 1 illustrates the steps to determine the design volume of a structural BMP to achieve a known phosphorus load reduction target when the contributing drainage area is 100% impervious.



Flow Chart 1: Method to determine BMP design volume to achieve a known phosphorous load reduction when contributing drainage area is 100% impervious.

- 1) Determine the desired cumulative phosphorus load reduction target (P_{target}) in percentage for the structural BMP;
- 2) Determine the contributing impervious drainage area (IA) in acres to the structural BMP;
- 3) Determine the structural BMP type (e.g., infiltration trench, gravel wetland). For infiltration systems, determine the appropriate infiltration rate for the location of the BMP in the Watershed;
- 4) Using the cumulative phosphorus removal performance curve for the selected structural BMP (Figures 3-1 through 3-18), determine the storage volume for the BMP (BMP-Volume $_{\text{IA-in}}$), in inches of runoff, needed to treat runoff from the contributing IA to achieve the reduction target;
- 5) Calculate the corresponding BMP storage volume in cubic feet (BMP-Volume $_{\text{IA-ft}^3}$) using BMP-Volume $_{\text{IA-in}}$ determined from step 4 and equation 3-1:

$$\text{BMP-Volume}_{\text{IA-ft}^3} = \text{IA (acre)} \times \text{BMP-Volume}_{\text{IA-in}} \times 3630 \text{ ft}^3/\text{ac-in} \quad \text{(Equation 3-1)}$$

- 6) Provide supporting calculations using the dimensions and specifications of the proposed structural BMP showing that the necessary storage volume, BMP-Volume $_{\text{IA-ft}^3}$, determined from step 5 will be provided to achieve the P_{Target} ; and
- 7) Calculate the cumulative phosphorus load reduction in pounds of phosphorus (BMP-Reduction $_{\text{lbs-P}}$) for the structural BMP using the BMP Load (as calculated from the procedure in Attachment 1 to Appendix F) and P_{target} by using equation 3-2:

$$\text{BMP-Reduction}_{\text{lbs-P}} = \text{BMP Load} \times (P_{\text{target}} / 100) \quad \text{(Equation 3-2)}$$

Example 3-2 to determine design volume of a structural BMP with a 100% impervious drainage area to achieve a known phosphorus load reduction target:

A permittee is considering a surface infiltration practice to capture and treat runoff from 2.57 acres (1.04 ha) of commercial impervious area that will achieve a 70% reduction in annual phosphorus load. The infiltration practice would be located adjacent to the impervious area. The permittee has measured an infiltration rate (IR) of 0.39 inches per hour (in/hr) in the vicinity of the proposed infiltration practice. Determine the:

- A) Design storage volume needed for an surface infiltration practice to achieve a 70% reduction in annual phosphorus load from the contributing drainage area (BMP-Volume $_{\text{IA-ft}^3}$); and
- B) Cumulative phosphorus reduction in pounds that would be accomplished by the BMP (BMP-Reduction $_{\text{lbs-P}}$)

Solution:

- 1) Contributing impervious drainages area (IA) = 2.57 acres

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BMP type is a surface infiltration practice (i.e., basin) with an infiltration rate (IR) of 0.39 in/hr

Solution continued:

3) Phosphorus load reduction target (P_{target}) = 70%

4) The performance curve for the infiltration basin (i.e., surface infiltration practice), Figure 3-8, IR = 0.27 in/hr is used to determine the design storage volume of the BMP (BMP-Volume_{IA-in}) needed to treat runoff from the contributing IA and achieve a P_{target} = 70%. The curve for an infiltration rate of 0.27 in/hr is chosen because 0.27 in/hr is the nearest simulated IR that is less than the field measured IR of 0.39 in/hr. From Figure 3-8, the BMP-Volume_{IA-in} for a P_{target} = 70% is 0.36 in.

5) The BMP-Volume_{IA-in} is converted to cubic feet (BMP-Volume_{IA-ft³}) using Equation 3-1:

$$\begin{aligned} \text{BMP-Volume}_{IA-ft^3} &= \text{IA (acre)} \times \text{BMP-Volume}_{IA-in} \times 3,630 \text{ ft}^3/\text{acre-in} \\ \text{BMP-Volume}_{IA-ft^3} &= 2.57 \text{ acre} \times 0.36 \text{ in} \times 3,630 \text{ ft}^3/\text{acre-in} \\ &= \mathbf{3,359 \text{ ft}^3} \end{aligned}$$

6) A narrow trapezoidal infiltration basin with the following characteristics is proposed to achieve the P_{Target} of 70%:

Length (ft)	Design Depth (ft)	Side Slopes	Bottom area (ft ²)	Pond surface area (ft ²)	Design Storage Volume (ft ³)
355	1.25	3:1	1,387	4,059	3,404

The volume of the proposed infiltration practice, 3,404 ft³, exceeds the BMP-Volume_{IA-ft³} needed, 3,359 ft³ and is sufficient to achieve the P_{Target} of 70%.

7) The cumulative phosphorus load reduction in pounds of phosphorus for the infiltration practice (BMP-Reduction_{lbs-P}) is calculated using Equation 3-2. The BMP Load is first determined using the method described above.

$$\begin{aligned} \text{BMP Load} &= \text{IA} \times \text{impervious cover phosphorus export loading rate for commercial use (see Table 3-1)} \\ &= 2.57 \text{ acres} \times 1.78 \text{ lbs/acre/yr} \\ &= 4.58 \text{ lbs/yr} \end{aligned}$$

$$\begin{aligned} \text{BMP-Reduction}_{lbs-P} &= \text{BMP Load} \times (P_{target} / 100) \\ \text{BMP-Reduction}_{lbs-P} &= 4.58 \text{ lbs/yr} \times (70/100) \\ &= \mathbf{3.21 \text{ lbs/yr}} \end{aligned}$$

Alternate Solution: Alternatively, the permittee could determine the design storage volume needed for an IR = 0.39 in/hr by performing interpolation of the results from the surface

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infiltration performance curves for IR = 0.27 in/hr and IR = 0.52 in/hr as follows (replacing steps 3 and 4 on the previous page):

Alternate solution continued:

Using the performance curves for the infiltration basin (i.e., surface infiltration practice), Figures 3-8, IR = 0.27 in/hr and 3-9, IR = 0.52 in/hr, interpolate between the curves to determine the design storage volume of the BMP (BMP-Volume_{IA-in}) needed to treat runoff from the contributing IA and achieve a P_{target} = 70%.

First calculate the interpolation adjustment factor (IAF) to interpolate between the infiltration basin performance curves for infiltration rates of 0.27 and 0.52 in/hr:

$$IAF = (0.39 - 0.27) / (0.52 - 0.27) = 0.48$$

From the two performance curves, develop the following table to estimate the general magnitude of the needed storage volume for an infiltration swale with an IR = 0.39 in/hr and a P_{target} of 70%.

Table Example 3-1-1: Interpolation Table for determining design storage volume of infiltration basin with IR = 0.39 in/hr and a phosphorus load reduction target of 70%

BMP Storage Volume	% Phosphorus Load Reduction IR = 0.27 in/hr (PR _{IR=0.27})	% Phosphorus Load Reduction IR = 0.52 in/hr (PR _{IR=0.52})	Interpolated % Phosphorus Load Reduction IR = 0.39 in/hr (PR _{IR=0.39}) PR _{IR=0.39} = IAF(PR _{IR=0.52} - PR _{IR=0.27}) + PR _{IR=0.27}
0.3	64%	67%	65%
0.4	74%	77%	75%
0.5	79%	82%	80%

As indicated from Table Example 3-1, the BMP-Volume_{IA-in} for PR_{IR=0.39} of 70% is between 0.3 and 0.4 inches and can be determined by interpolation:

$$\begin{aligned} \text{BMP-Volume}_{IA-in} &= (70\% - 65\%) / (75\% - 65\%) \times (0.4 \text{ in} - 0.3 \text{ in}) + 0.3 \text{ in} \\ &= 0.35 \text{ inches} \end{aligned}$$

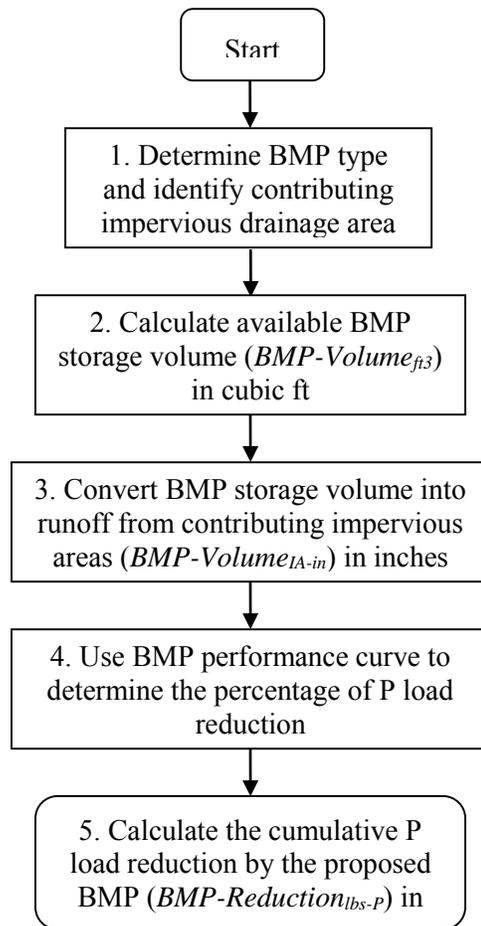
5 alternative) Convert the resulting BMP-Volume_{IA-in} to cubic feet (BMP-Volume_{IA-ft³}) using equation 3-1:

$$\begin{aligned} \text{BMP-Volume}_{IA-ft^3} &= 2.57 \text{ acre} \times 0.35 \text{ in} \times 3,630 \text{ ft}^3/\text{acre-in} \\ &= \mathbf{3,265 \text{ ft}^3} \end{aligned}$$

(2) Method to determine the phosphorus load reduction for a structural BMP with a known design volume when the contributing drainage area is 100% impervious:

Flow Chart 2 illustrates the steps to determine the phosphorus load reduction for a structural BMP with a known design volume when the contributing drainage area is 100% impervious.

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Flow Chart 2: Method to determine the phosphorus load reduction for a BMP with a known design volume when contributing drainage area is 100% impervious.

- 1) Identify the structural BMP type and contributing impervious drainage area (IA);
- 2) Document the available storage volume (ft^3) of the structural BMP (BMP-Volume ft^3) using the BMP dimensions and design specifications (e.g., maximum storage depth, filter media porosity);
- 3) Convert BMP-Volume ft^3 into inches of runoff from the contributing impervious area (BMP-Volume IA-in) using equation 3-3:

$$\text{BMP-Volume}_{\text{IA-in}} = \text{BMP-Volume}_{\text{ft}^3} / \text{IA (acre)} \times 12 \text{ in/ft} \times 1 \text{ acre}/43560 \text{ ft}^2 \text{ (Equation 3-3)}$$

- 4) Determine the % phosphorus load reduction for the structural BMP (BMP Reduction $\%_{\text{-P}}$) using the appropriate BMP performance curve (Figures 3-1 through 3-18) and the BMP-Volume IA-in calculated in step 3; and

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- 5) Calculate the cumulative phosphorus load reduction in pounds of phosphorus for the structural BMP (BMP Reduction_{lbs-P}) using the BMP Load as calculated from the procedure described above and the percent phosphorus load reduction determined in step 4 by using equation 3-4:

$$\text{BMP Reduction}_{\text{lbs-P}} = \text{BMP Load} \times (\text{BMP Reduction}_{\%-\text{P}}/100) \quad \text{(Equation 3-4)}$$

Example 3-2: Determine the phosphorus load reduction for a structural BMP with a known storage volume capacity when the contributing drainage area is 100% impervious:

A permittee is considering a bio-filtration system to treat runoff from 1.49 acres of high density residential (HDR) impervious area. Site constraints would limit the bio-filtration system to have a surface area of 1200 ft² and the system would have to be located next to the impervious drainage area to be treated. The design parameters for the bio-filtration system are presented in Table Example 3-2-1.

Table Example 3-2-1: Design parameters for bio-filtration system for Example 3-2

Components of representation	Parameters	Value
Ponding	Maximum depth	0.5 ft
	Surface area	1200 ft ²
	Vegetative parameter ^a	85-95%
Soil mix	Depth	2.5 ft
	Porosity	0.40
	Hydraulic conductivity	4 inches/hour
Gravel layer	Depth	0.67 ft
	Porosity	0.40
	Hydraulic conductivity	14 inches/hour
Orifice #1	Diameter	0.5 ft

^a Refers to the percentage of surface covered with vegetation

Determine the:

- A) Percent phosphorus load reduction (BMP Reduction_{%-P}) for the specified bio-filtration system and contributing impervious drainage area; and
- B) Cumulative phosphorus reduction in pounds that would be accomplished by the bio-filtration system (BMP-Reduction_{lbs-P})

Solution:

- 1) The BMP is a bio-filtration system that will treat runoff from 1.49 acres of impervious area (IA = 1.49 acre);
- 2) The available storage volume capacity (ft³) of the bio-filtration system (BMP-Volume_{BMP-ft³}) is determined using the surface area of the system, depth of ponding, and the porosity of the filter media:

$$\begin{aligned} \text{BMP-Volume}_{\text{BMP-ft}^3} &= (\text{surface area} \times \text{pond maximum depth}) + ((\text{soil mix depth} + \\ &\text{gravel layer depth})/12 \text{ in/ft}) \times \text{surface area} \times \text{gravel layer porosity}) \\ &= (1,200 \text{ ft}^2 \times 0.5 \text{ ft}) + ((38/12) \times 1,200 \text{ ft}^2 \times 0.4) \\ &= 2,120 \text{ ft}^3 \end{aligned}$$

Solution continued:

- 3) The available storage volume capacity of the bio-filtration system in inches of runoff from the contributing impervious area (BMP-Volume_{IA-in}) is calculated using equation 3-3:

$$\begin{aligned} \text{BMP-Volume}_{\text{IA-in}} &= (\text{BMP-Volume}_{\text{ft}^3} / \text{IA (acre)} \times 12 \text{ in/ft} \times 1 \text{ acre} / 43560 \text{ ft}^2) \\ \text{BMP-Volume}_{\text{IA-in}} &= (2120 \text{ ft}^3 / 1.49 \text{ acre}) \times 12 \text{ in/ft} \times 1 \text{ acre} / 43560 \text{ ft}^2 \\ &= 0.39 \text{ in} \end{aligned}$$

- 4) Using the bio-filtration performance curve shown in Figure 3-13, a **51%** phosphorus load reduction (BMP Reduction %_{-P}) is determined for a bio-filtration system sized for 0.39 in of runoff from 1.49 acres of impervious area; and
- 5) Calculate the cumulative phosphorus load reduction in pounds of phosphorus for the bio-filtration system (BMP Reduction_{lbs-P}) using the BMP Load as calculated from the procedure described above and the BMP Reduction %_{-P} determined in step 4 by using equation 3-4. First, the BMP Load is determined as specified above:

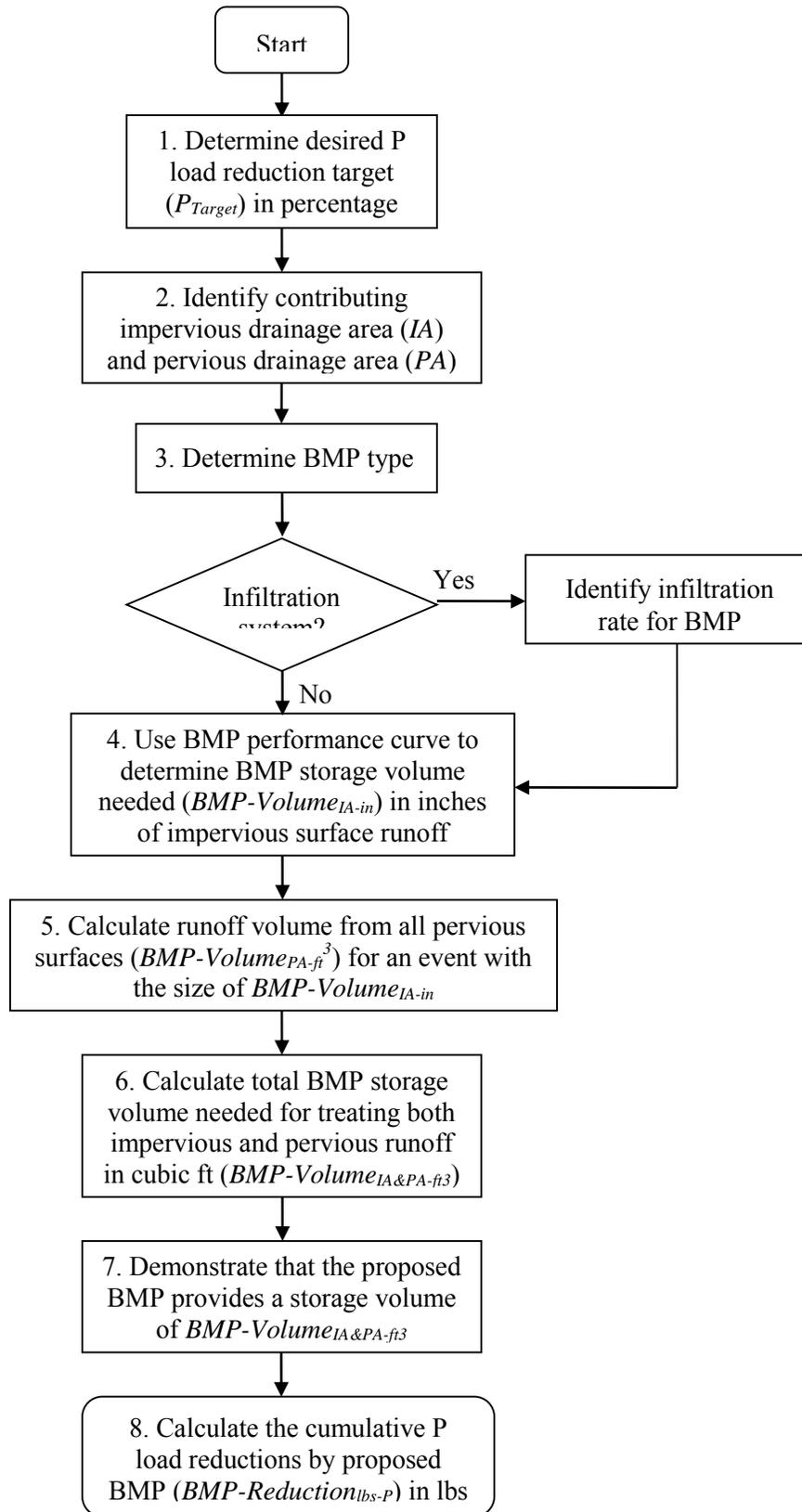
$$\begin{aligned} \text{BMP Load} &= \text{IA} \times \text{impervious cover phosphorus export loading rate for HDR (see Table 3-1)} \\ &= 1.49 \text{ acres} \times 2.32 \text{ lbs/acre/yr} \\ &= 3.46 \text{ lbs/yr} \end{aligned}$$

$$\begin{aligned} \text{BMP Reduction}_{\text{lbs-P}} &= \text{BMP Load} \times (\text{BMP Reduction}_{\%-\text{P}} / 100) \\ \text{BMP Reduction}_{\text{lbs-P}} &= 3.46 \text{ lbs/yr} \times (51 / 100) \\ &= \mathbf{1.76 \text{ lbs/yr}} \end{aligned}$$

(3) Method to determine the design storage volume of a structural BMP to achieve a known phosphorus load reduction target when the contributing drainage area has impervious and pervious surfaces:

Flow Chart 3 illustrates the steps to determine the design storage volume of a structural BMP to achieve a known phosphorus load reduction target when the contributing drainage area has impervious and pervious surfaces.

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Flow Chart 3: Method to determine the design storage volume of a BMP to reach a known P load reduction when both impervious and pervious drainage areas are present.

- 1) Determine the desired cumulative phosphorus load reduction target (P_{target}) in percentage for the structural BMP;
- 2) Characterize the contributing drainage area to the structural BMP by identifying the following information for the impervious and pervious surfaces:

Impervious area (IA) - Area (acre) and land use (e.g., commercial)

Pervious area (PA) – Area (acre) and runoff depths based on hydrologic soil group (HSG) and rainfall depth. Table 3-3 provides values of runoff depth from pervious areas for various rainfall depths and HSGs. Soils are assigned to an HSG on the basis of their permeability. HSG A is the most permeable, and HSG D is the least permeable. HSG categories for pervious areas in the drainage area shall be estimated by consulting local soil surveys prepared by the National Resource Conservation Service (NRCS) or by a storm water professional evaluating soil testing results from the drainage area. If the HSG condition is not known, a HSG D soil condition should be assumed.

Table 3- 3: Developed Land Pervious Area Runoff Depths based on Precipitation depth and Hydrological Soil Groups (HSGs)

Developed Land Pervious Area Runoff Depths based on Precipitation depth and Hydrological Soil Groups					
Rainfall Depth, Inches	Runoff Depth, inches				
	Pervious HSG A	Pervious HSG B	Pervious HSG C	Pervious HSG C/D	Pervious HSG D
0.10	0.00	0.00	0.00	0.00	0.00
0.20	0.00	0.00	0.01	0.02	0.02
0.40	0.00	0.00	0.03	0.05	0.06
0.50	0.00	0.01	0.05	0.07	0.09
0.60	0.01	0.02	0.06	0.09	0.11
0.80	0.02	0.03	0.09	0.13	0.16
1.00	0.03	0.04	0.12	0.17	0.21
1.20	0.04	0.05	0.14	0.27	0.39
1.50	0.08	0.11	0.39	0.55	0.72
2.00	0.14	0.22	0.69	0.89	1.08

Notes: Runoff depths derived from combination of volumetric runoff coefficients from Table 5 of *Small Storm Hydrology and Why it is Important for the Design of Stormwater Control Practices*, (Pitt, 1999), and using the Stormwater Management Model (SWMM) in continuous model mode for hourly precipitation data for Boston, MA, 1998-2002.

- 3) Determine the structural BMP type (e.g., infiltration trench, gravel wetland). For infiltration systems, determine the appropriate infiltration rate for the location of the BMP in the Watershed;
- 4) Using the cumulative phosphorus removal performance curve for the selected structural BMP, determine the storage volume capacity of the BMP in inches needed to treat runoff from the contributing impervious area (BMP-Volume_{IA-in});

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- 5) Using Equation 3-5 below and the pervious area runoff depth information from Table 3-3-1, determine the total volume of runoff from the contributing pervious drainage area in cubic feet (BMP Volume $_{PA-ft^3}$) for a rainfall size equal to the sum of BMP Volume $_{IA-in}$, determined in step 4. The runoff volume for each distinct pervious area must be determined;

$$\text{BMP-Volume}_{PA-ft^3} = \sum (PA \times (\text{runoff depth}) \times 3,630 \text{ ft}^3/\text{acre-in}) \quad (PA_1, \dots, PA_n)$$

(Equation 3-5)

- 6) Using equation 3-6 below, calculate the BMP storage volume in cubic feet (BMP-Volume $_{IA\&PA-ft^3}$) needed to treat the runoff depth from the contributing impervious (IA) and pervious areas (PA);

$$\text{BMP-Volume}_{IA\&PA-ft^3} = \text{BMP Volume}_{PA-ft^3} + (\text{BMP Volume}_{IA-in} \times IA \text{ (acre)}) \times 3,630 \text{ ft}^3/\text{acre-in}$$

(Equation 3-6)

- 7) Provide supporting calculations using the dimensions and specifications of the proposed structural BMP showing that the necessary storage volume determined in step 6, BMP-Volume $_{IA\&PA-ft^3}$, will be provided to achieve the P_{Target} ; and
- 8) Calculate the cumulative phosphorus load reduction in pounds of phosphorus (BMP-Reduction $_{lbs-P}$) for the structural BMP using the BMP Load (as calculated from the procedure in Attachment 1 to Appendix F) and the P_{target} by using equation 3-2:

$$\text{BMP-Reduction}_{lbs-P} = \text{BMP Load} \times (P_{\text{target}} / 100) \quad \text{(Equation 3-2)}$$

Example 3-3: Determine the design storage volume of a structural BMP to achieve a known phosphorus load reduction target when the contributing drainage area has impervious and pervious surfaces

A permittee is considering a gravel wetland system to treat runoff from a high-density residential (HDR) site. The site is 7.50 acres of which 4.00 acres are impervious surfaces and 3.50 acres are pervious surfaces. The pervious area is made up of 2.5 acres of lawns in good condition surrounding cluster housing units and 1.00 acre of stable unmanaged woodland. Soils information indicates that all of the woodland and 0.50 acres of the lawn is hydrologic soil group (HSG) B and the other 2.00 acres of lawn are HSG C. The permittee wants to size the gravel wetland system to achieve a cumulative phosphorus load reduction (P_{Target}) of 55% from the entire 7.50 acres.

Determine the:

- A)** Design storage volume needed for a gravel wetland system to achieve a 55% reduction in annual phosphorus load from the contributing drainage area (BMP-Volume $_{IA\&PA-ft^3}$); and
- B)** Cumulative phosphorus reduction in pounds that would be accomplished by the BMP (BMP-Reduction $_{lbs-P}$)

Example 3-3 continued:

Solution:

- 1) The BMP type is gravel wetland system.
- 2) The phosphorus load reduction target ($P_{\text{Target}} = 55\%$).
- 3) Using the cumulative phosphorus removal performance curve for the gravel wetland system shown in Figure 3-14, the storage volume capacity in inches needed to treat runoff from the contributing impervious area (BMP Volume $_{IA-in}$) is 0.71 in;

Using equation 3-5 and the pervious runoff depth information from Table 3-3, the volume of runoff from the contributing pervious drainage area in cubic feet (BMP Volume $_{PA-ft^3}$) for a rainfall size equal to 0.71 in is summarized in Table Example 3-3-A. As indicated from Table 3-3, the runoff depth for a rainfall size equal to 0.71 inches is between 0.6 and 0.8 inches and can be determined by interpolation (example shown for runoff depth of HSG C):

$$\begin{aligned} \text{Runoff depth (HSG C)} &= (0.71 - 0.6)/(0.8 - 0.6) \times (0.09 \text{ in} - 0.06 \text{ in}) + 0.06 \text{ in} \\ &= 0.07 \text{ inches} \end{aligned}$$

Table Example 3-3-A: Runoff contributions from pervious areas for HDR site

ID	Type	Pervious Area (acre)	HSG	Runoff (in)	Runoff = (runoff) x PA (acre-in)	Runoff = Runoff (acre-in) x 3630 $\text{ft}^3/\text{acre-in}$ (ft^3)
PA1	Grass	2.00	C	0.07	0.14	508
PA2	Grass	0.50	B	0.01	0.0	0.0
PA3	Woods	1.00	B	0.01	0.0	0.0
Total	-----	3.50	-----	-----	0.14	508

- 4) Using equation 3-6, determine the BMP storage volume in cubic feet (BMP-Volume $_{IA\&PA-ft^3}$) needed to treat 0.71 inches of runoff from the contributing impervious area (IA) and the runoff of 0.14 acre-in from the contributing pervious areas, determined in step 5 is:

$$\text{BMP Volume}_{IA\&PA-ft^3} = \text{BMP Volume}_{PA \text{ ac-in}} + (\text{BMP Volume}_{IA-in} \times \text{IA (acre)}) \times 3,630 \text{ ft}^3/\text{acre-in}$$

$$\begin{aligned} \text{BMP Volume}_{IA\&PA-ft^3} &= (508 \text{ ft}^3 + (0.71 \text{ in} \times 4.00 \text{ acre})) \times 3,630 \text{ ft}^3/\text{acre-in} \\ &= 10,817 \text{ ft}^3 \end{aligned}$$

- 5) Table Example 3-3-B provides design details for of a potential gravel wetland system

Solution continued:

Table Example 3-3-B: Design details for gravel wetland system

Gravel Wetland System Components	Design Detail	Depth (ft)	Surface Area (ft ²)	Volume (ft ³)
Sediment Forebay	10% of Treatment Volume			
Pond area	---	1.33	896	1,192
Wetland Cell #1	45% of Treatment Volume	-----	-----	-----
Pond area	---	2.00	1,914	3,828
Gravel layer	porosity = 0.4	2.00	1,914	1,531
Wetland Cell #2	45% of Treatment Volume	-----	-----	-----
Pond area	---	2.00	1,914	3,828
Gravel layer	porosity = 0.4	2.00	1,914	1,531

The total design storage volume for the proposed gravel wetland system identified in Table Example 3-3-C is 11,910 ft³. This volume is greater than 11,834 ft³ ((BMP-Volume_{IA&PA-ft³}), calculated in step 6) and is therefore sufficient to achieve a P_{Target} of 55%.

- 6) The cumulative phosphorus load reduction in pounds of phosphorus (BMP-Reduction_{lbs-P}) for the proposed gravel wetland system is calculated by using equation 3-2 with the BMP Load and the P_{target} = 55%.

$$\text{BMP-Reduction}_{\text{lbs-P}} = \text{BMP Load} \times (\text{P}_{\text{target}} / 100) \quad \text{(Equation 3-2)}$$

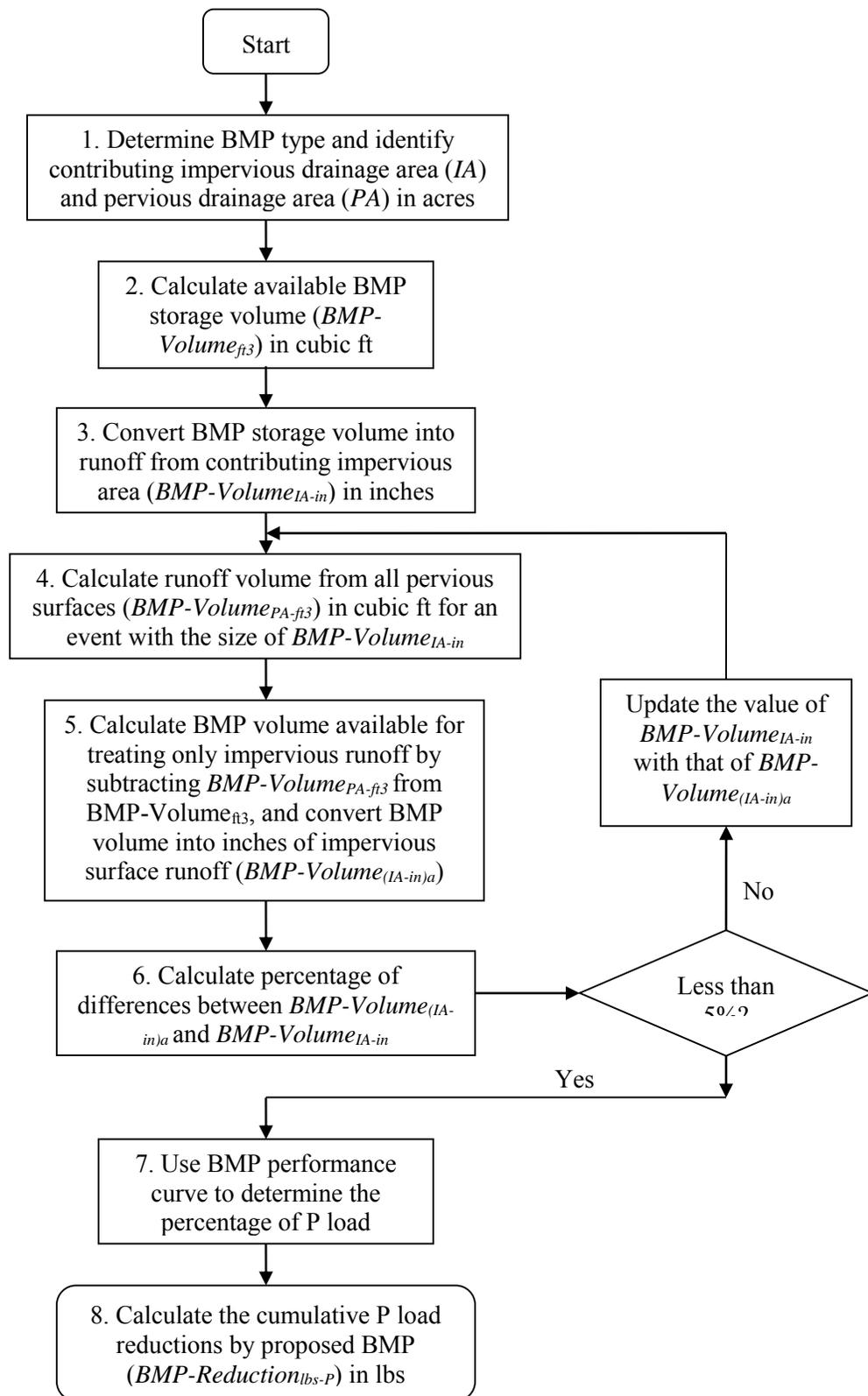
Using Table 3-1, the BMP Load is calculated:

$$\begin{aligned} \text{BMP Load} &= (\text{IA} \times \text{PLER}_{\text{HDR}}) + (\text{PA}_{\text{lawn HSG B}} \times \text{PLER}_{\text{HSG B}}) + (\text{PA}_{\text{lawn HSG C}} \times \text{PLER}_{\text{HSG C}}) + (\text{PA}_{\text{forest}} \times \text{PA}_{\text{PLER}_{\text{For}}}) \\ &= (4.00 \text{ acre} \times 2.32 \text{ lbs/acre/yr}) + (0.50 \text{ acres} \times 0.12 \text{ lbs/acre/yr}) + (1.00 \text{ acre} \times 0.21 \text{ lbs/acre/yr}) + (1.00 \text{ acres} \times 0.13) \\ &= 9.68 \text{ lbs/yr} \\ \text{BMP-Reduction}_{\text{lbs-P}} &= \text{BMP Load} \times (\text{P}_{\text{target}} / 100) \\ \text{BMP-Reduction}_{\text{lbs-P}} &= 9.68 \text{ lbs/yr} \times 55/100 \\ &= \mathbf{5.32 \text{ lbs/yr}} \end{aligned}$$

(4) Method to determine the phosphorus load reduction for a structural BMP with a known storage volume when the contributing drainage area has impervious and pervious surfaces:

Flow Chart 4 illustrates the steps to determine the phosphorus load reduction for a structural BMP with a known storage volume when the contributing drainage area has impervious and pervious surfaces.

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Flow Chart 4: Method to determine the phosphorus load reduction for a BMP with known storage volume when both pervious and impervious drainage areas are present.

- 1) Identify the type of structural BMP and characterize the contributing drainage area to the structural BMP by identifying the following information for the impervious and pervious surfaces:

Impervious area (IA) – Area (acre) and land use (e.g., commercial)

Pervious area (PA) – Area (acre) and runoff depth based on hydrologic soil group (HSG) and size of rainfall event. Table 3-3 provides values of runoff depth for various rainfall depths and HSGs. Soils are assigned to an HSG based on their permeability. HSG categories for pervious areas in the Watershed shall be estimated by consulting local soil surveys prepared by the National Resource Conservation Service (NRCS) or by a storm water professional evaluating soil testing results from the Watershed. If the HSG condition is not known, a HSG C/D soil condition should be assumed.

- 2) Determine the available storage volume (ft³) of the structural BMP (BMP-Volume ft³) using the BMP dimensions and design specifications (e.g., maximum storage depth, filter media porosity);
- 3) To estimate the phosphorus load reduction of a BMP with a known storage volume capacity, it is first necessary to determine the portion of available BMP storage capacity (BMP-Volume ft³) that would treat the runoff volume generated from the contributing impervious area (IA) for a rainfall event with a depth of *i* inches (in). This will require knowing the corresponding amount of runoff volume that would be generated from the contributing pervious area (PA) for the same rainfall event (depth of *i* inches). Using equation 3-6a below, solve for the BMP capacity that would be available to treat runoff from the contributing impervious area for the unknown rainfall depth of *i* inches (see equation 3-6b):

$$\text{BMP-Volume}_{\text{ft}^3} = \text{BMP-Volume}_{(\text{IA-ft}^3)_i} + \text{BMP-Volume}_{(\text{PA-ft}^3)_i} \quad \text{(Equation 3-6a)}$$

Where:

BMP-Volume ft³ = the available storage volume of the BMP;

BMP-Volume (IA-ft³)_{*i*} = the available storage volume of the BMP that would fully treat runoff generated from the contributing impervious area for a rainfall event of size *i* inches; and

BMP-Volume (PA-ft³)_{*i*} = the available storage volume of the BMP that would fully treat runoff generated from the contributing pervious area for a rainfall event of size *i* inches

Solving for BMP-Volume (IA-ft³)_{*i*}:

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$$\text{BMP-Volume}_{(IA-ft^3)_i} = \text{BMP-Volume}_{ft^3} - \text{BMP-Volume}_{(PA-ft^3)_i} \quad \text{(Equation 3-6b)}$$

To determine BMP-Volume_{(IA-ft³)_i}, requires performing an iterative process of refining estimates of the rainfall depth used to calculate runoff volumes until the rainfall depth used results in the sum of runoff volumes from the contributing IA and PA equaling the available BMP storage capacity (BMP-Volume_{ft³}). For the purpose of estimating BMP performance, it will be considered adequate when the IA runoff depth (in) is within 5% IA runoff depth used in the previous iteration.

For the first iteration (1), convert the BMP-Volume_{ft³} determined in step 2 into inches of runoff from the contributing impervious area (BMP Volume_{(IA-in)₁}) using equation 3-7a.

$$\text{BMP-Volume}_{(IA-in)_1} = (\text{BMP-Volume}_{ft^3} / \text{IA (acre)}) \times (12 \text{ in/ft} / 43,560 \text{ ft}^2/\text{acre}) \quad \text{(Equation 3-7a)}$$

For iterations 2 through n (2...n), convert the BMP Volume_{(IA-ft³)_{2...n}}, determined in step 5a below, into inches of runoff from the contributing impervious area (BMP Volume_{(IA-in)_{2...n}}) using equation 3-7b.

$$\text{BMP-Volume}_{(IA-in)_{2...n}} = (\text{BMP-Volume}_{(IA-ft^3)_{2...n}} / \text{IA (acre)}) \times (12 \text{ in/ft} / 43,560 \text{ ft}^2/\text{acre}) \quad \text{(Equation 3-7b)}$$

- 4) For 1 to n iterations, use the pervious runoff depth information from Table 3-3 and equation 3-8 to determine the total volume of runoff (ft³) from the contributing PA (BMP Volume_{PA-ft³}) for a rainfall size equal to the sum of BMP-Volume_{(IA-in)₁}, determined in step 3. The runoff volume for each distinct pervious area must be determined.

$$\text{BMP Volume}_{(PA-ft^3)_{1...n}} = \sum ((\text{PA} \times (\text{runoff depth})_{(PA1, PA2...PAN)}) \times (3,630 \text{ ft}^3/\text{acre-in})) \quad \text{(Equation 3-8)}$$

- 5) For iteration 1, estimate the portion of BMP Volume that is available to treat runoff from only the IA by subtracting BMP-Volume_{PA-ft³}, determined in step 4, from BMP-Volume_{ft³}, determined in step 2, and convert to inches of runoff from IA (see equations 3-9a and 3-9b):

$$\text{BMP-Volume}_{(IA-ft^3)_2} = ((\text{BMP-Volume}_{ft^3} - \text{BMP Volume}_{(PA-ft^3)_1}) \quad \text{(Equation 3-9a)}$$

$$\text{BMP-Volume}_{(IA-in)_2} = (\text{BMP-Volume}_{(IA-ft^3)_2} / \text{IA (acre)}) \times (12 \text{ in/ft} \times 1 \text{ acre} / 43,560 \text{ ft}^2) \quad \text{(Equation 3-9b)}$$

If additional iterations (i.e., 2 through n) are needed, estimate the portion of BMP volume that is available to treat runoff from only the IA (BMP-Volume_{(IA-in)_{3...n+1}}) by subtracting BMP Volume_{(PA-ft³)_{2...n}}, determined in step 4, from BMP Volume_{(IA-ft³)_{3...n+1}}, determined in step 5, and by converting to inches of runoff from IA using equation 3-9b):

Appendix F Attachment 3

- 6) For iteration a (an iteration between 1 and n+1), compare BMP Volume $(IA-in)_a$ to BMP Volume $(IA-in)_{a-1}$ determined from the previous iteration (a-1). If the difference in these values is greater than 5% of BMP Volume $(IA-in)_a$ then repeat steps 4 and 5, using BMP Volume $(IA-in)_a$ as the new starting value for the next iteration (a+1). If the difference is less than or equal to 5 % of BMP Volume $(IA-in)_a$ then the permittee may proceed to step 7;
- 7) Determine the % phosphorus load reduction for the structural BMP (BMP Reduction $\%_P$) using the appropriate BMP performance curve and the BMP-Volume $(IA-in)_n$ calculated in the final iteration of step 5; and
- 8) Calculate the cumulative phosphorus load reduction in pounds of phosphorus for the structural BMP (BMP Reduction $lbs-P$) using the BMP Load as calculated from the procedure in Attachment 1 to Appendix F and the percent phosphorus load reduction (BMP Reduction $\%_P$) determined in step 7 by using equation 3-4:

$$\text{BMP Reduction } lbs-P = \text{BMP Load} \times (\text{BMP Reduction } \%_P / 100) \quad \text{(Equation 3-4)}$$

Example 3-4: Determine the phosphorus load reduction for a structural BMP with a known design volume when the contributing drainage area has impervious and pervious surfaces

A permittee is considering an infiltration basin to capture and treat runoff from a portion of the medium density residential area (MDR). The contributing drainage area is 16.55 acres and has 11.75 acres of impervious area and 4.8 acres of pervious area (PA) made up mostly of lawns and landscaped areas that is 80% HSG D and 20% HSG C. An infiltration basin with the following specifications can be placed at the down-gradient end of the contributing drainage area where soil testing results indicates an infiltration rate (IR) of 0.28 in/hr:

Table Example 3-4-A: Infiltration basin characteristics

Structure	Bottom area (acre)	Top surface area (acre)	Maximum pond depth (ft)	Design storage volume (ft ³)	Infiltration Rate (in/hr)
Infiltration basin	0.65	0.69	1.65	48,155	0.28

Determine the:

- A) Percent phosphorus load reduction (BMP Reduction $\%_P$) for the specified infiltration basin and the contributing impervious and pervious drainage area; and
- B) Cumulative phosphorus reduction in pounds that would be accomplished by the BMP (BMP-Reduction $lbs-P$)

Example continued:**Solution:**

- 1) A surface infiltration basin is being considered. Information for the contributing impervious (IA) and pervious (PA) areas are summarized in Tables Example 3-4-A and Example 3-4-B, respectively.

Table Example 3-4-B: Impervious area characteristics

ID	Land use	Area (acre)
IA1	MDR	11.75

Table Example 3-4-C: Pervious area characteristics

ID	Area (acre)	Hydrologic Soil Group (HSG)
PA1	3.84	D
PA2	0.96	C

- 2) The available storage volume (ft^3) of the infiltration basin (BMP-Volume ft^3) is determined from the design details and basin dimensions; BMP-Volume $\text{ft}^3 = 48,155 \text{ ft}^3$.
- 3) To determine what the BMP design storage volume is in terms of runoff depth (in) from IA, an iterative process is undertaken:

Solution Iteration 1

For the first iteration (1), the BMP-Volume ft^3 is converted into inches of runoff from the contributing impervious area (BMP Volume $(\text{IA-in})_1$) using equation 3-5a.

$$\begin{aligned} \text{BMP Volume } (\text{IA-in})_1 &= (48,155 \text{ ft}^3 / 11.75 \text{ acre}) \times (12 \text{ in/ft} / 43,560 \text{ ft}^2/\text{acre}) \\ &= 1.13 \text{ in} \end{aligned}$$

- 4-1) The total volume of runoff (ft^3) from the contributing PA (BMP Volume PA-ft^3) for a rainfall size equal to the sum of BMP Volume $(\text{IA-in})_1$ determined in step 3 is determined for each distinct pervious area identified in Table Example 3-4-B using the information from Table 3-3 and equation 3-5. Interpolation was used to determine runoff depths.

$$\begin{aligned} \text{BMP Volume } (\text{PA-ft}^3)_1 &= ((3.84 \text{ acre} \times (0.33 \text{ in}) + (0.96 \text{ acre} \times (0.13 \text{ in})) \times 3,630 \text{ ft}^3/\text{acre-in}) \\ &= 5052 \text{ ft}^3 \end{aligned}$$

- 5-1) For iteration 1, the portion of BMP Volume that is available to treat runoff from only the IA is estimated by subtracting the BMP Volume $(\text{PA-ft}^3)_1$, determined in step 4-1, from BMP Volume ft^3 , determined in step 2, and converted to inches of runoff from IA:

$$\begin{aligned} \text{BMP Volume } (\text{IA-ft}^3)_2 &= 48,155 \text{ ft}^3 - 5052 \text{ ft}^3 \\ &= 43,103 \text{ ft}^3 \end{aligned}$$

$$\begin{aligned} \text{BMP Volume } (\text{IA-in})_2 &= (43,103 \text{ ft}^3 / 11.75 \text{ acre}) \times (12 \text{ in/ft} \times 1 \text{ acre} / 43,560 \text{ ft}^2) \\ &= 1.01 \text{ in} \end{aligned}$$

Solution continued:

- 6-1)** The % difference between BMP Volume $(IA-in)_2$, 1.01 in, and BMP Volume $(IA-in)_1$, 1.13 in is determined and found to be significantly greater than 5%:

$$\begin{aligned} \text{\% Difference} &= ((1.13 \text{ in} - 1.01 \text{ in})/1.01 \text{ in}) \times 100 \\ &= 12\% \end{aligned}$$

Therefore, steps 4 through 6 are repeated starting with BMP Volume $(IA-in)_2 = 1.01$ in.

Solution Iteration 2

- 4-2)** $BMP\text{-Volume}_{(PA-ft^3)_2} = ((3.84 \text{ acre} \times 0.21 \text{ in}) + (0.96 \text{ acre} \times 0.12 \text{ in})) \times 3,630 \text{ ft}^3/\text{acre-in}$
 $= 3,358 \text{ ft}^3$

- 5-2)** $BMP\text{-Volume}_{(IA-ft^3)_3} = 48,155 \text{ ft}^3 - 3,358 \text{ ft}^3$
 $= 44,797 \text{ ft}^3$

$$\begin{aligned} BMP\text{-Volume}_{(IA-in)_3} &= (44,797 \text{ ft}^3/11.75 \text{ acre}) \times (12 \text{ in/ft} \times 1 \text{ acre}/43,560 \text{ ft}^2) \\ &= 1.05 \text{ in} \end{aligned}$$

- 6-2)** $\text{\% Difference} = ((1.05 \text{ in} - 1.01 \text{ in})/1.05 \text{ in}) \times 100$
 $= 4\%$

The difference of 4% is acceptable.

- 7)** The % phosphorus load reduction for the infiltration basin (BMP Reduction $\%_P$) is determined by using the infiltration basin performance curve for an infiltration rate of 0.27 in/hr and the treatment volume ($BMP\text{-Volume}_{Net\ IA-in} = 1.05$ in) calculated in step 5-2 and is **BMP Reduction $\%_P = 93\%$** .

The performance curve for IR = 0.27 is used rather than interpolating between the performance curves for IR = 0.27 in/hr and 0.52 in/hr to estimate performance for IR = 0.28 in/hr. An evaluation of the performance curves for IR = 0.27 in/hr and IR = 0.52 in/hr for a design storage volume of 1.05 in indicate a small difference in estimated performance (BMP Reduction $\%_P = 93\%$ for IR = 0.27 in/hr and BMP Reduction $\%_P = 95\%$ for IR = 0.52 in/hr).

- 8)** The cumulative phosphorus load reduction in pounds of phosphorus (BMP-Reduction $lbs-P$) for the proposed infiltration basin is calculated by using equation 3-2 with the BMP Load and the P_{target} of 93%.

$$BMP\text{-Reduction}_{lbs-P} = BMP \text{ Load} \times (P_{target}/100) \quad \text{(Equation 3-2)}$$

Using Table 3-1, the BMP load is calculated:

$$\begin{aligned} BMP \text{ Load} &= (IA \times \text{impervious cover phosphorus export loading rate for industrial}) \\ &\quad + (PA_{HSG D} \times \text{pervious cover phosphorus export loading rate for HSG D}) \\ &\quad + (PA_{HSG C} \times \text{pervious cover phosphorus export loading rate for HSG C}) \end{aligned}$$

Solution continued:

$$= (11.75 \text{ acre} \times 1.96 \text{ lbs/acre/yr}) + (3.84 \text{ acre} \times 0.37 \text{ lbs/acre/yr}) \\ + (0.96 \text{ acre} \times 0.21 \text{ lbs/acre/yr}) \\ = 24.65 \text{ lbs/yr}$$

$$\text{BMP-Reduction}_{\text{lbs-P}} = 24.22 \text{ lbs/yr} \times 93/100 = \mathbf{22.93 \text{ lbs/yr}}$$

Example 3-5: Determine the phosphorus load reduction for disconnecting impervious area using storage with delayed release.

A commercial operation has an opportunity to divert runoff from 0.75 acres of impervious roof top to a 5000 gallon (668.4 ft³) storage tank for temporary storage and subsequent release to 0.09 acres of pervious area (PA) with HSG C soils.

Determine the:

- A) Percent phosphorus load reduction rates (BMP Reduction %_{-P}) for the specified impervious area (IA) disconnection and storage system assuming release times of 1, 2 and 3 days for the stored volumes to discharge to the pervious area; and
- B) Cumulative phosphorus reductions in pounds that would be accomplished by the system (BMP-Reduction_{lbs-P}) for the three storage release times, 1, 2 and 3 days.

Solution:

1. Determine the storage volume in units of inches of runoff depth from contributing impervious area:

$$\text{Storage Volume}_{\text{IA-in}} = (668.4 \text{ ft}^3 / (0.75 \text{ acre} \times 43.560 \text{ ft}^2/\text{acre})) \times 12 \text{ inch/ft} \\ = 0.25 \text{ inches}$$
2. Determine the ratio of the contributing impervious area to the receiving pervious area:

$$\text{IA:PA} = 0.75 \text{ acres} / 0.09 \text{ acres} \\ = 8.3$$
3. Using Table 3-21 for a IA:PA ratio of 8:1, determine the phosphorus load reduction rates for a storage volume of 0.25 inches that discharges to HSG C with release rates of 1, 2 and 3 days: Using interpolation the reduction rates are shown in Table 3-5-A:

Table Example 3-5-A: Reduction Rates

Percent Phosphorus load reduction for IA disconnection with storage HSG C			
Storage Volume _{IA-in}	Storage release rate, days		
	1	2	3
0.25	39%	42%	43%

4. The cumulative phosphorus load reduction in pounds of phosphorus for the IA disconnection with storage (BMP-Reduction_{lbs-P}) is calculated using Equation 3-2. The BMP Load is first determined using the method described above.

Solution continued:

$$\begin{aligned} \text{BMP Load} &= \text{IA} \times \text{phosphorus export loading rate for commercial IA (see Table 3-1)} \\ &= 0.75 \text{ acres} \times 1.78 \text{ lbs/acre/yr} \\ &= 1.34 \text{ lbs/yr} \end{aligned}$$

$$\text{BMP Reduction}_{\text{lbs-P}} = \text{BMP Load} \times (\text{BMP Reduction}_{\%-\text{P}}/100)$$

$$\begin{aligned} \text{BMP Reduction}_{\text{lbs-P}} &= 1.34 \text{ lbs/yr} \times (39/100) \\ &= \mathbf{0.53 \text{ lbs/yr}} \end{aligned}$$

Table Example 3-5-B presents the BMP Reduction_{lbs-P} for each of the release rates:

Table Example 3-5-B: Reduction Load

Phosphorus load reduction for IA disconnection with storage HSG C, lbs			
Storage Volume _{IA-in}	Storage release rate, days		
	1	2	3
0.25	0.53	0.56	0.58

Example 3-6: Determine the phosphorus load reduction for disconnecting impervious area with and without soil augmentation in the receiving pervious area.

The same commercial property as in example 3-5 wants to evaluate disconnecting drainage from the 0.75 acre impervious roof top and discharging it directly to 0.09 acres of pervious area (PA) with HSG C. Also, the property has the opportunity to purchase a small adjoining area (0.06 acres), also HSG C, to increase the size of the receiving PA from 0.09 to 0.15 acres and to allow the property owner to avoid having to install a drainage structure to capture overflow runoff from the PA. The property owner has been informed that the existing PA soil can be tilled and augmented with soil amendments to support denser vegetative growth and improve hydrologic function to approximate HSG B.

Determine the:

- A) Percent phosphorus load reduction rates (BMP Reduction_{%-P}) for the specified impervious area (IA) disconnection to both the 0.09 and 0.15 acre receiving PAs with and without soil augmentation; and
- B) Cumulative phosphorus reductions in pounds that would be accomplished by the IA disconnection for the various scenarios (BMP-Reduction_{lbs-P}).

Solution:

1. Determine the ratio of the contributing impervious area to the receiving pervious area:
 - IA:PA = 0.75 acres/0.09 acres
= 8.3
 - IA:PA = 0.75 acres/0.15 acres
= 5.0

Solution Continued:

- Using Table 3-26 and Figure 3-40 for a IA:PA ratios of 8:1 and 5:1, respectively, determine the phosphorus load reduction rates for IA disconnections to HSG C and HSG B:

Table Example 3-6-A: Reduction Rates

Percent Phosphorus load reduction rates for IA disconnection		
Receiving PA	IA:PA	
	8:1	5:1
HSG C	7%	14%
HSG B (soil augmentation)	14%	22%

- The cumulative phosphorus load reduction in pounds of phosphorus for the IA disconnection with storage (BMP-Reduction_{lbs-P}) is calculated using Equation 3-2. The BMP Load was calculated in example 3-5 and is 1.34 lbs/yr.

$$\text{BMP Reduction}_{\text{lbs-P}} = \text{BMP Load} \times (\text{BMP Reduction}_{\%-\text{P}}/100)$$

For PA of 0.09 acres HSG C the BMP Reduction_{lbs-P} is calculated as follows:

$$\begin{aligned} \text{BMP Reduction}_{\text{lbs-P}(0.09\text{ac-HSG C})} &= 1.34 \text{ lbs/yr} \times (7/100) \\ &= \mathbf{0.09 \text{ lbs/yr}} \end{aligned}$$

Table Example 3-6-B presents the BMP Reduction_{lbs-P} for each of the scenarios:

Table Example 3-6-B: Reduction

Pounds Phosphorus load reduction for IA disconnection, lbs/yr		
Receiving PA	Area of Receiving PA, acres	
	0.09	0.15
HSG C	0.09	0.19
HSG B (soil augmentation)	0.19	0.29

Example 3-7: Determine the phosphorus load reduction for converting impervious area to permeable/pervious area.

A municipality is planning upcoming road reconstruction work in medium density residential (MDR) neighborhoods and has identified an opportunity to convert impervious surfaces to permeable/pervious surfaces by narrowing the road width of 3.7 miles (mi) of roadway from 32 feet (ft) to 28 ft and eliminating 3.2 miles of 4 ft wide paved sidewalk (currently there are sidewalks on both sides of the roadways targeted for restoration). The newly created permeable/pervious area will be tilled and treated with soil amendments to support vegetated growth in order to restore hydrologic function to at least HSG B.

Determine the:

- A) Percent phosphorus load reduction rate (BMP Reduction %_{-P}) for the conversion of impervious area (IA) to permeable/pervious area (PA); and
- B) Cumulative phosphorus reduction in pounds that would be accomplished by the project (BMP-Reduction _{lbs-P}).

Solution:

1. Determine the area of IA to be converted to PA:

$$\begin{aligned} \text{New PA} &= (((3.7 \text{ mi} \times 4 \text{ ft}) + (3.2 \text{ mi} \times 4 \text{ ft})) \times 5280 \text{ ft/mi}) / 43,560 \text{ ft}^2/\text{acre} \\ &= 3.35 \text{ acres} \end{aligned}$$

2. Using Table 3-27, the phosphorus load reduction rate for converting IA to HSG B is 94.1%

3. The BMP Load is first determined using the method described above.

$$\begin{aligned} \text{BMP Load} &= \text{IA} \times \text{phosphorus export loading rate for MDR IA (see Table 3-1)} \\ &= 3.35 \text{ acres} \times 1.96 \text{ lbs/acre/yr} \\ &= 6.57 \text{ lbs/yr} \end{aligned}$$

4. The cumulative phosphorus load reduction in pounds of phosphorus for the IA conversion (BMP-Reduction _{lbs-P}) is calculated using Equation 3-2.

$$\begin{aligned} \text{BMP Reduction}_{\text{lbs-P}} &= \text{BMP Load} \times (\text{BMP Reduction}_{\%-\text{P}} / 100) \\ \text{BMP Reduction}_{\text{lbs-P}} &= 6.57 \text{ lbs/yr} \times (94.1 / 100) \\ &= 6.18 \text{ lbs/yr} \end{aligned}$$

Table 3- 4: Infiltration Trench (IR = 0.17 in/hr) BMP Performance Table

Infiltration Trench (IR = 0.17 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	14.7%	27.6%	48.6%	64.1%	74.9%	82.0%	91.6%	95.4%
Cumulative Phosphorus Load Reduction	18%	33%	57%	73%	83%	90%	97%	99%

Figure 3- 1: BMP Performance Curve: Infiltration Trench (infiltration rate = 0.17 in/hr)

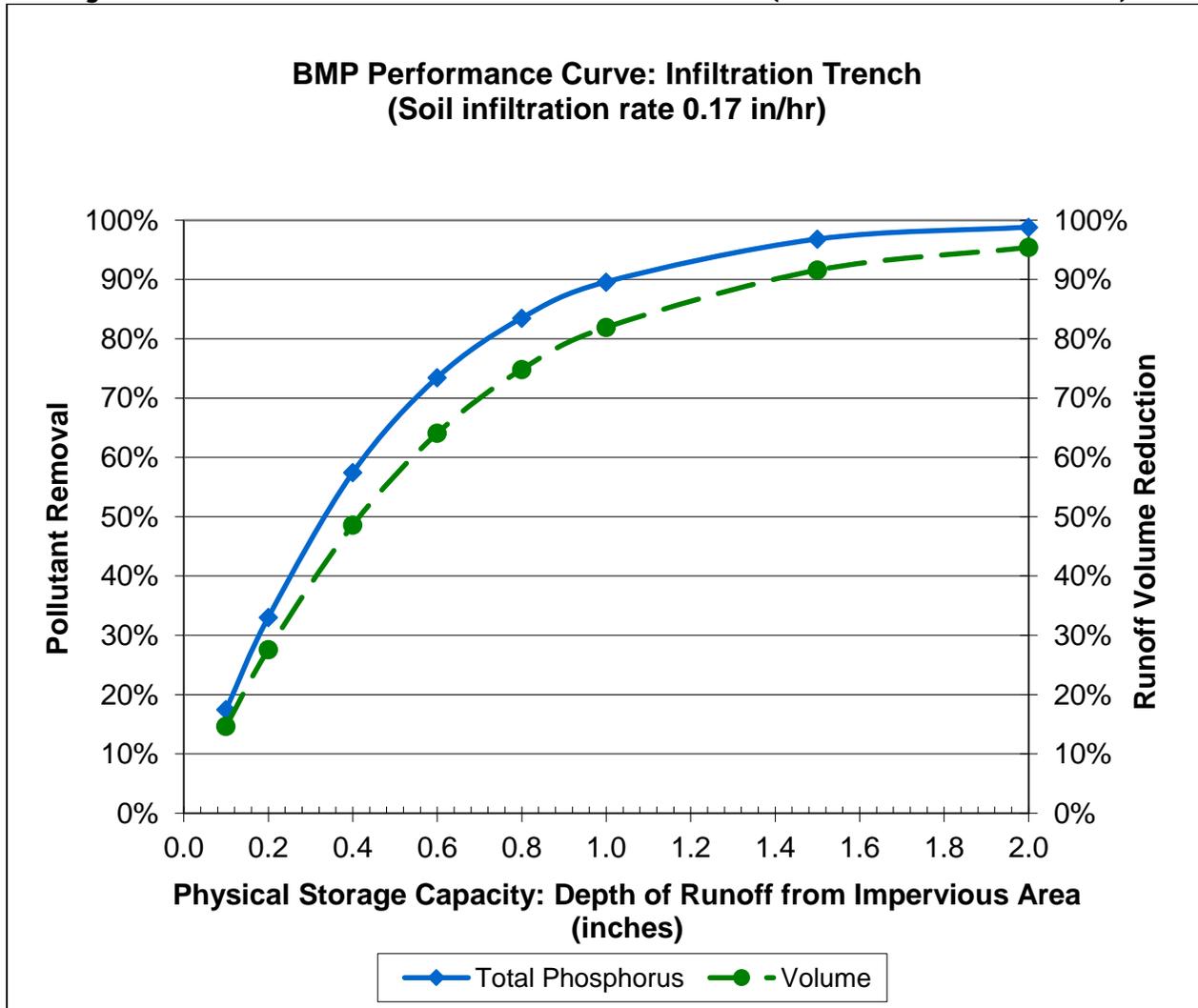


Table 3- 5: Infiltration Trench (IR = 0.27 in/hr) BMP Performance Table

Infiltration Trench (IR = 0.27 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	17.8%	32.5%	55.0%	70.0%	79.3%	85.2%	93.3%	96.3%
Cumulative Phosphorus Load Reduction	20%	37%	63%	78%	86%	92%	97%	99%

Figure 3- 2: BMP Performance Curve: Infiltration Trench (infiltration rate = 0.27 in/hr)

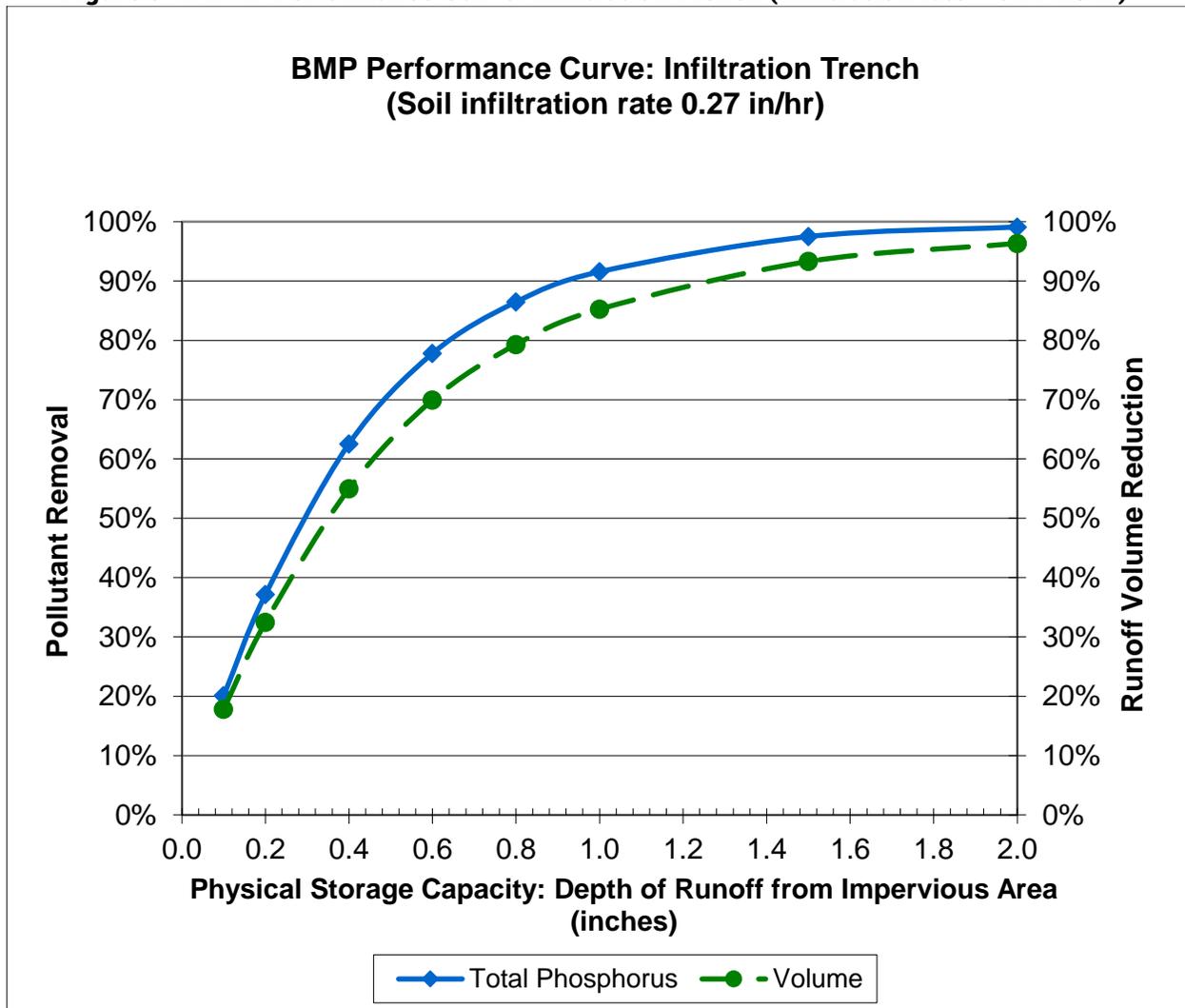


Table 3- 6: Infiltration Trench (IR = 0.52 in/hr) BMP Performance Table

Infiltration Trench (IR = 0.52 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	22.0%	38.5%	61.8%	75.7%	83.7%	88.8%	95.0%	97.2%
Cumulative Phosphorus Load Reduction	23%	42%	68%	82%	89%	94%	98%	99%

Figure 3- 3: BMP Performance Curve: Infiltration Trench (infiltration rate = 0.52 in/hr)

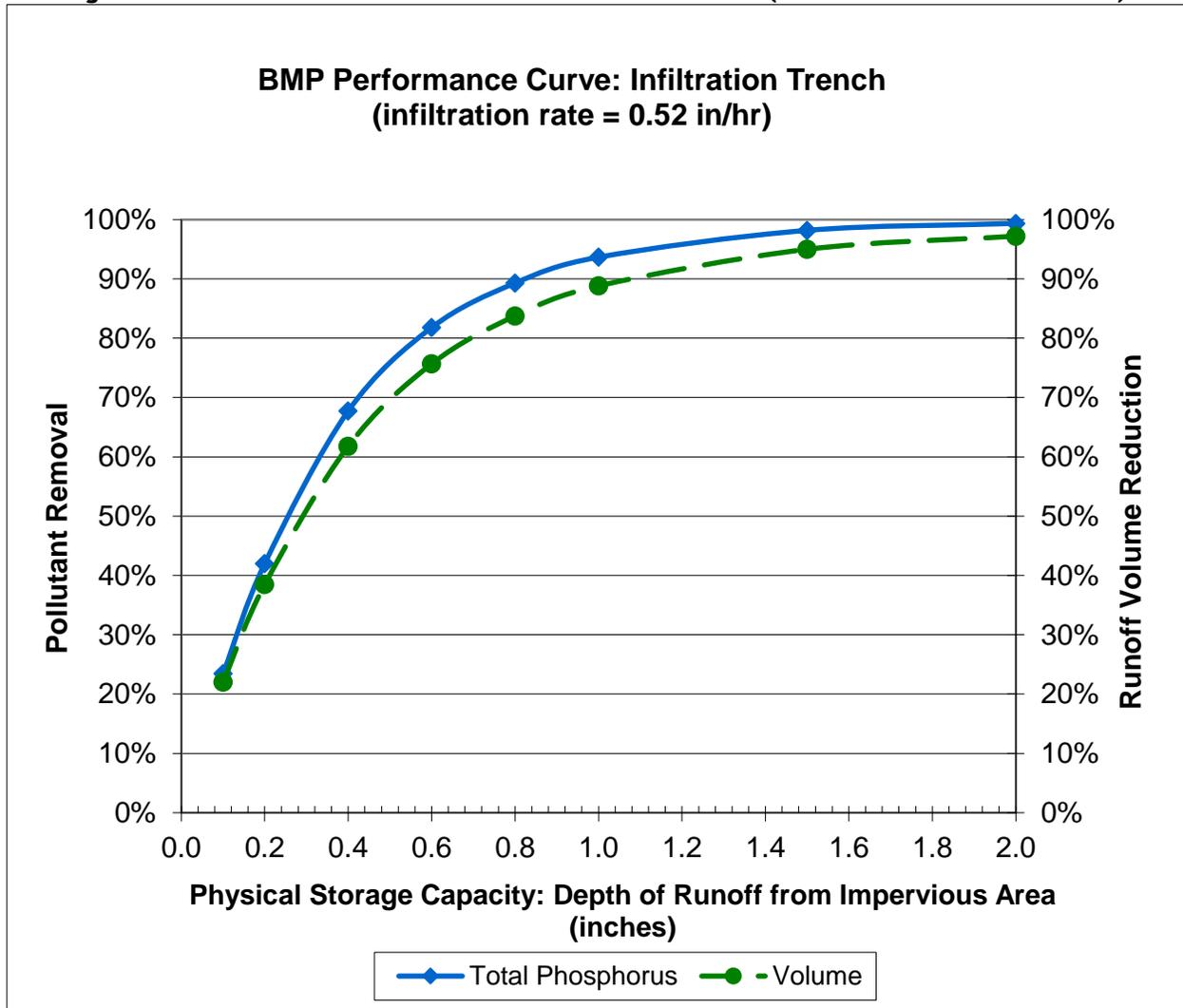


Table 3- 7: Infiltration Trench (IR = 1.02 in/hr) BMP Performance Table

Infiltration Trench (IR = 1.02 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	26.3%	44.6%	68.2%	81.0%	88.0%	92.1%	96.5%	98.3%
Cumulative Phosphorus Load Reduction	27%	47%	73%	86%	92%	96%	99%	100%

Figure 3- 4: BMP Performance Curve: Infiltration Trench (infiltration rate = 1.02 in/hr)

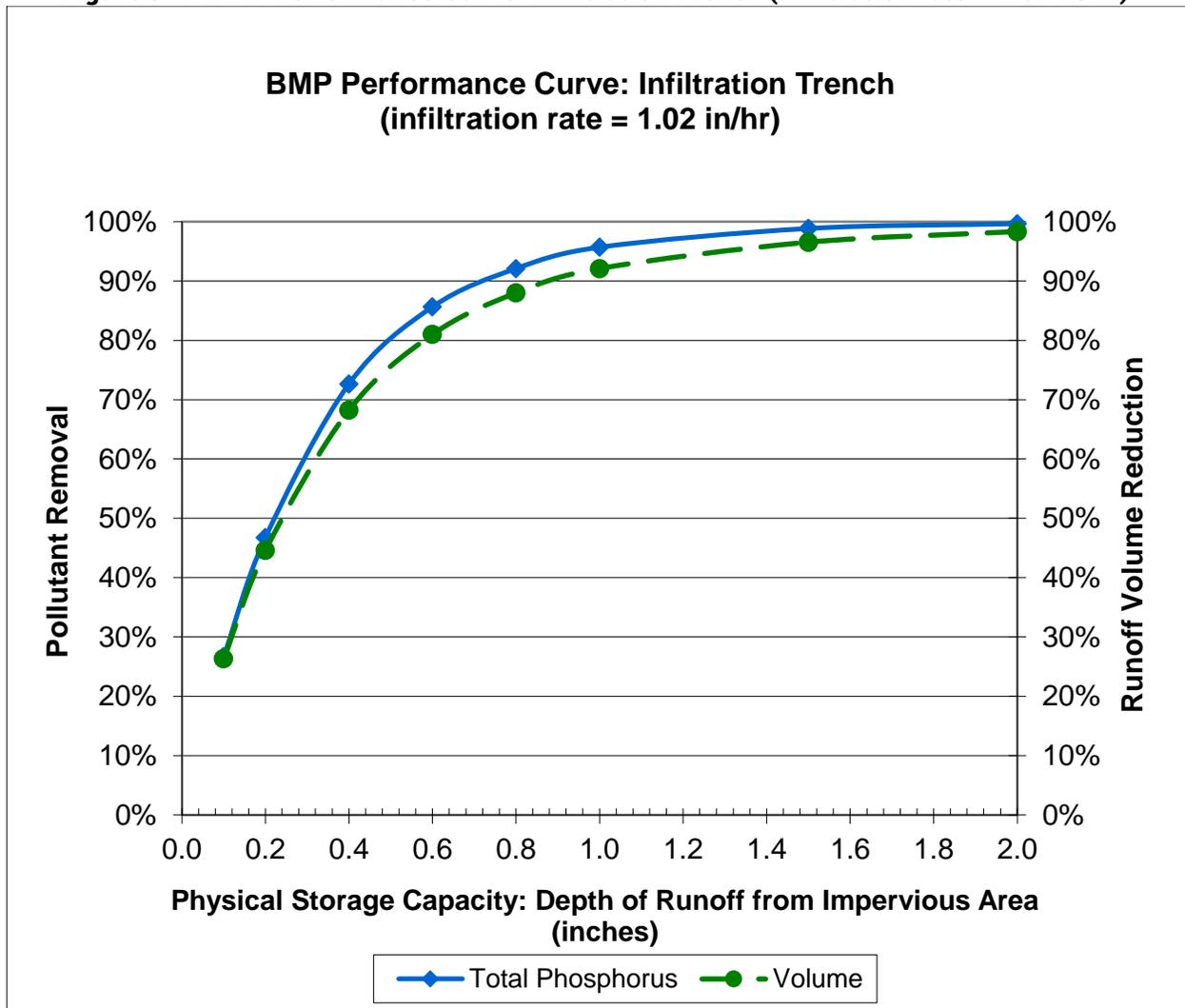


Table 3- 8: Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table

Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	34.0%	54.7%	78.3%	88.4%	93.4%	96.0%	98.8%	99.8%
Cumulative Phosphorus Load Reduction	33%	55%	81%	91%	96%	98%	100%	100%

Figure 3- 5: BMP Performance Curve: Infiltration Trench (infiltration rate = 2.41 in/hr)

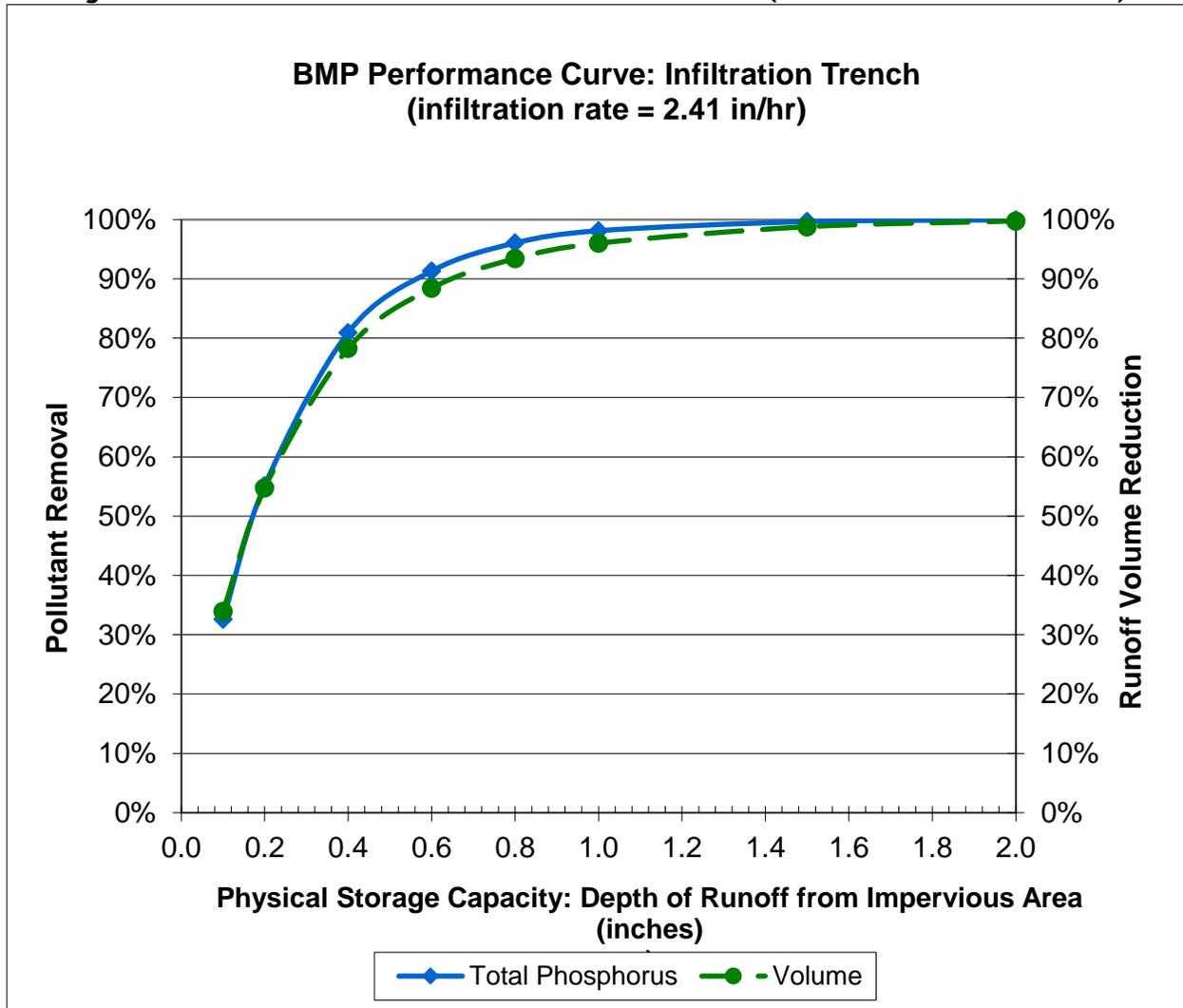


Table 3- 9: Infiltration Trench (8.27 in/hr) BMP Performance Table

Infiltration Trench (8.27 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	53.6%	76.1%	92.6%	97.2%	98.9%	99.5%	100.0%	100.0%
Cumulative Phosphorus Load Reduction	50%	75%	94%	98%	99%	100%	100%	100%

Figure 3- 6: BMP Performance Curve: Infiltration Trench (infiltration rate = 8.27 in/hr)

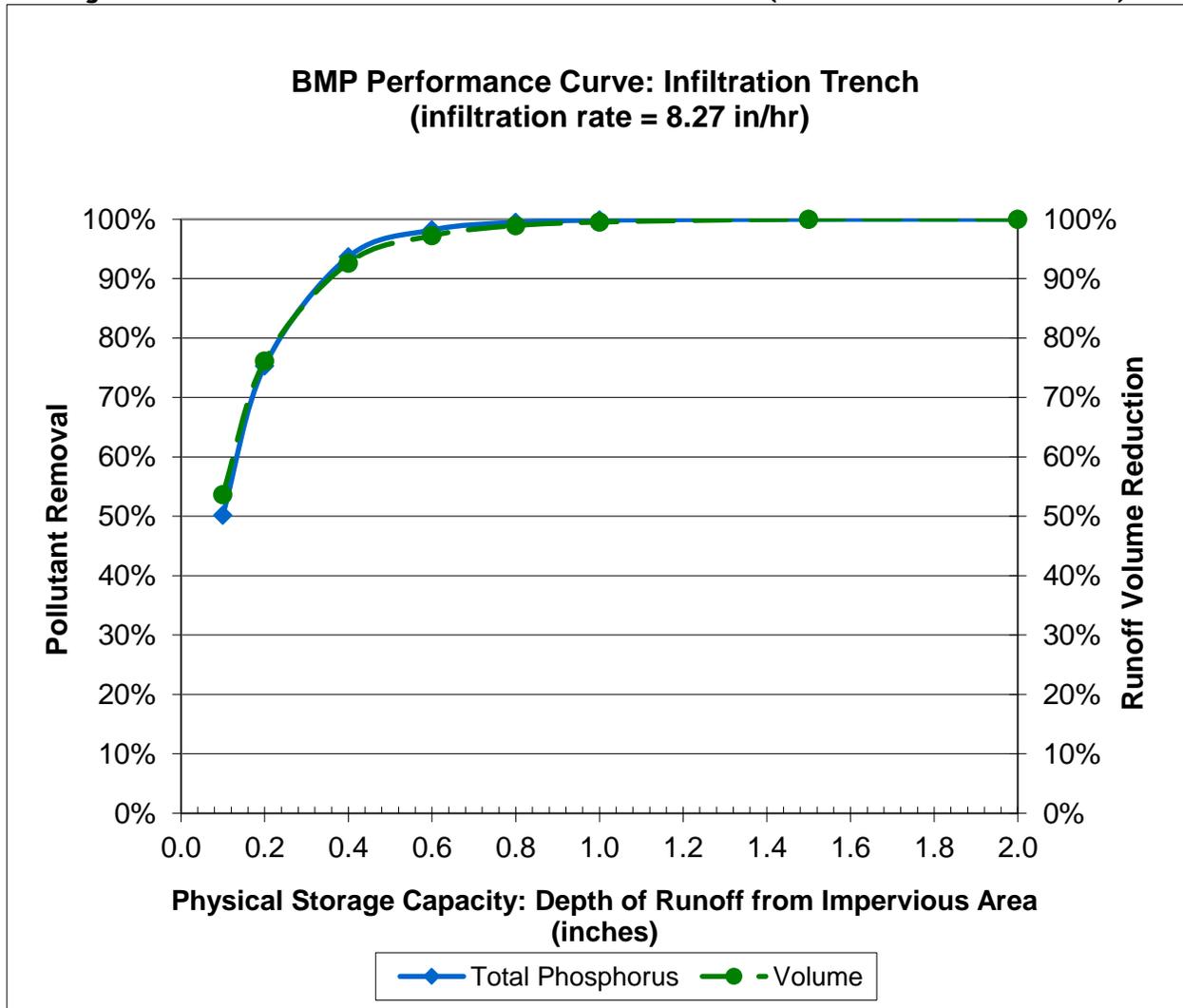


Table 3- 10: Infiltration Basin (0.17 in/hr) BMP Performance Table

Infiltration Basin (0.17 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	13.0%	24.6%	44.2%	59.5%	70.6%	78.1%	89.2%	93.9%
Cumulative Phosphorus Load Reduction	35%	52%	72%	82%	88%	92%	97%	99%

Figure 3- 7: BMP Performance Curve: Infiltration Basin (infiltration rate = 0.17 in/hr)

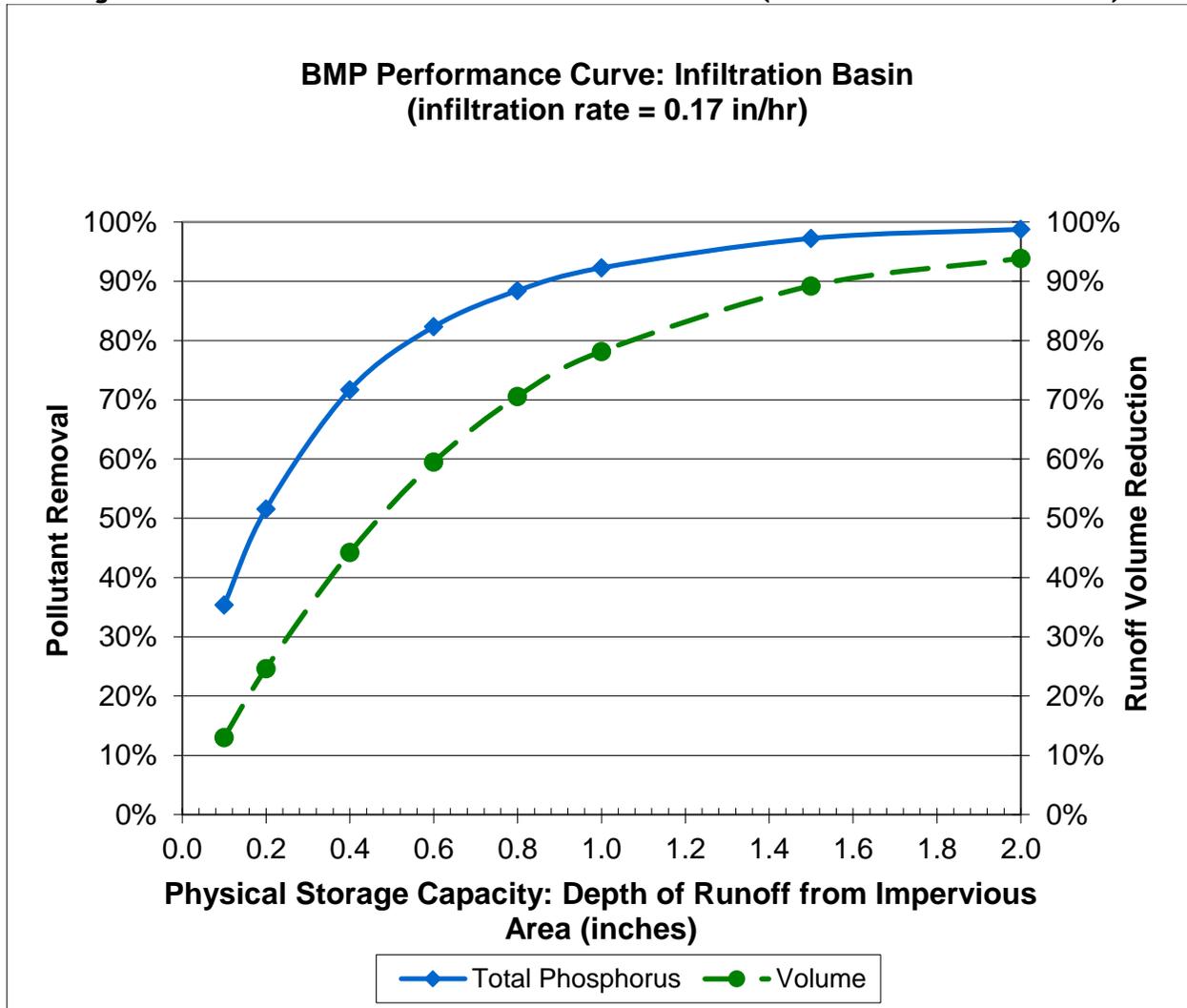


Table 3- 11: Infiltration Basin (0.27 in/hr) BMP Performance Table

Infiltration Basin (0.27 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	16.3%	29.8%	51.0%	66.0%	76.0%	82.4%	91.5%	95.2%
Cumulative Phosphorus Load Reduction	37%	54%	74 %	85%	90%	93%	98%	99%

Figure 3- 8: BMP Performance Curve: Infiltration Basin (infiltration rate = 0.27 in/hr)

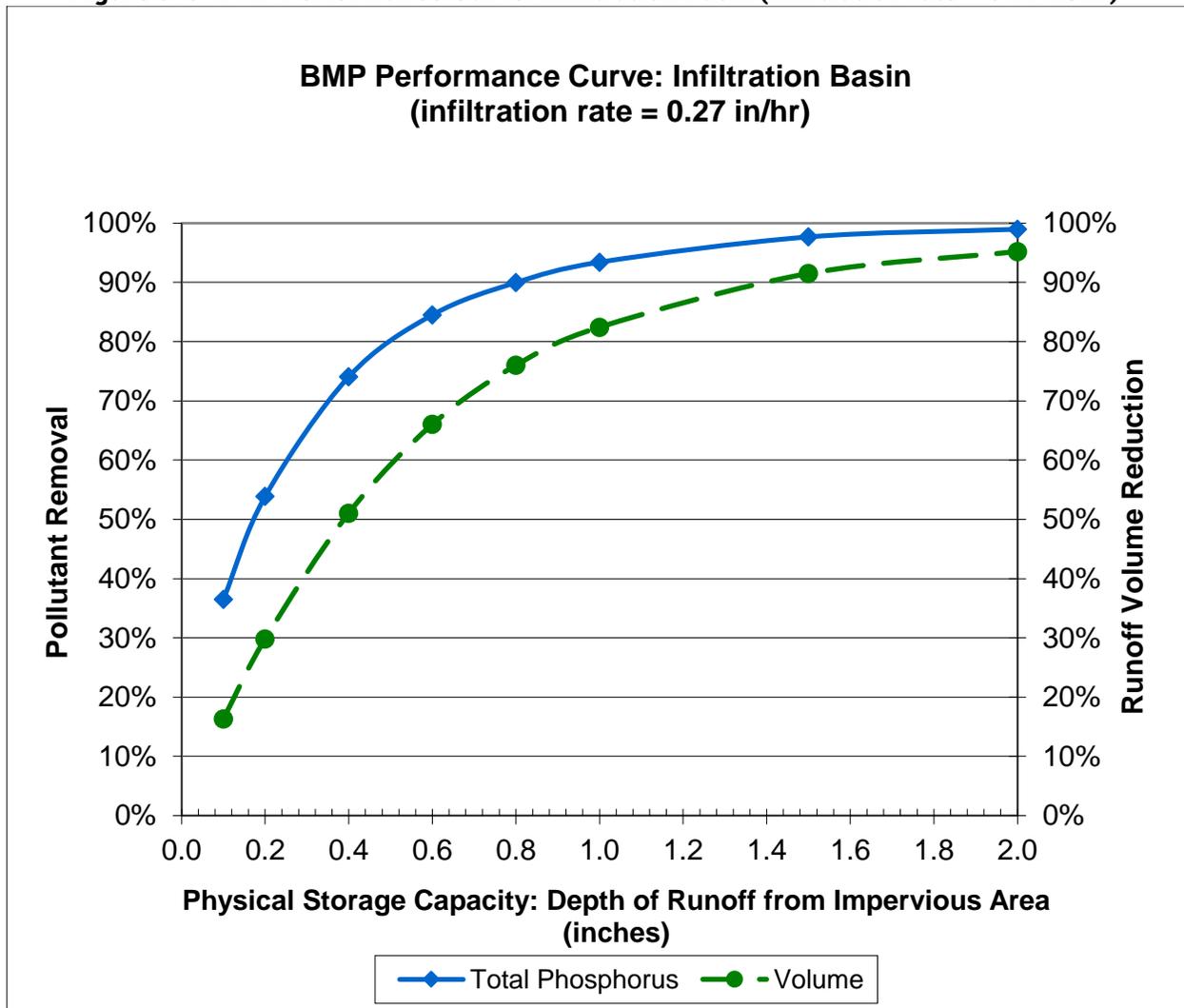


Table 3- 12: Infiltration Basin (0.52 in/hr) BMP Performance Table

Infiltration Basin (0.52 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	20.2%	35.6%	58.0%	72.6%	81.3%	86.9%	94.2%	96.7%
Cumulative Phosphorus Load Reduction	38%	56%	77%	87%	92%	95%	98%	99%

Figure 3- 9: BMP Performance Curve: Infiltration Basin (infiltration rate = 0.52 in/hr)

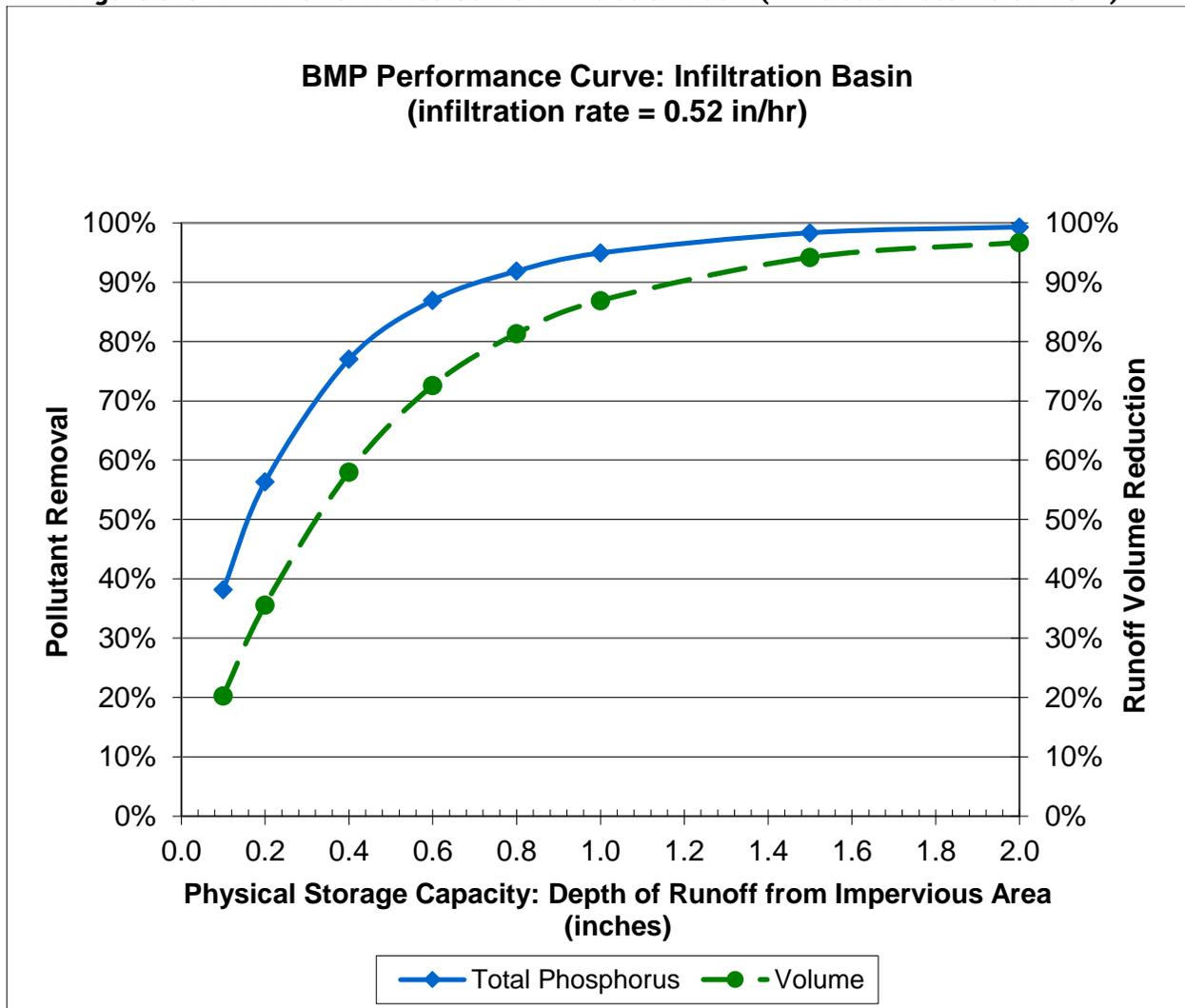


Table 3- 13: Infiltration Basin (1.02 in/hr) BMP Performance Table

Infiltration Basin (1.02 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	24.5%	42.0%	65.6%	79.4%	86.8%	91.3%	96.2%	98.1%
Cumulative Phosphorus Load Reduction	41%	60%	81%	90%	94%	97%	99%	100%

Figure 3- 10: BMP Performance Curve: Infiltration Basin (Soil infiltration rate = 1.02 in/hr)

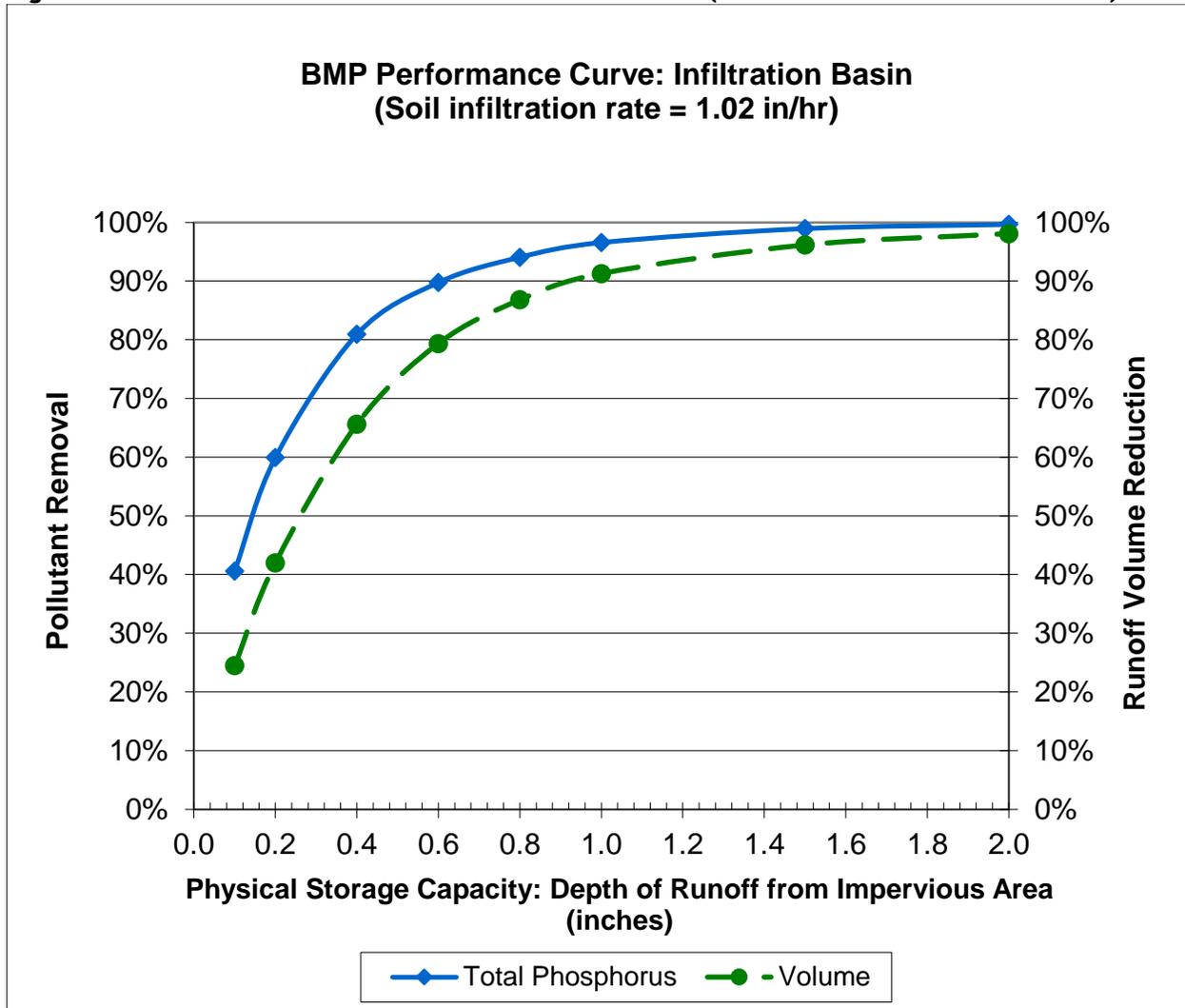


Table 3- 14: Infiltration Basin (2.41 in/hr) BMP Performance Table

Infiltration Basin (2.41 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	32.8%	53.8%	77.8%	88.4%	93.4%	96.0%	98.8%	99.8%
Cumulative Phosphorus Load Reduction	46%	67%	87%	94%	97%	98%	100%	100%

Figure 3- 11: BMP Performance Curve: Infiltration Basin (infiltration rate = 2.41 in/hr)

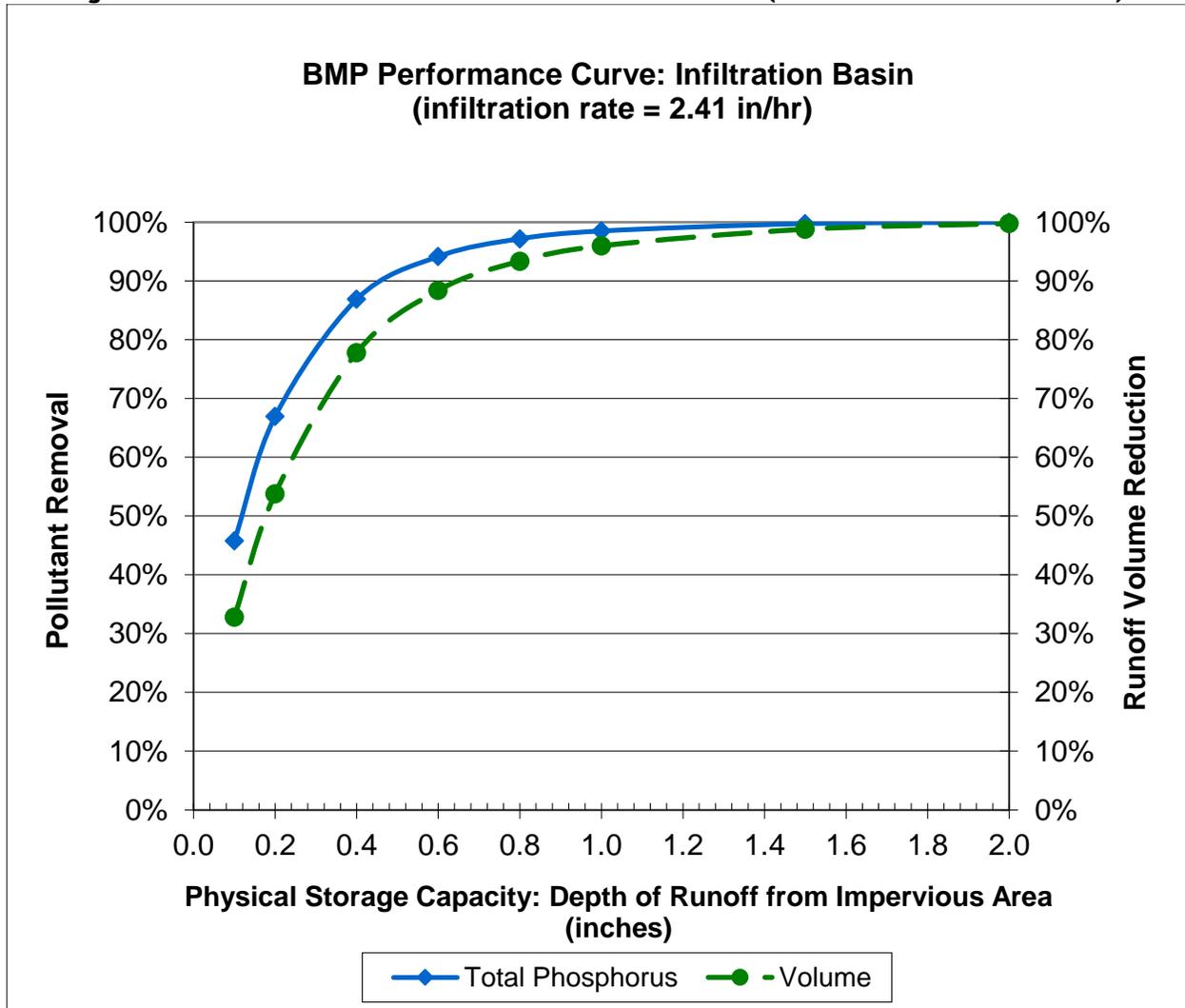


Table 3- 15: Infiltration Basin (8.27 in/hr) BMP Performance Table

Infiltration Basin (8.27 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	54.6%	77.2%	93.4%	97.5%	99.0%	99.6%	100.0%	100.0%
Cumulative Phosphorus Load Reduction	59%	81%	96%	99%	100%	100%	100%	100%

Figure 3- 12: BMP Performance Curve: Infiltration Basin (infiltration rate = 8.27 in/hr)

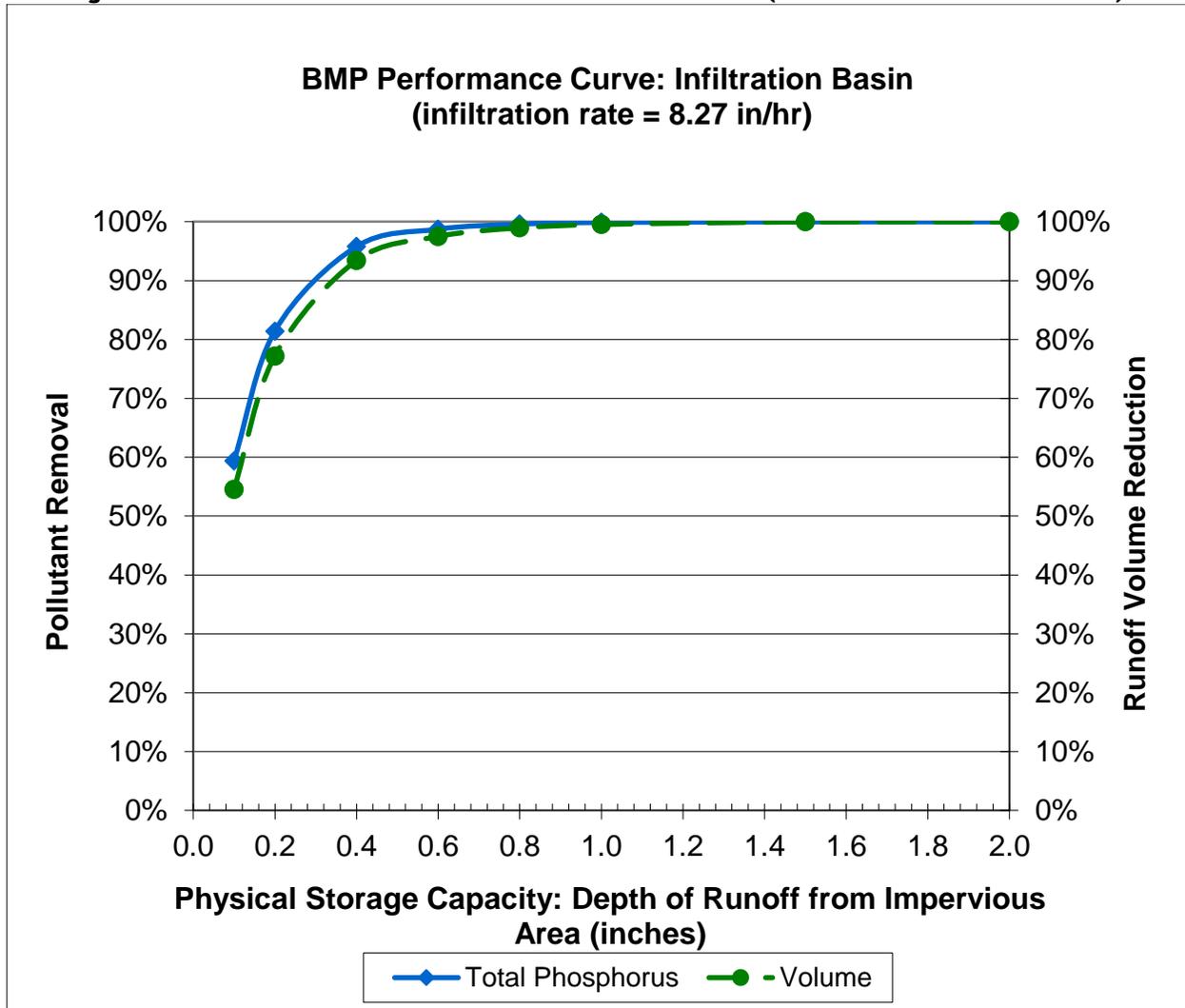


Table 3- 16: Biofiltration BMP Performance Table

Biofiltration BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	19%	34%	53%	64%	71%	76%	84%	89%

Figure 3- 13: BMP Performance Curve: Biofiltration

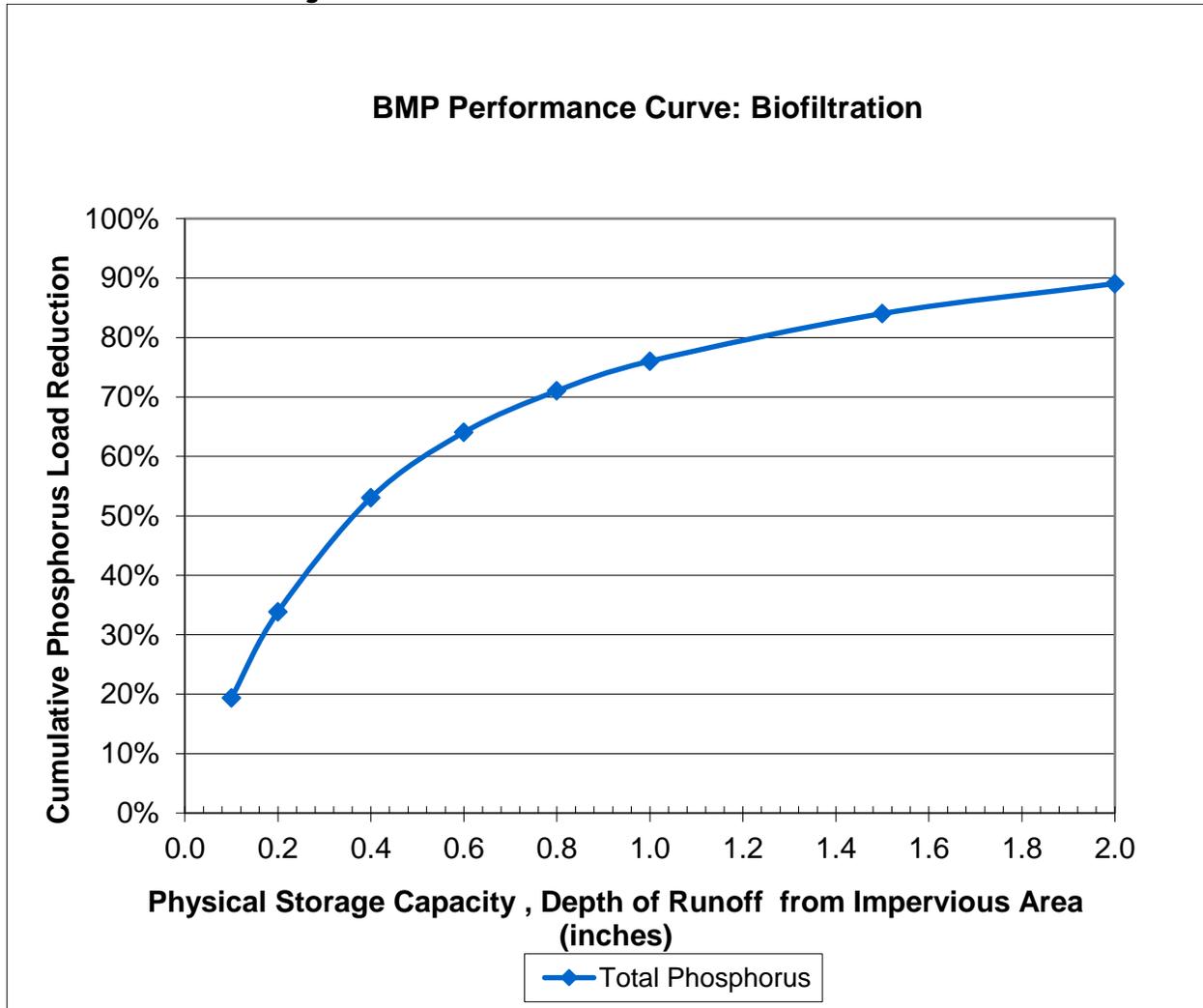


Table 3- 17: Gravel Wetland BMP Performance Table

Gravel Wetland BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	19%	26%	41%	51%	57%	61%	65%	66%

Figure 3- 14: BMP Performance Curve: Gravel Wetland

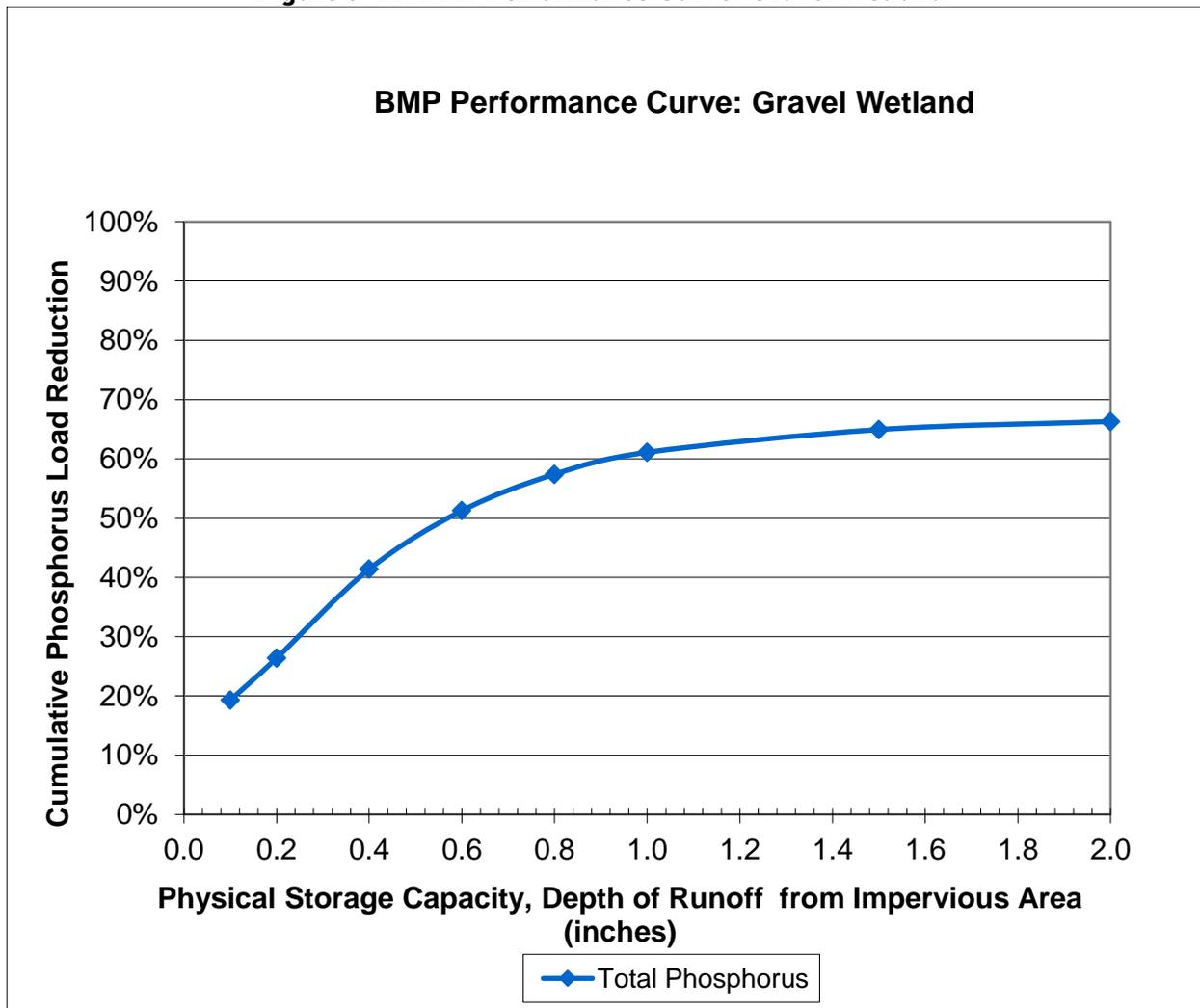


Table 3- 18: Porous Pavement BMP Performance Table

Porous Pavement BMP Performance Table: Long-Term Phosphorus Load Reduction				
BMP Capacity: Depth of Filter Course Area (inches)	12.0	18.0	24.0	32.0
Cumulative Phosphorus Load Reduction	62%	70%	75%	78%

Figure 3- 15: BMP Performance Curve: Porous Pavement

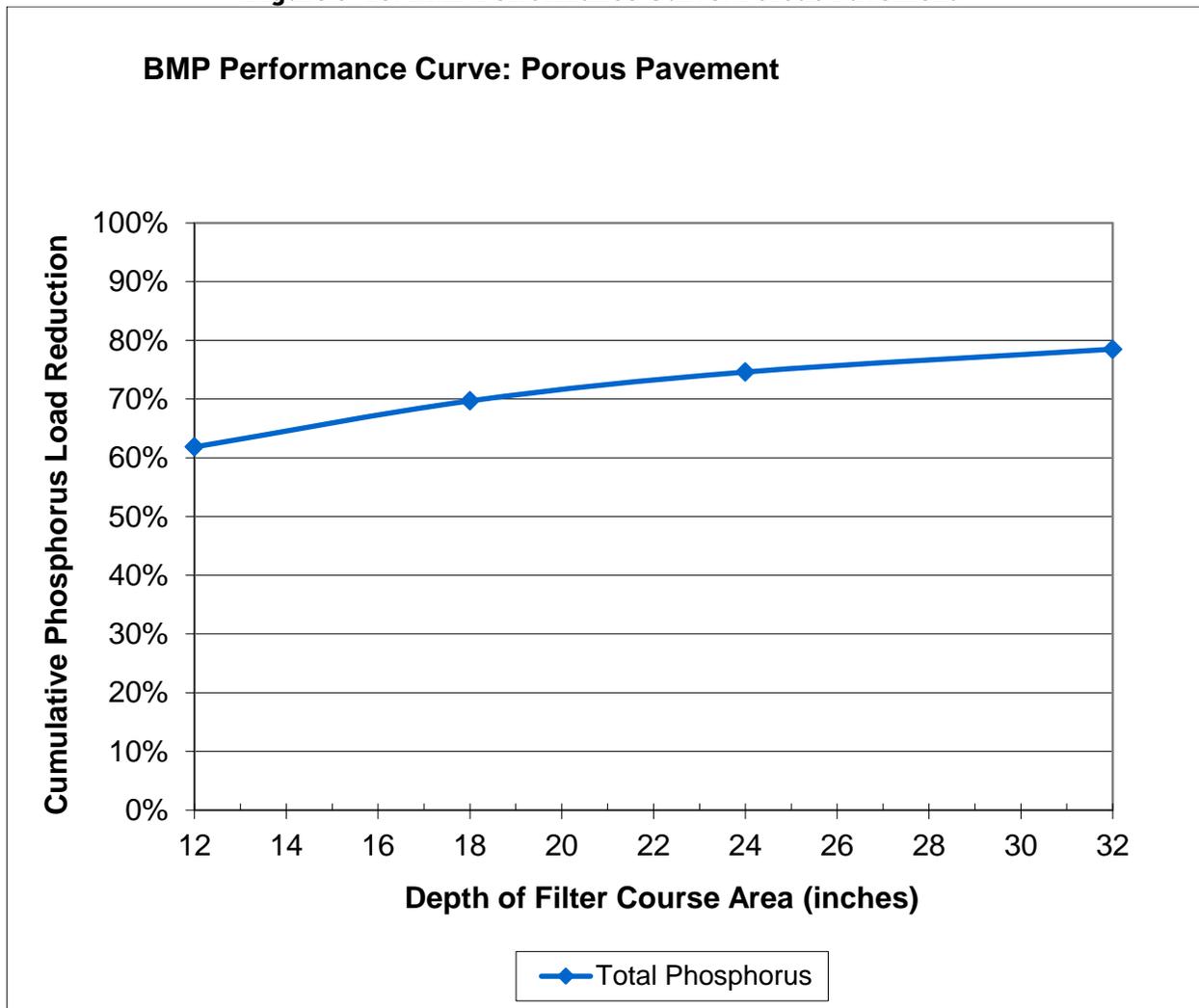


Table 3- 19: Wet Pond BMP Performance Table

Wet Pond BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	14%	25%	37%	44%	48%	53%	58%	63%

Table 3- 20: Dry Pond BMP Performance Table

Dry Pond BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	3%	6%	8%	9%	11%	12%	13%	14%

Figure 3- 16: BMP Performance Curve: Dry Pond

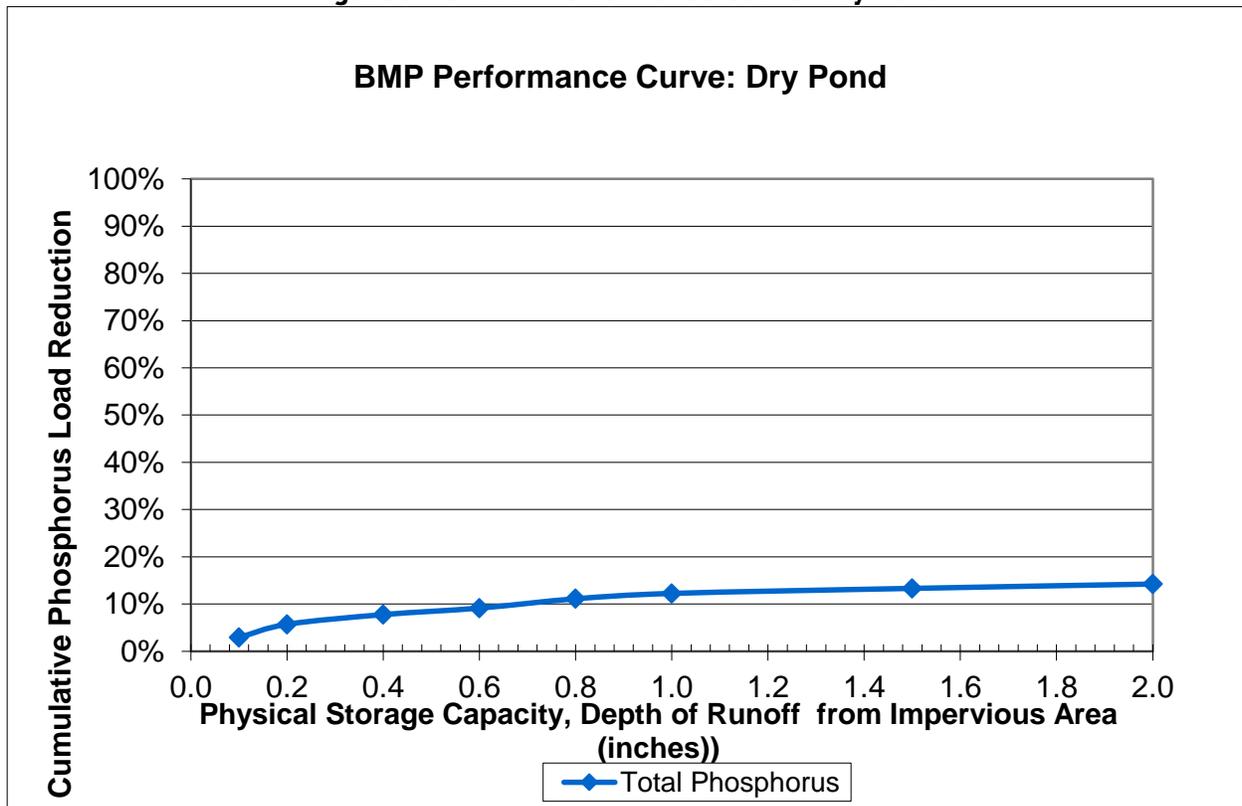


Table 3- 21: Grass Swale BMP Performance Table

Grass Swale BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	2%	5%	9%	13%	17%	21%	29%	36%

Figure 3- 17: BMP Performance Curve: Grass Swale

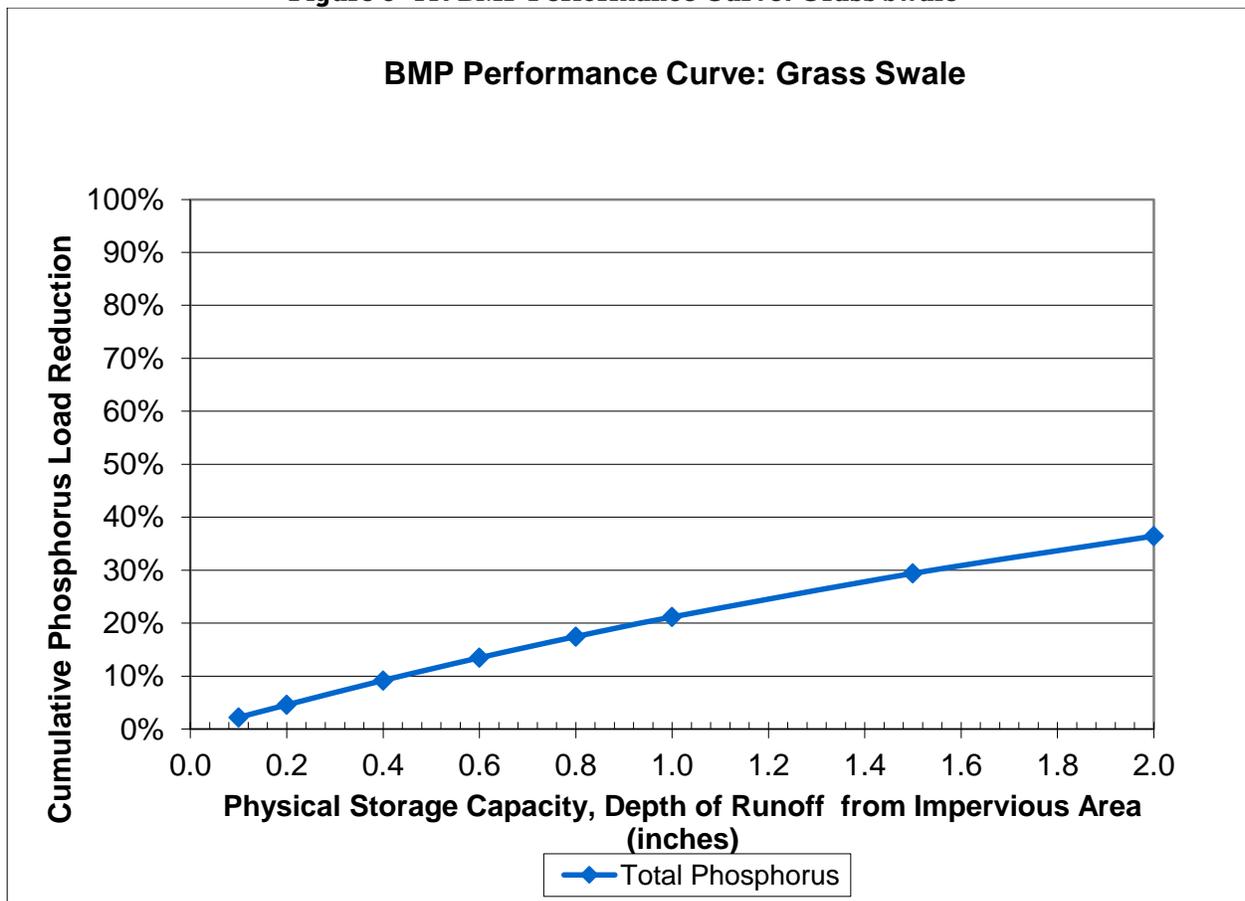


Table 3- 22: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1

Impervious Area Disconnection through Storage : Impervious Area to Pervious Area Ratio = 8:1												
Storage volume to impervious area ratio	Total Runoff Volume (TP) Reduction Percentages											
	HSG A			HSG B			HSG C			HSG D		
	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
0.1 in	24%	23%	22%	24%	23%	22%	24%	23%	22%	22%	22%	21%
0.2 in	40%	38%	37%	40%	38%	37%	37%	38%	37%	24%	26%	27%
0.3 in	52%	50%	49%	52%	50%	49%	40%	46%	49%	24%	26%	27%
0.4 in	61%	59%	58%	59%	59%	58%	40%	48%	54%	24%	26%	27%
0.5 in	67%	66%	64%	62%	66%	64%	40%	48%	56%	24%	26%	27%
0.6 in	70%	71%	70%	62%	70%	70%	40%	48%	56%	24%	26%	27%
0.8 in	71%	78%	77%	62%	73%	77%	40%	48%	56%	24%	26%	27%
1.0 in	71%	80%	80%	62%	73%	79%	40%	48%	56%	24%	26%	27%
1.5 in	71%	81%	87%	62%	73%	81%	40%	48%	56%	24%	26%	27%
2.0 in	71%	81%	88%	62%	73%	81%	40%	48%	56%	24%	26%	27%

Figure 3- 18: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1 for HSG A Soils

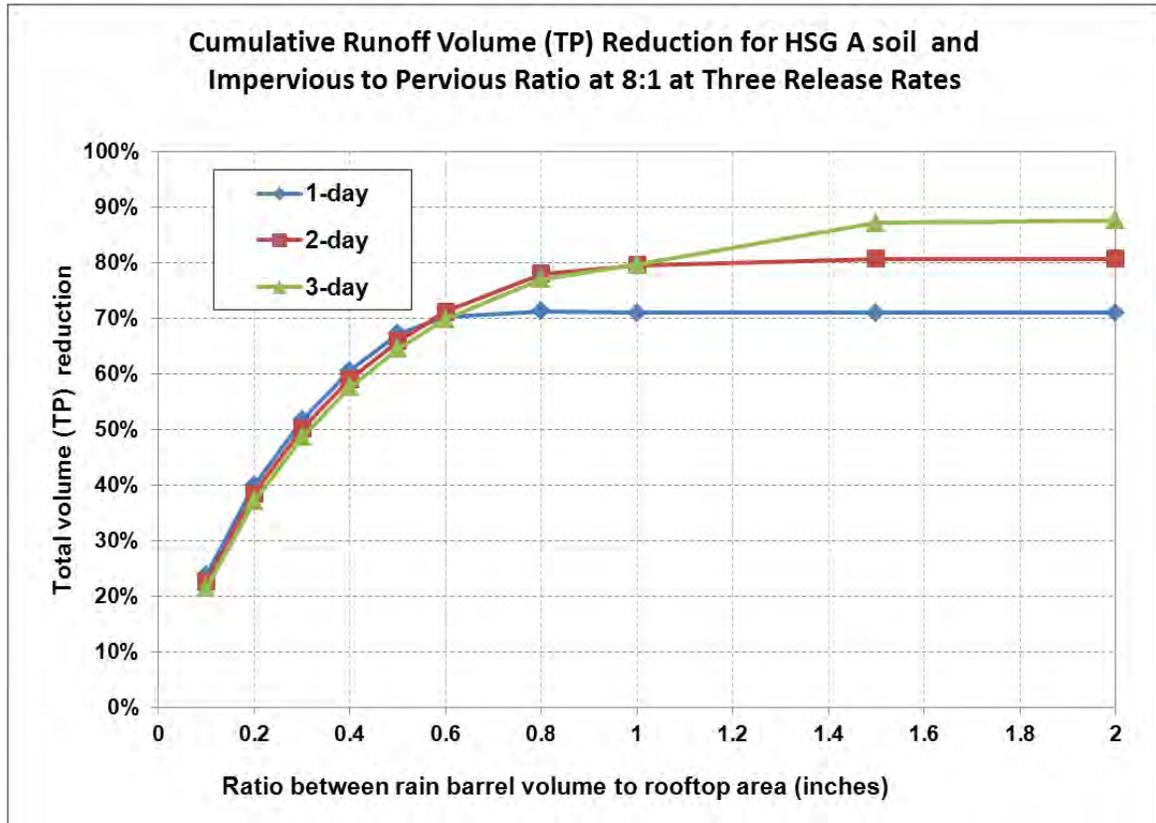


Figure 3- 19: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1 for HSG B Soils

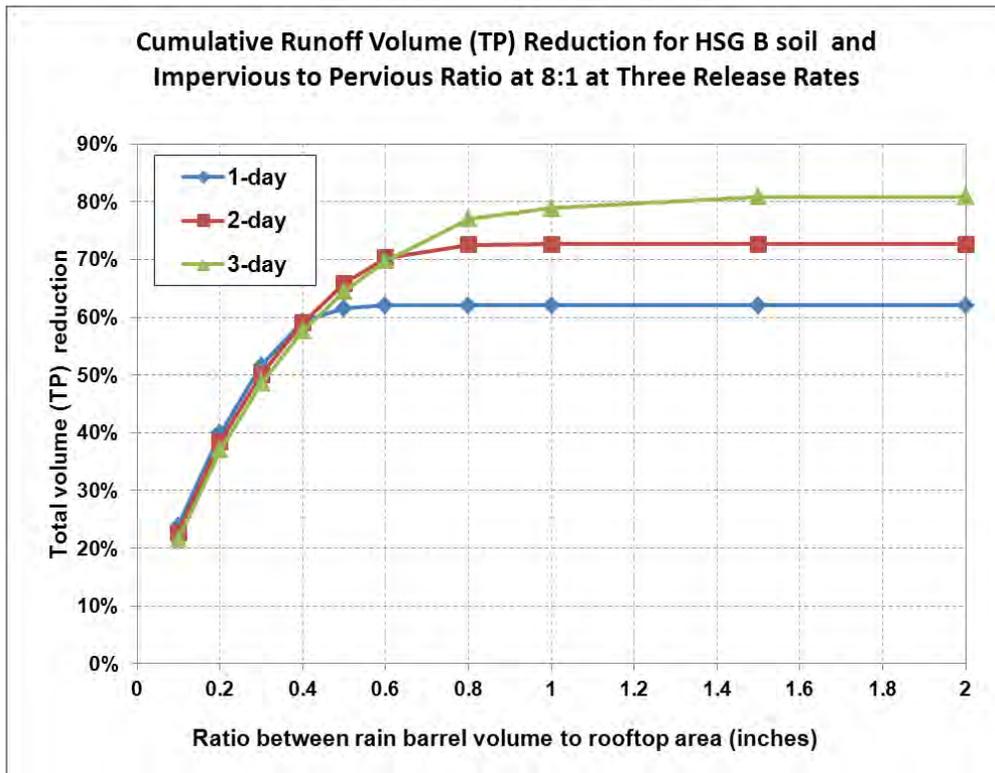


Figure 3- 20: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1 for HSG C Soils

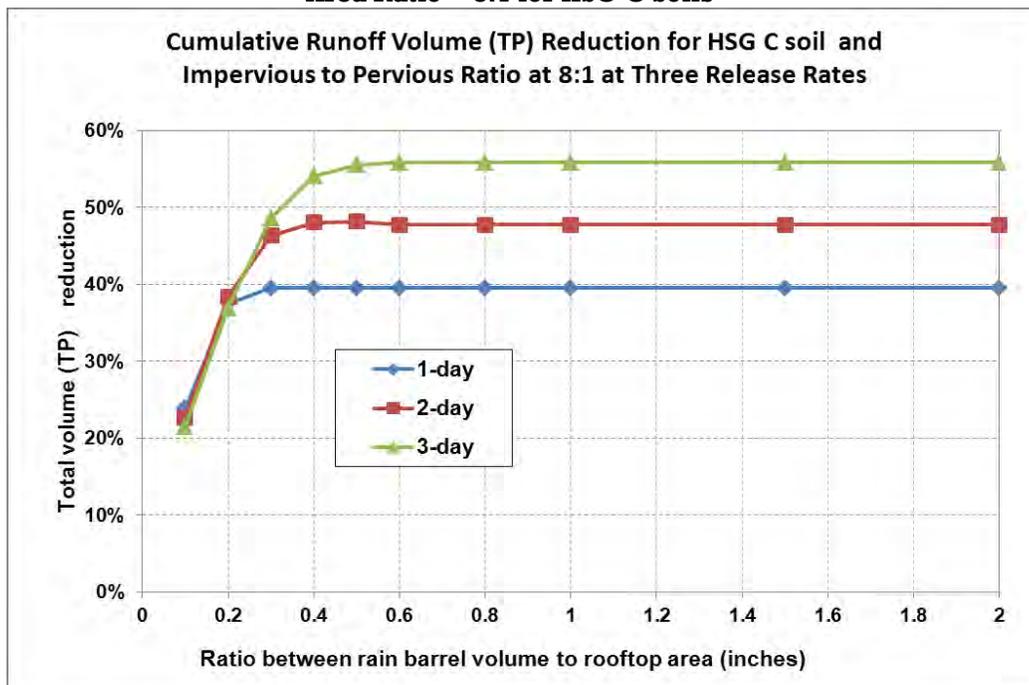


Figure 3- 21: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1 for HSG D Soils

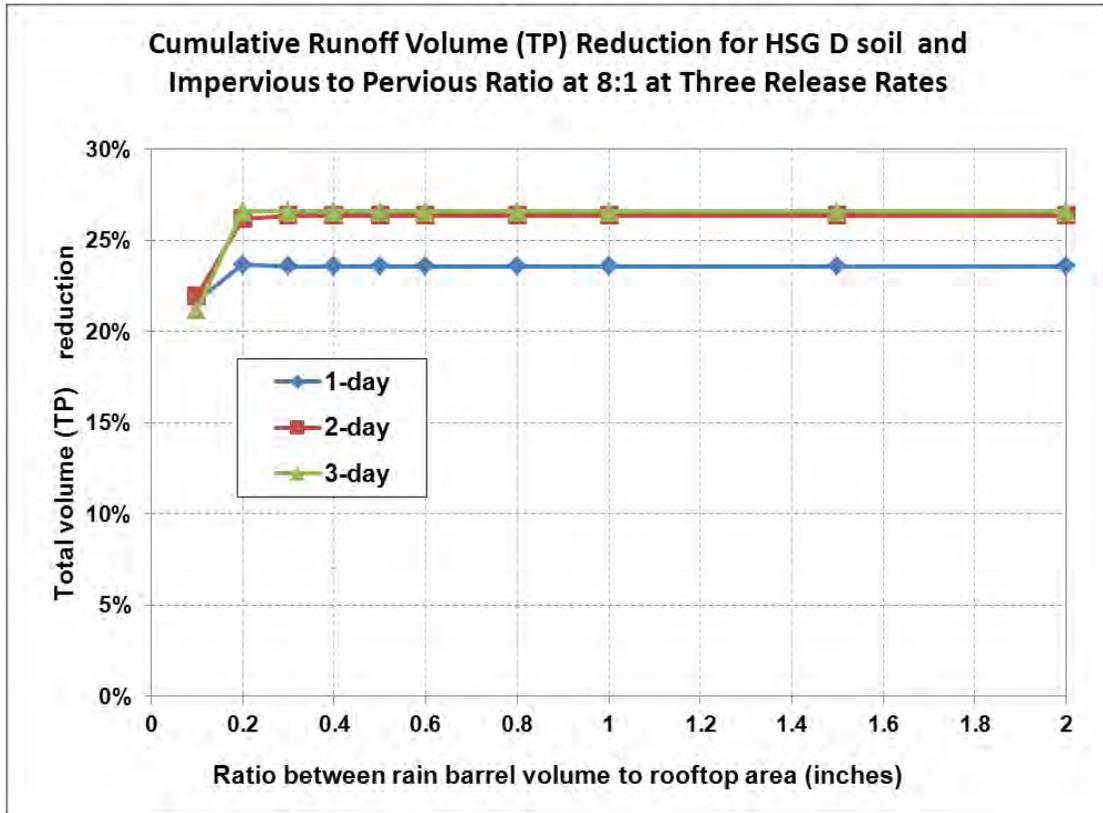


Table 3- 23: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1

Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1												
Rain barrel volume to impervious area ratio	Total Runoff Volume and Phosphorus Load (TP) Reduction Percentages											
	HSG A			HSG B			HSG C			HSG D		
	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
0.1 in	24%	23%	22%	24%	23%	22%	24%	23%	22%	23%	23%	22%
0.2 in	40%	38%	37%	40%	38%	37%	40%	38%	37%	28%	30%	33%
0.3 in	52%	50%	49%	52%	50%	49%	47%	50%	49%	29%	31%	34%
0.4 in	61%	59%	58%	61%	59%	58%	48%	55%	58%	29%	31%	34%
0.5 in	67%	66%	64%	67%	66%	64%	48%	57%	63%	29%	31%	34%
0.6 in	73%	71%	70%	70%	71%	70%	48%	57%	65%	29%	31%	34%
0.8 in	78%	78%	77%	71%	78%	77%	48%	57%	66%	29%	31%	34%
1.0 in	79%	81%	80%	71%	79%	80%	48%	57%	66%	29%	31%	34%
1.5 in	79%	87%	88%	71%	80%	87%	48%	57%	66%	29%	31%	34%
2.0 in	79%	87%	91%	71%	80%	87%	48%	57%	66%	29%	31%	34%

Figure 3- 22: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1 for HSG A Soils

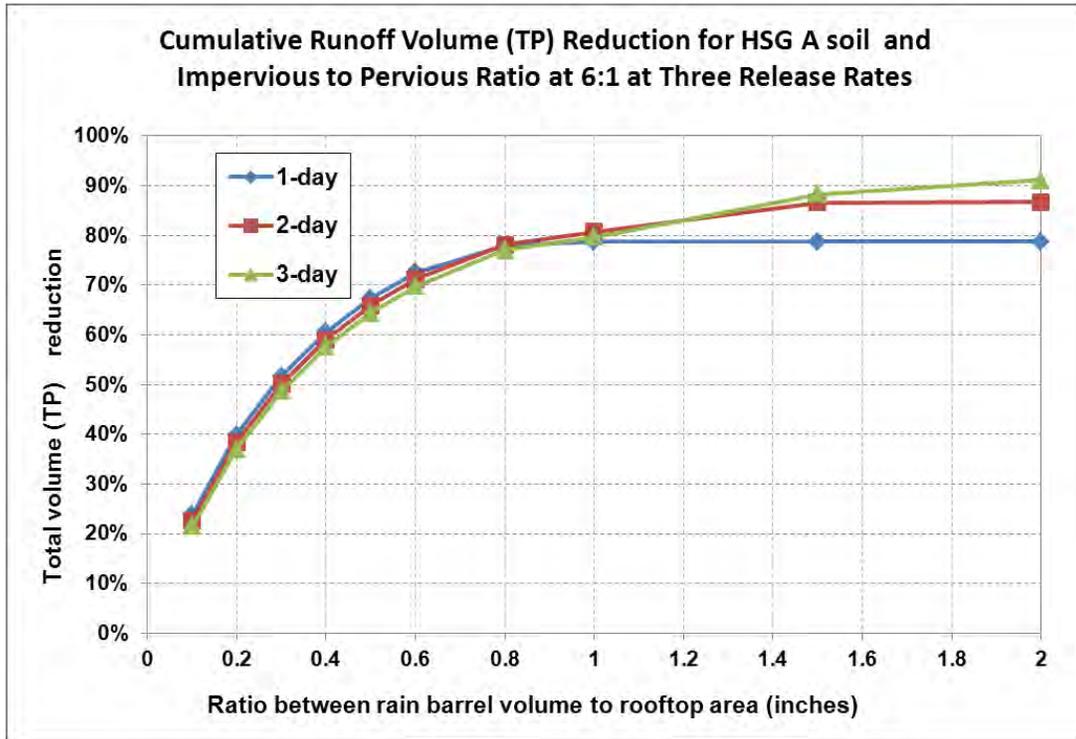


Figure 3- 23: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1 for HSG B Soils

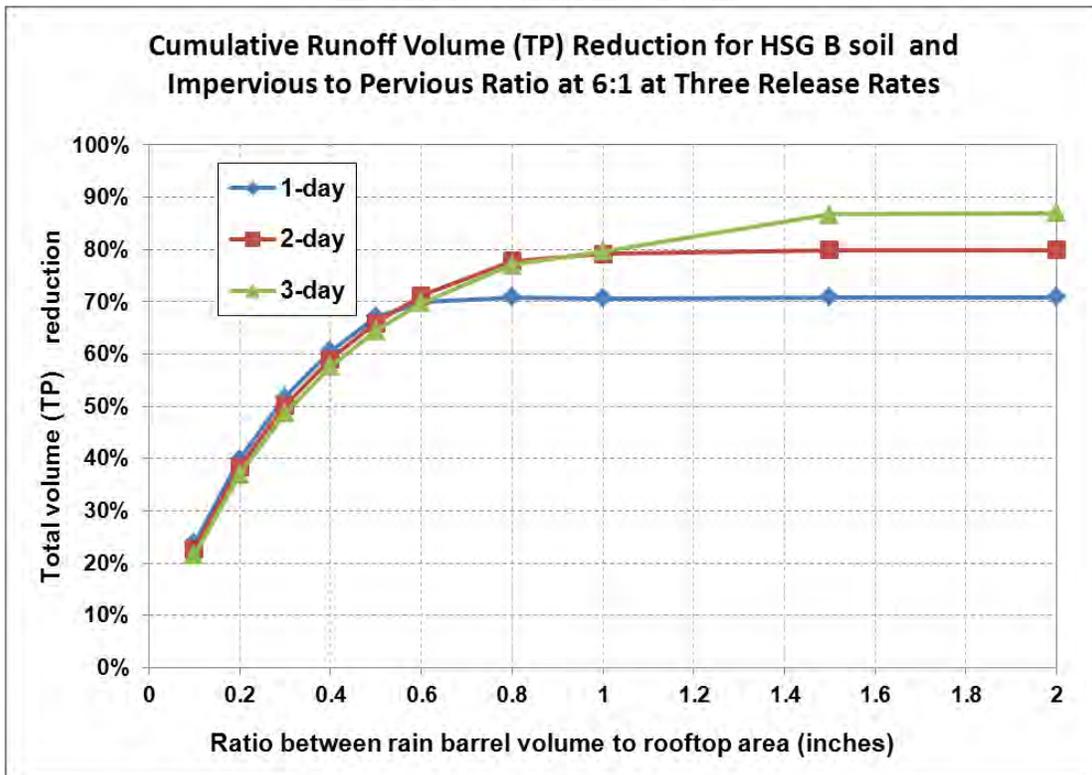


Figure 3- 24: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1 for HSG C Soils

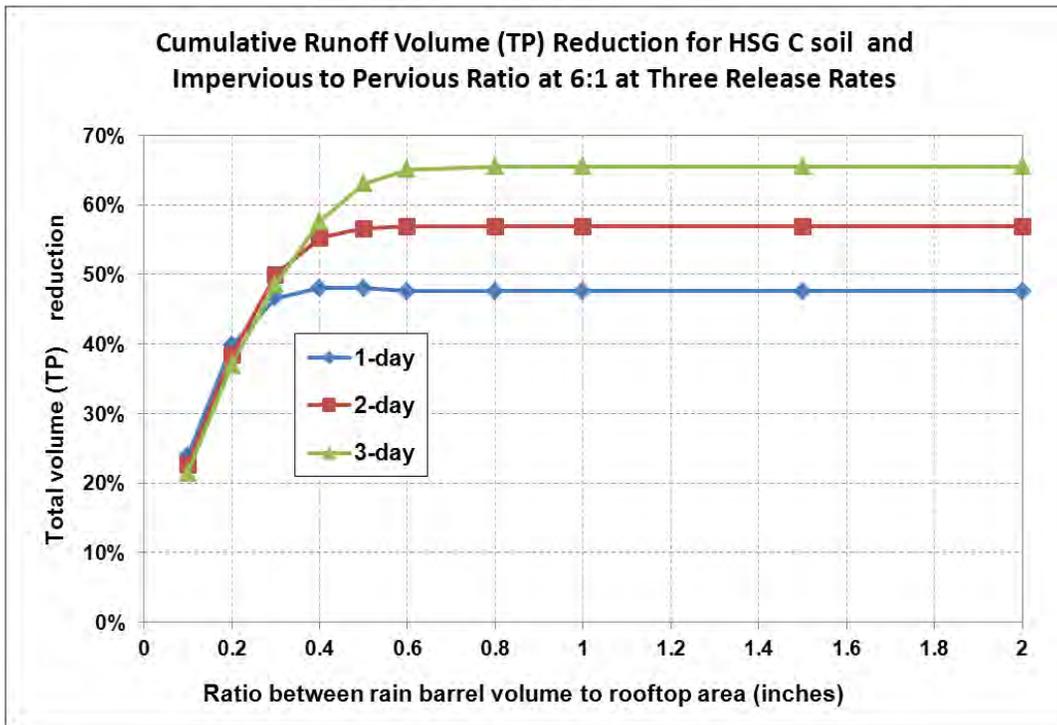


Figure 3- 25: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1 for HSG D Soils

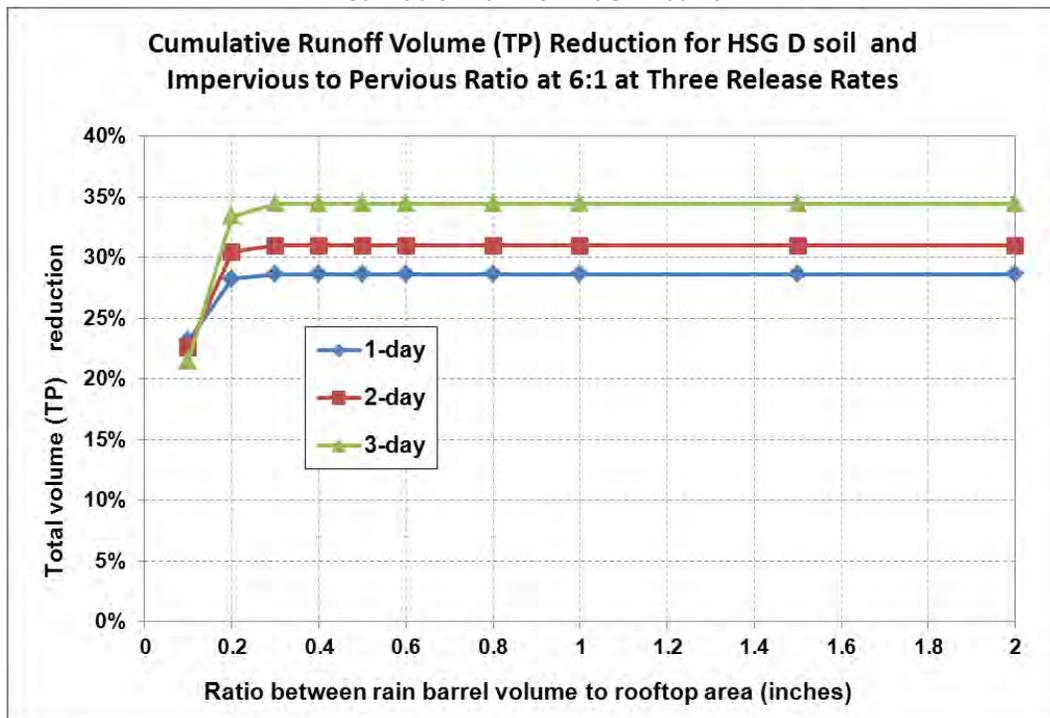


Table 3- 24: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1

Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1												
Storage volume to impervious area ratio	Total Runoff Volume and Phosphorus Load (TP) Reduction Percentages											
	HSG A			HSG B			HSG C			HSG D		
	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
0.1 in	24%	23%	22%	24%	23%	22%	24%	23%	22%	24%	23%	22%
0.2 in	40%	38%	37%	40%	38%	37%	40%	38%	37%	37%	37%	37%
0.3 in	52%	50%	49%	52%	50%	49%	52%	50%	49%	39%	42%	45%
0.4 in	61%	59%	58%	61%	59%	58%	58%	59%	58%	39%	42%	47%
0.5 in	67%	66%	64%	67%	66%	64%	60%	65%	64%	40%	42%	47%
0.6 in	73%	71%	70%	73%	71%	70%	61%	68%	70%	40%	42%	47%
0.8 in	79%	78%	77%	79%	78%	77%	61%	69%	75%	40%	42%	47%
1.0 in	82%	81%	80%	80%	81%	80%	61%	69%	76%	40%	42%	47%
1.5 in	87%	89%	88%	80%	87%	88%	61%	69%	76%	40%	42%	47%
2.0 in	87%	91%	91%	80%	88%	91%	61%	69%	76%	40%	42%	47%

Figure 3- 26: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1 for HSG A Soils

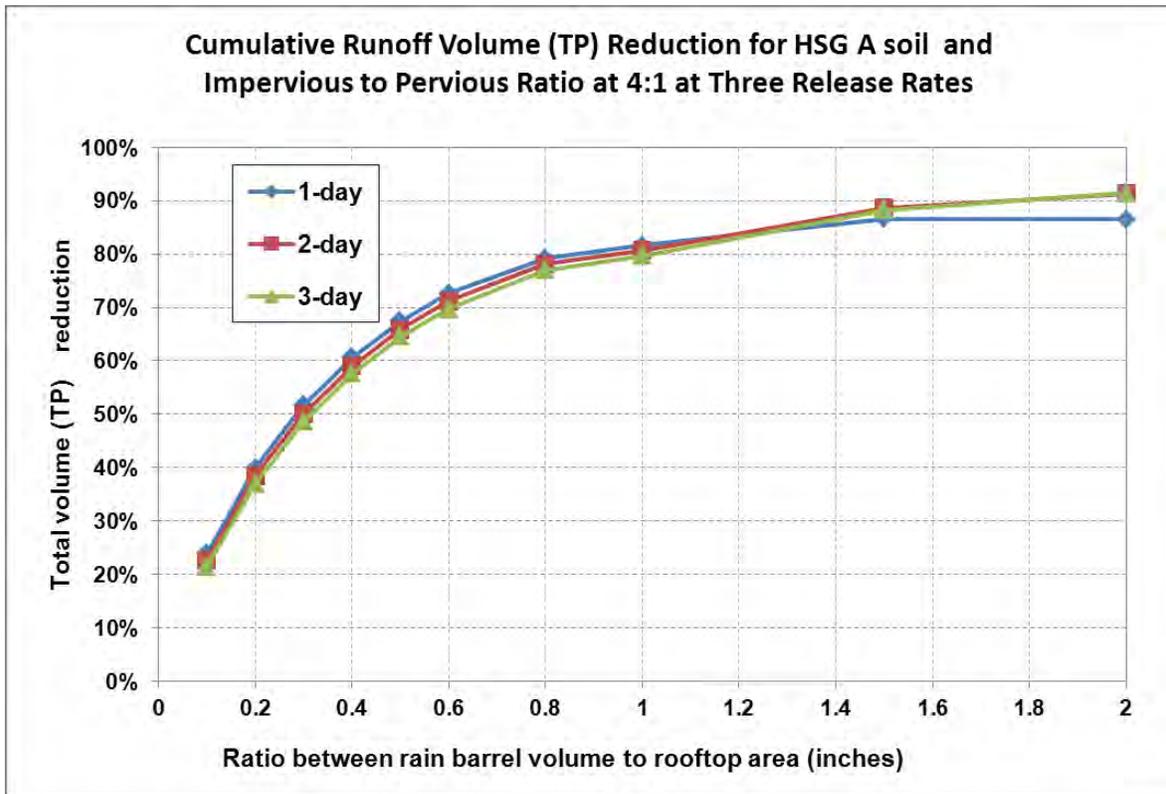


Figure 3- 27: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1 for HSG B Soils

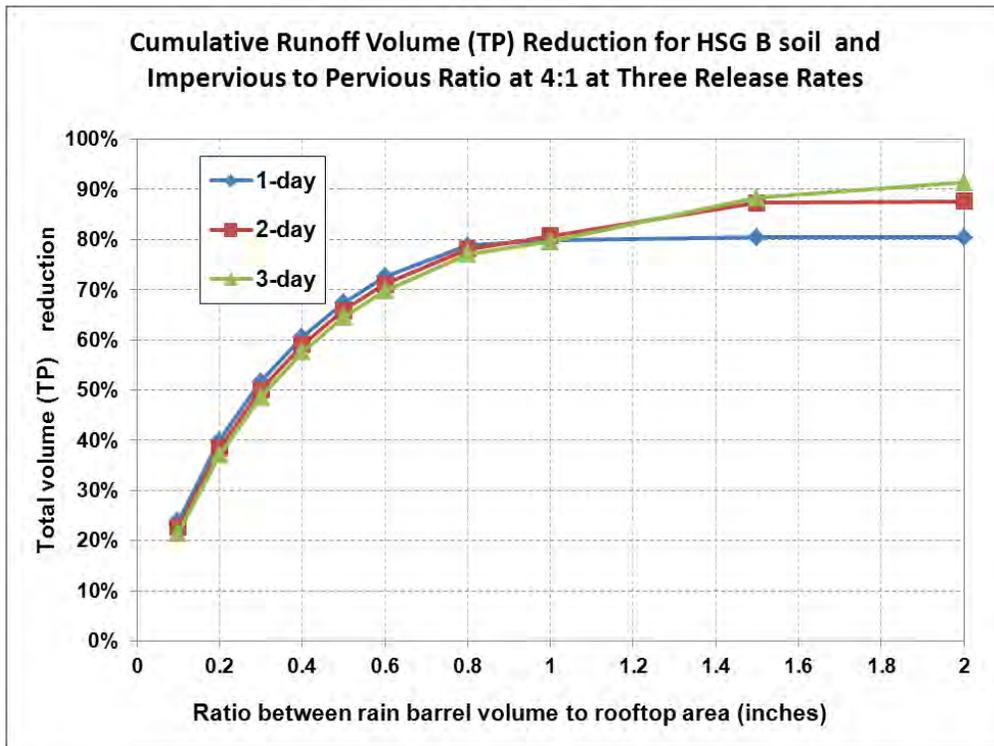


Figure 3- 28: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1 for HSG C Soils

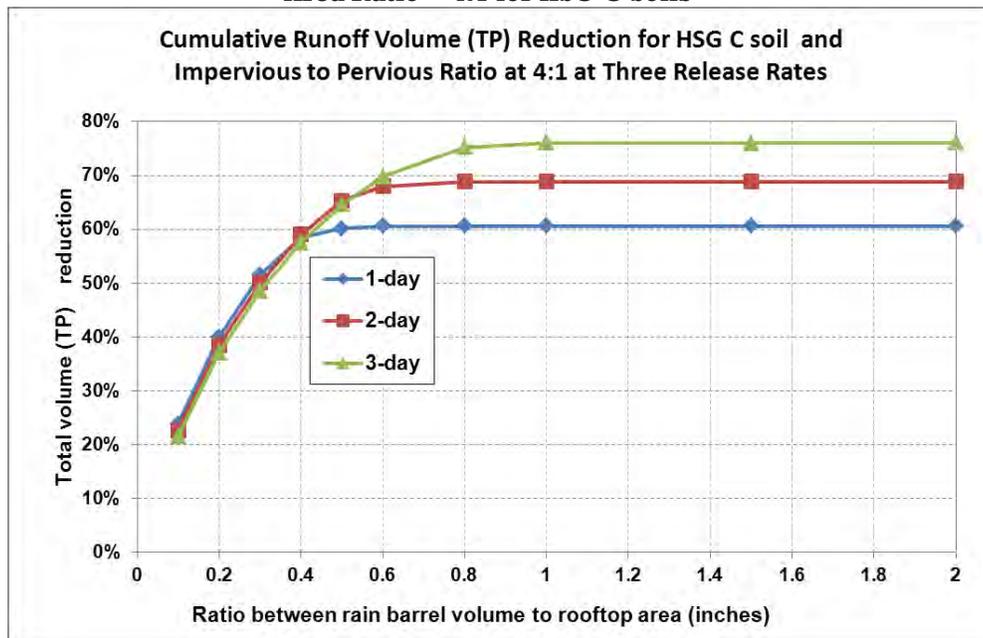


Figure 3- 29: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1 for HSG D Soils

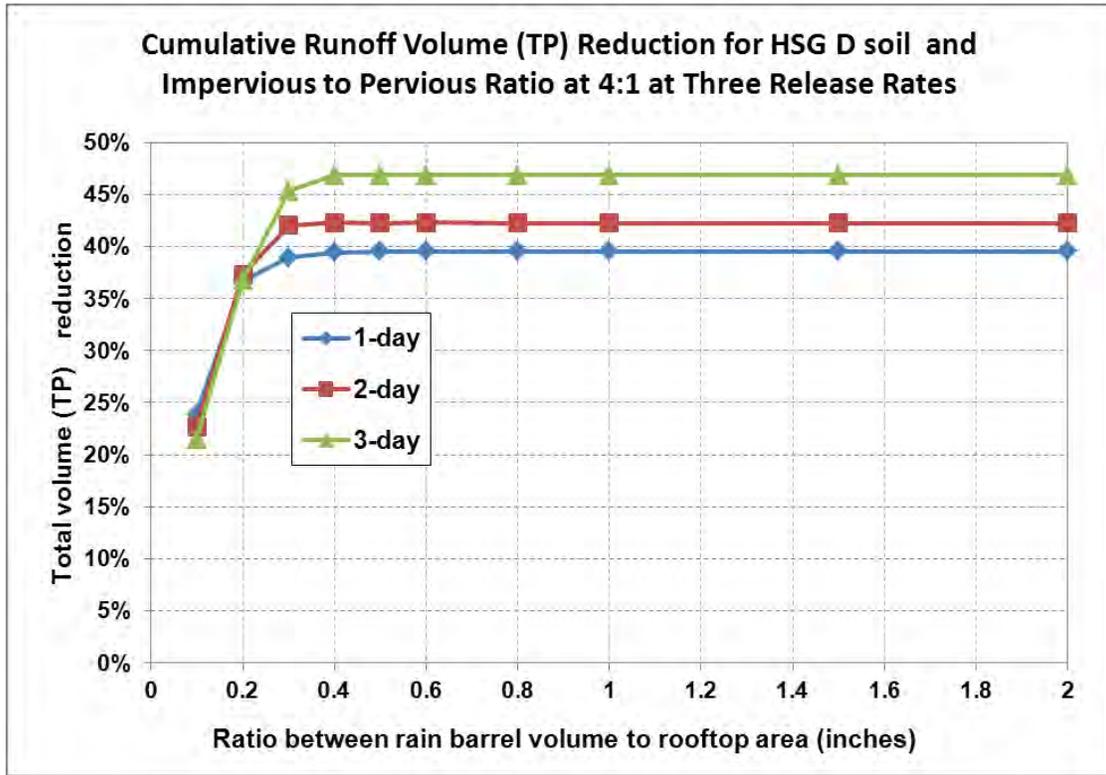


Table 3- 25: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 2:1

Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 2:1												
Storage volume to impervious area ratio	Total Runoff Volume and Phosphorus Load (TP) Reduction Percentages											
	HSG A			HSG B			HSG C			HSG D		
	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
0.1 in	24%	23%	22%	24%	23%	22%	24%	23%	22%	24%	23%	22%
0.2 in	40%	38%	37%	40%	38%	37%	40%	38%	37%	40%	38%	37%
0.3 in	52%	50%	49%	52%	50%	49%	52%	50%	49%	51%	50%	49%
0.4 in	61%	59%	58%	61%	59%	58%	61%	59%	58%	57%	58%	57%
0.5 in	67%	66%	64%	67%	66%	64%	67%	66%	64%	59%	62%	63%
0.6 in	73%	71%	70%	73%	71%	70%	72%	71%	70%	59%	62%	67%
0.8 in	79%	78%	77%	79%	78%	77%	77%	78%	77%	59%	62%	67%
1.0 in	82%	81%	80%	82%	81%	80%	78%	81%	80%	59%	62%	67%
1.5 in	89%	89%	88%	89%	89%	88%	78%	84%	88%	59%	62%	67%
2.0 in	92%	92%	91%	91%	92%	91%	78%	84%	89%	59%	62%	67%

Figure 3- 30: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio= 2:1 for HSG A Soils

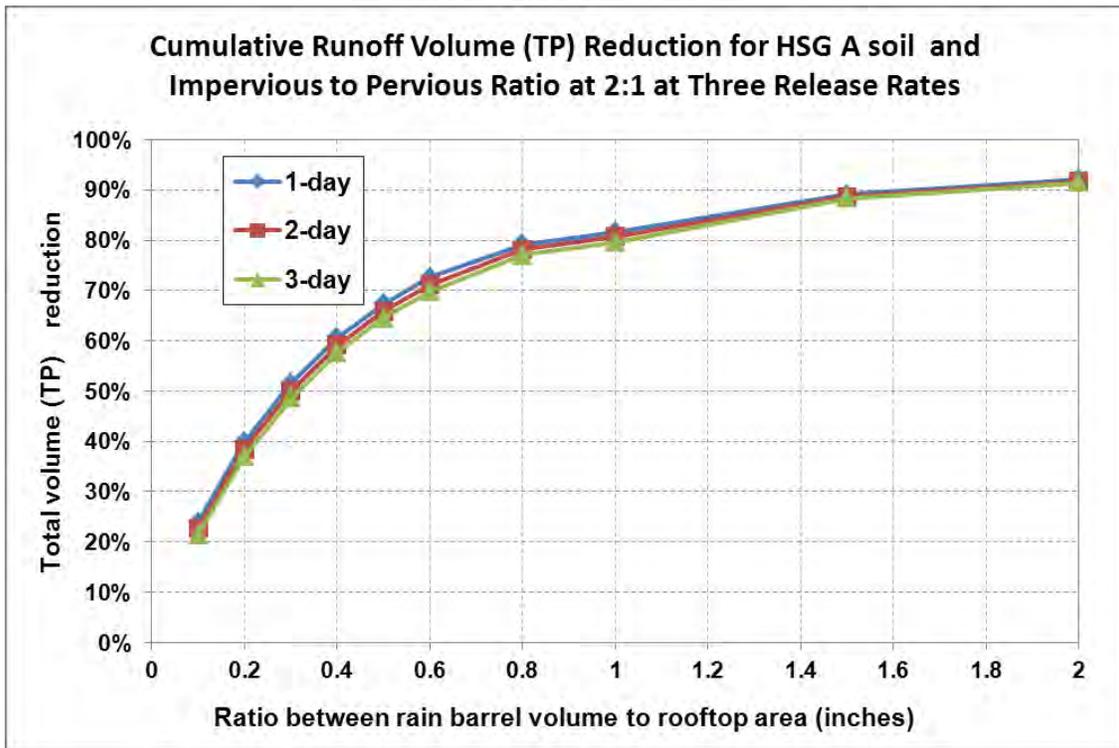


Figure 3- 31: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio= 2:1 for HSG B Soils

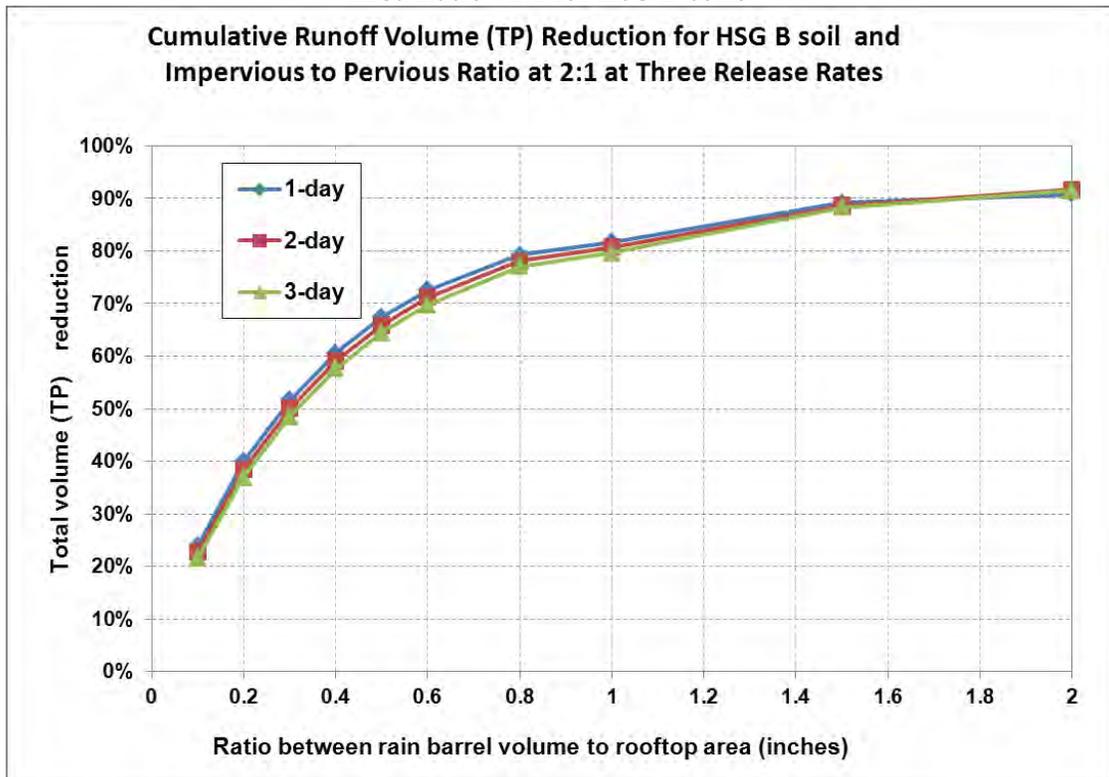


Figure 3- 32: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio= 2:1 for HSG C Soils

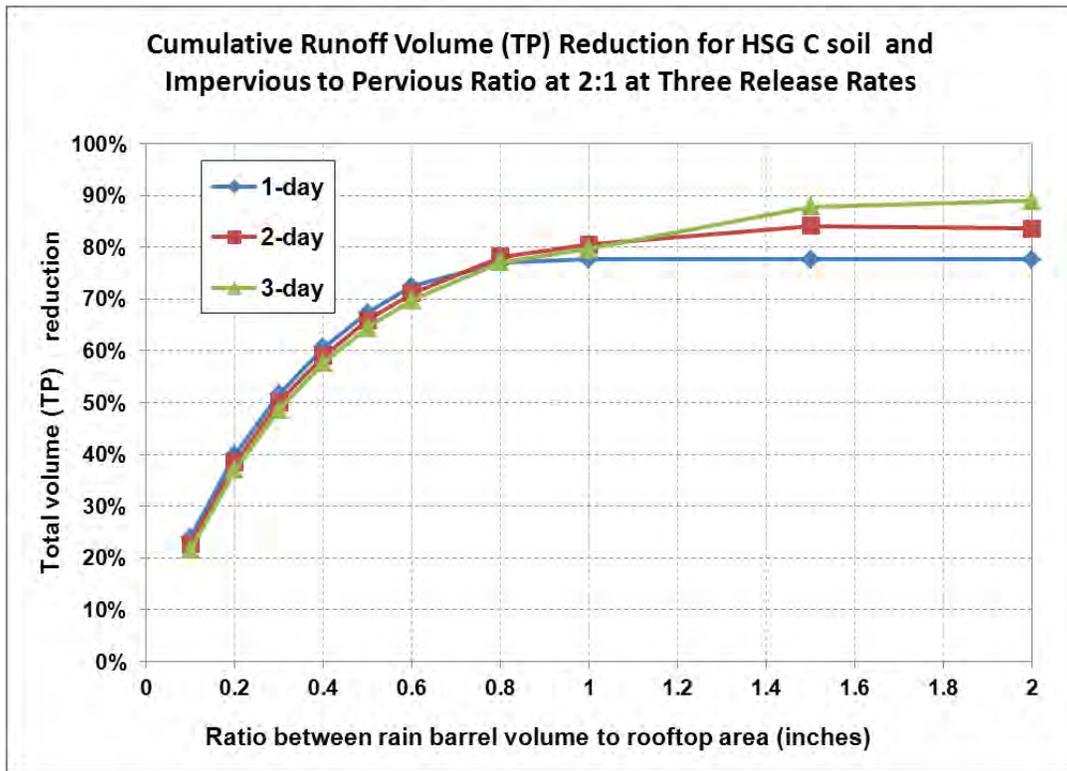


Figure 3- 33: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio= 2:1 for HSG D Soils

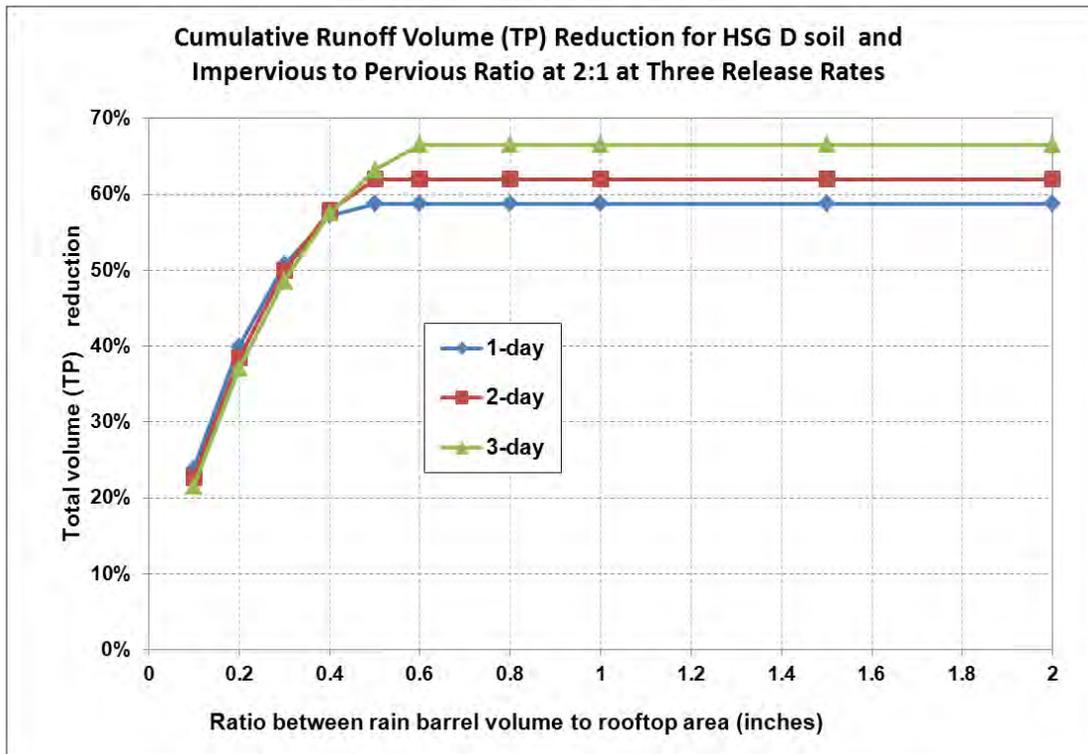


Table 3- 26: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1

Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1												
Storage volume to impervious area ratio	Total Runoff Volume and Phosphorus Load (TP) Reduction Percentages											
	HSG A			HSG B			HSG C			HSG D		
	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day	1-day	2-day	3-day
0.1 in	24%	23%	22%	24%	23%	22%	24%	23%	22%	24%	23%	22%
0.2 in	40%	38%	37%	40%	38%	37%	40%	38%	37%	40%	38%	37%
0.3 in	52%	50%	49%	52%	50%	49%	52%	50%	49%	52%	50%	49%
0.4 in	61%	59%	58%	61%	59%	58%	61%	59%	58%	61%	59%	58%
0.5 in	67%	66%	64%	67%	66%	64%	67%	66%	64%	67%	66%	64%
0.6 in	73%	71%	70%	73%	71%	70%	73%	71%	70%	72%	71%	70%
0.8 in	79%	78%	77%	79%	78%	77%	79%	78%	77%	78%	78%	77%
1.0 in	82%	81%	80%	82%	81%	80%	82%	81%	80%	79%	80%	80%
1.5 in	89%	89%	88%	89%	89%	88%	89%	89%	88%	80%	82%	86%
2.0 in	92%	92%	91%	92%	92%	91%	91%	92%	91%	80%	82%	86%

Figure 3- 34: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1 for HSG A Soils

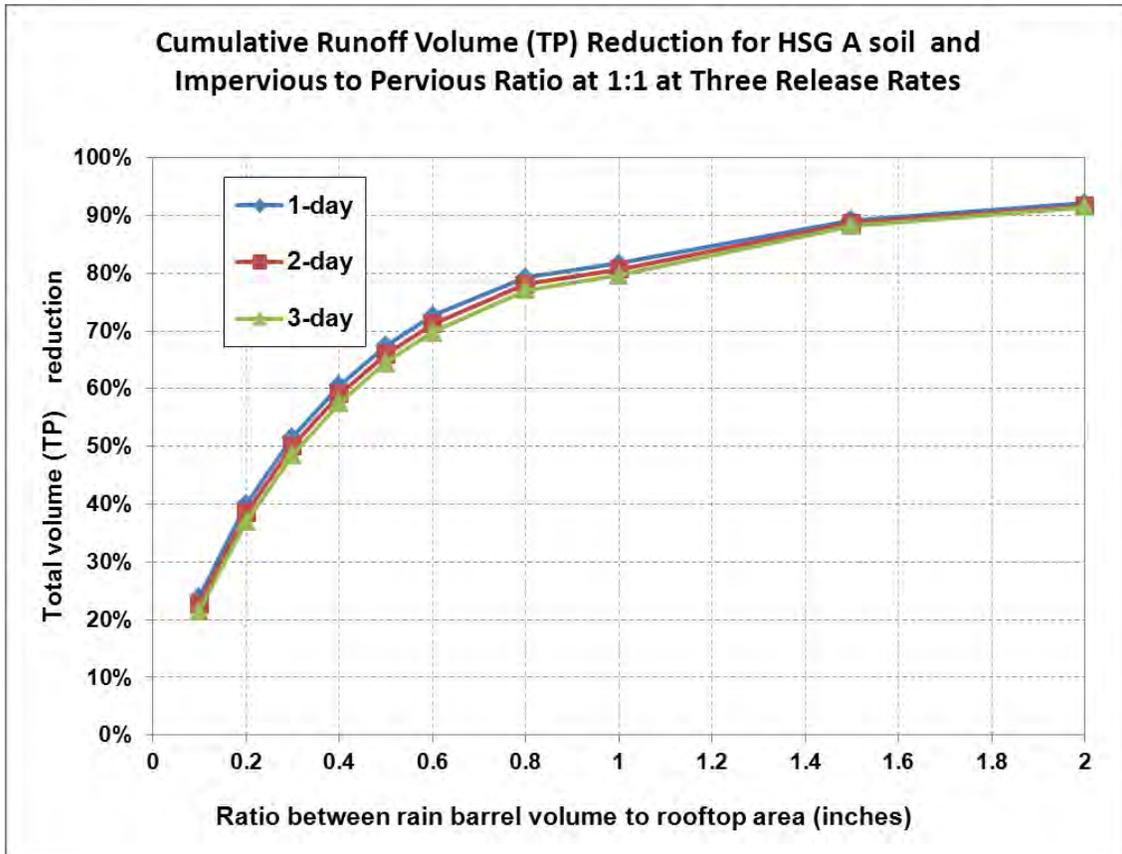


Figure 3- 35: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1 for HSG B Soils

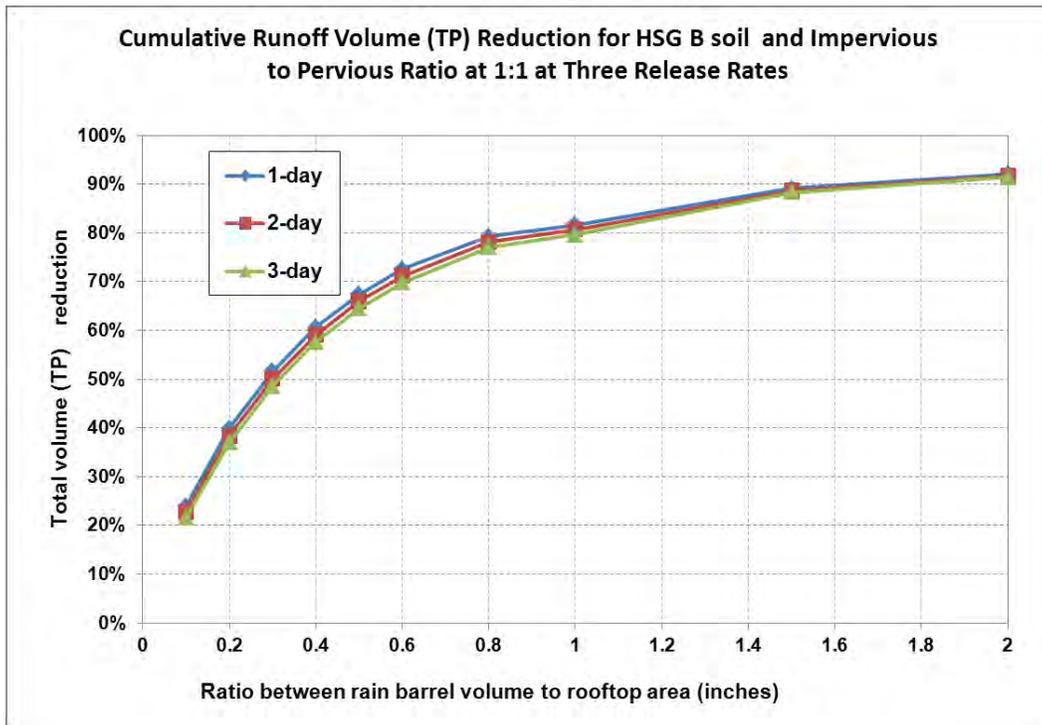


Figure 3- 36: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1 for HSG C Soils

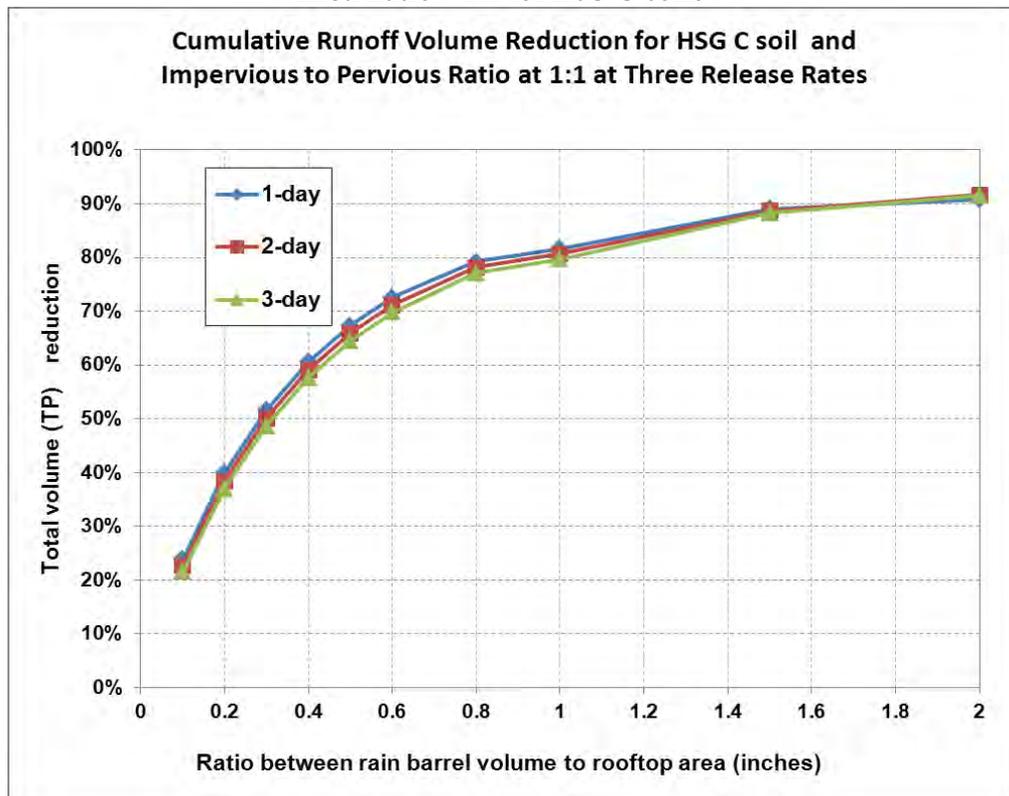


Figure 3- 37: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1 for HSG D Soils

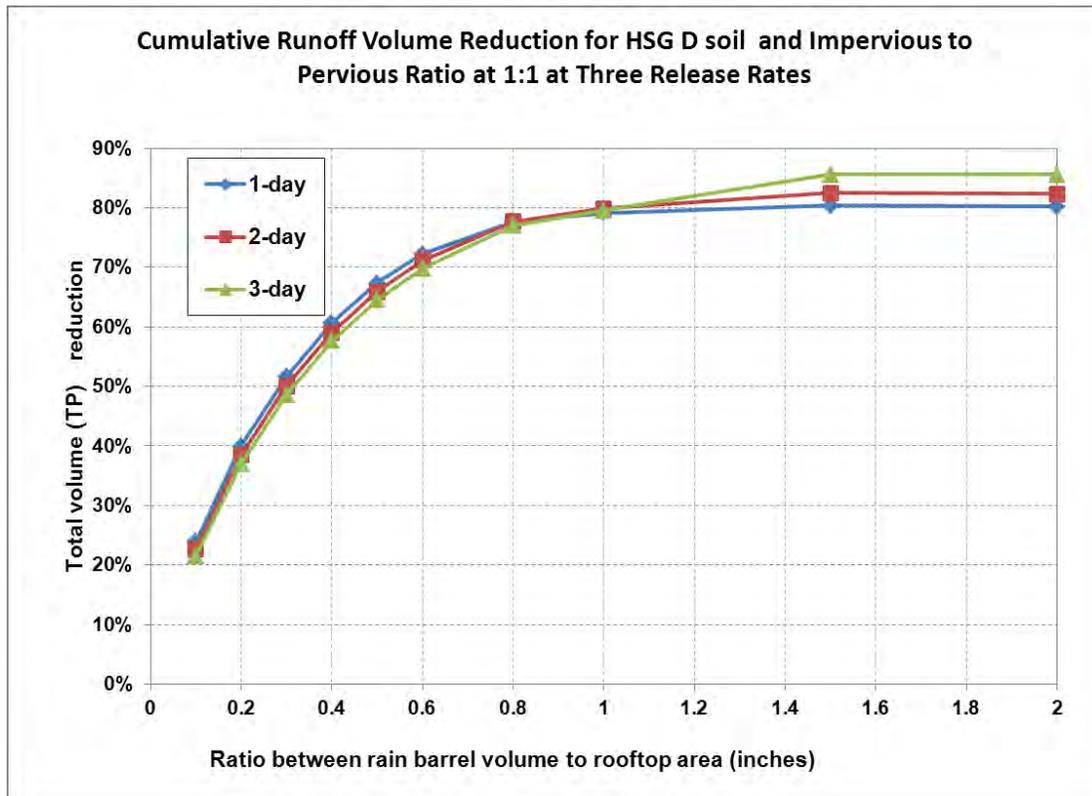


Table 3- 27: Impervious Area Disconnection Performance Table

Impervious area to pervious area ratio	Soil type of Receiving Pervious Area			
	HSG A	HSG B	HSG C	HSG D
8:1	30%	14%	7%	3%
6:1	37%	18%	11%	5%
4:1	48%	27%	17%	9%
2:1	64%	45%	33%	21%
1:1	74%	59%	49%	36%
1:2	82%	67%	60%	49%
1:4	85%	72%	67%	57%

Figure 3- 38: Impervious Area Disconnection Performance Curves

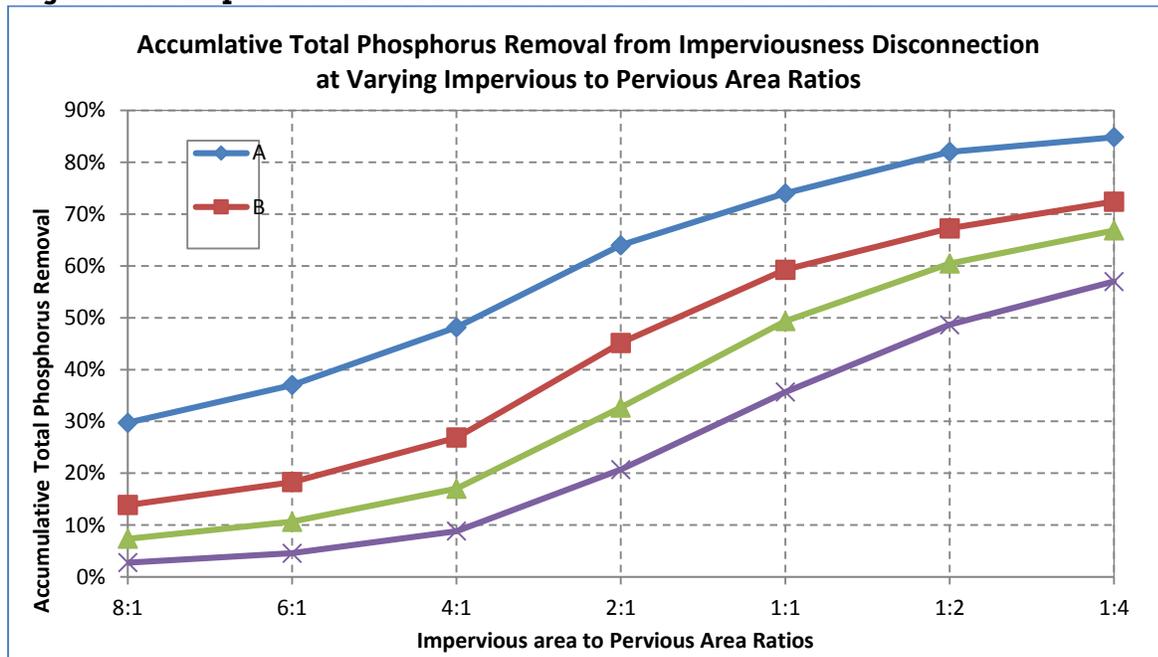


Table 3- 28: Performance Table for Conversion of Impervious Areas to Pervious Area based on Hydrological Soil Groups

Land-Use Group	Cumulative Reduction in Annual Stormwater Phosphorus Load				
	Conversion of impervious area to pervious area-HSG A	Conversion of impervious area to pervious area-HSG B	Conversion of impervious area to pervious area-HSG C	Conversion of impervious area to pervious area-HSG C/D	Conversion of impervious area to pervious area-HSG D
Commercial (Com) and Industrial (Ind)	98.5%	93.5%	88.0%	83.5%	79.5%
Multi-Family (MFR) and High-Density Residential (HDR)	98.8%	95.0%	90.8%	87.3%	84.2%
Medium -Density Residential (MDR)	98.6%	94.1%	89.1%	85.0%	81.4%
Low Density Residential (LDR) - "Rural"	98.2%	92.4%	85.9%	80.6%	75.9%
Highway (HWY)	98.0%	91.3%	84.0%	78.0%	72.7%
Forest (For)	98.2%	92.4%	85.9%	80.6%	75.9%
Open Land (Open)	98.2%	92.4%	85.9%	80.6%	75.9%
Agriculture (Ag)	70.6%	70.6%	70.6%	70.6%	70.6%

Appendix F Attachment 3

Table 3- 29: Performance Table for Conversion of Low Permeable Pervious Area to High Permeable Pervious Area based on Hydrological Soil Group

Land Cover	Cumulative Reduction in Annual SW Phosphorus Load from Pervious Area				
	Conversion of pervious area HSG D to pervious area-HSG A	Conversion of pervious area HSG D to pervious area-HSG B	Conversion of pervious area HSG D to pervious area-HSG C	Conversion of pervious area HSG C to pervious area-HSG A	Conversion of pervious area HSG C to pervious area-HSG B
Developed Pervious Land	92.7%	68.3%	41.5%	83.5%	79.5%

Table 3-30 Method for determining stormwater control design volume (DSV) (i.e., capacity) using Long-term cumulative performance curves

Stormwater Control Type	Description	Applicable Structural Stormwater Control Performance Curve	Equation for calculating Design Storage Capacity for Estimating Cumulative Reductions using Performances Curves
Infiltration Trench	Provides temporary storage of runoff using the void spaces within the soil/sand/gravel mixture that is used to backfill the trench for subsequent infiltration into the surrounding sub-soils.	Infiltration Trench (6 infiltration rates: 0.17, 0.27, 0.52, 1.02, 2.41 and 8.27 inches per hour)	DSV = void space volumes of gravel and sand layers $DSV = (L \times W \times D_{stone} \times n_{stone}) + (L \times W \times D_{sand} \times n_{sand})$
Subsurface Infiltration	Provides temporary storage of runoff using the combination of storage structures (e.g., galleys, chambers, pipes, etc.) and void spaces within the soil/sand/gravel mixture that is used to backfill the system for subsequent infiltration into the surrounding sub-soils.	Infiltration Trench (6 infiltration rates: 0.17, 0.27, 0.52, 1.02, 2.41 and 8.27 inches per hour)	DSV = Water storage volume of storage units and void space volumes of backfill materials. Example for subsurface galleys backfilled with washed stone: $DSV = (L \times W \times D)_{galley} + (L \times W \times D_{stone} \times n_{stone})$
Surface Infiltration	Provides temporary storage of runoff through surface ponding storage structures (e.g., basin or swale) for subsequent infiltration into the underlying soils.	Infiltration Basin (6 infiltration rates: 0.17, 0.27, 0.52, 1.02, 2.41 and 8.27 inches per hour)	DSV = Water volume of storage structure before bypass. Example for linear trapezoidal vegetated swale $DSV = (L \times ((W_{bottom} + W_{top@Dmax}) / 2) \times D)$
Rain Garden/Bio-retention (no underdrains)	Provides temporary storage of runoff through surface ponding and possibly void spaces within the soil/sand/gravel mixture that is used to filter runoff prior to infiltration into underlying soils.	Infiltration Basin (6 infiltration rates: 0.17, 0.27, 0.52, 1.02, 2.41 and 8.27 inches per hour)	DSV = Ponding water storage volume and void space volumes of soil filter media. Example for raingarden : $DSV = (A_{pond} \times D_{pond}) + (A_{soil} \times D_{soil} \times n_{soil \text{ mix}})$
Tree Filter (no underdrain)	Provides temporary storage of runoff through surface ponding and void spaces within the soil/sand/gravel mixture that is used to filter runoff prior to infiltration into underlying soils.	Infiltration Trench (6 infiltration rates: 0.17, 0.27, 0.52, 1.02, 2.41 and 8.27 inches per hour)	DSV = Ponding water storage volume and void space volumes of soil filter media. $DSV = (L \times W \times D_{ponding}) + (L \times W \times D_{soil} \times n_{soil \text{ mix}})$
Bio-Filtration (w/underdrain)	Provides temporary storage of runoff for filtering through an engineered soil media. The storage capacity includes void spaces in the filter media and temporary ponding at the surface. After runoff has passed through the filter media it is collected by an underdrain pipe for discharge. Manufactured or packaged bio-filter systems such as tree box filters may be suitable for using the bio-filtration performance results.	Bio-filtration	DSV = Ponding water storage volume and void space volume of soil filter media. Example of a linear biofilter: $DSV = (L \times W \times D_{ponding}) + (L \times W \times D_{soil} \times n_{soil})$
Gravel Wetland	Based on design by the UNH Stormwater Center (UNHSC). Provides temporary surface ponding storage of runoff in a vegetated wetland cell that is eventually routed to an underlying saturated gravel internal storage reservoir (ISR) for nitrogen treatment. Outflow is controlled by an elevated orifice that has its invert elevation equal to the top of the ISR layer and provides a retention time of at least 24 hours.	Gravel Wetland	DSV = pretreatment volume + ponding volume + void space volume of gravel ISR. $DSV = (A_{pretreatment} \times D_{pretreatment}) + (A_{wetland} \times D_{ponding}) + (A_{ISR} \times D_{gravel} \times n_{gravel})$
Porous Pavement with subsurface infiltration	Provides filtering of runoff through a filter course and temporary storage of runoff within the void spaces of a subsurface gravel reservoir prior to infiltration into subsoils.	Infiltration Trench (6 infiltration rates: 0.17, 0.27, 0.52, 1.02, 2.41 and 8.27 inches per hour)	DSV = void space volumes of gravel layer $DSV = (L \times W \times D_{stone} \times n_{stone})$
Porous pavement w/ impermeable underliner w/underdrain	Provides filtering of runoff through a filter course and temporary storage of runoff within the void spaces prior to discharge by way of an underdrain.	Porous Pavement	Depth of Filter Course = D_{FC}
Wet Pond	Provides treatment of runoff through routing through permanent pool.	Wet Pond	DSV= Permanent pool volume prior to high flow bypass $DSV = A_{pond} \times D_{pond}$ (does not include pretreatment volume)
Extended Dry Detention Basin	Provides temporary detention storage for the design storage volume to drain in 24 hours through multiple out let controls.	Dry Pond	DSV= Ponding volume prior to high flow bypass $DSV = A_{pond} \times D_{pond}$ (does not include pretreatment volume)
Dry Water Quality Swale/Grass Swale	Based on MA design standards. Provides temporary surface ponding storage of runoff in an open vegetated channel through permeable check dams. Treatment is provided by filtering of runoff by vegetation and check dams and infiltration into subsurface soils.	Grass swale	DSV = Volume of swale at full design depth $DSV = L_{swale} \times A_{swale}$
Definitions: DSV= Design Storage Volume = physical storage capacity to hold water; VSV = Void Space Volume; L = length, W = width, D = depth at design capacity before bypass, n = porosity fill material, A= average surface area for calculating volume; Infiltration rate = saturated soil hydraulic conductivity			

Appendix G
Massachusetts Small MS4 Permit Monitoring Requirements
For Discharges into Impaired Waters – Parameters and Methods

Pollutant Causing Impairment	Monitoring Parameter	EPA or Approved Method No.
Aluminum	Aluminum, Total	200.7; 200.8; 200.9
Ammonia (Un-ionized)	Ammonia – Nitrogen	350.1
Arsenic	Arsenic, Total	200.7; 200.8; 200.9
Cadmium	Cadmium, Total	200.7; 200.8; 200.9
Chlordane	NMR	608; 625
Chloride	Chloride	300
Chromium (total)	Chromium, Total	200.7; 200.8; 200.9
Copper	Copper, Total	200.7; 200.8; 200.9
DDT	NMR	608; 625
DEHP (Di-sec-octyl phthalate)	NMR	---
Dioxin (including 2,3,7,8-TCDD)	NMR	613; 1613
Dioxin (2,3,7,8-Tetrachlorodibenzo-p-dioxin only)	NMR	613
Lead	Lead, Total	200.7; 200.8; 200.9
Mercury in Water Column	NMR unless potentially present such (e.g., salvage yards crushing vehicles with Hg switches)	200.7; 200.8; 200.9
Nitrogen (Total)	Nitrogen, Total	351.1/351.2 + 353.2
Pentachlorophenol (PCP)	NMR	---
Petroleum Hydrocarbons	Oil and Grease	1664
Phosphorus (Total)	Phosphorus, Total	365.1; 365.2; 365.3; SM 4500-P-E
Polychlorinated biphenyls	NMR	---
Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems)	PAHs	610; 1625
Sulfide-Hydrogen Sulfide	NMR	---
Mercury in Fish Tissue	NMR	---
PCB in Fish Tissue	NMR	---
Total Dissolved Solids	Total Dissolved Solids	160.1
Total Suspended Solids (TSS)	Total Suspended Solids	160.2, 180.1
Turbidity	Total Suspended Solids and Turbidity	160.2, 180.1
Secchi disk transparency	Total Suspended Solids	160.2
Sediment Screening Value (Exceedence)	Total Suspended Solids	160.2

Sedimentation/Siltation	Total Suspended Solids	160.2
Bottom Deposits	Total Suspended Solids	160.2
Color	NMR	---
pH, High	pH	150.2
pH, Low	pH	150.2
Taste and Odor	NMR	---
Temperature, water	NMR	---
Salinity	Specific Conductance	120.1
Enterococcus	Enterococcus	1106.1; 1600; Enterolert® 12 22.
Escherichia coli	E. coli	1103.1; 1603; Colilert® 12 16, Colilert-18® 12 15 16.; mColiBlue- 24®17.
Fecal Coliform	Fecal Coliform	1680; 1681
Organic Enrichment (Sewage) Biological Indicators	Enterococcus (marine waters) or E. coli (freshwater)	1106.1; 1600
Debris/Floatables/Trash	NMR	or
Foam/Flocs/Scum/Oil Slicks	Contact MassDEP	1103.1; 1603
Oil and Grease	Oil and Grease	---
Chlorophyll-a	Total Phosphorus (freshwater)	---
	Total Nitrogen (marine waters)	1664
Nutrient/Eutrophication Biological Indicators	Total Phosphorus (freshwater)	365.1; 365.2; 365.3
	Total Nitrogen (marine waters)	351.1/351.2 + 353.2
Dissolved oxygen saturation / Oxygen, Dissolved	Dissolved Oxygen	365.1; 365.2; 365.3
	Temperature	351.1/351.2 + 353.2
	BOD ₅	360.1; 360.2
	Total Phosphorus (freshwater)	SM-2550
	Total Nitrogen (marine waters)	SM-5210
Excess Algal Growth	Total Phosphorus (freshwater)	365.1; 365.2; 365.3
	Total Nitrogen (marine waters)	351.1/351.2 + 353.2
Aquatic Plants (Macrophytes)	NMR	---

Abnormal Fish deformities, erosions, lesions, tumors (DELTS)	NMR	---
Abnormal Fish Histology (Lesions)	NMR	---
Estuarine Bioassessments	Contact MassDEP	---
Fishes Bioassessments	Contact MassDEP	---
Aquatic Macroinvertebrate Bioassessments	Contact MassDEP	---
Combined Biota/Habitat Bioassessments	Contact MassDEP	---
Habitat Assessment (Streams)	Contact MassDEP	---
Lack of a coldwater assemblage	Contact MassDEP	---
Fish Kills	Contact MassDEP	---
Whole Effluent Toxicity (WET)	Contact MassDEP	---
Ambient Bioassays -- Chronic Aquatic Toxicity	Contact MassDEP	---
Sediment Bioassays -- Acute Toxicity Freshwater	Contact MassDEP	---
Sediment Bioassays -- Chronic Toxicity Freshwater	Contact MassDEP	---
Fish-Passage Barrier	NMR	---
Alteration in stream-side or littoral vegetative covers	NMR	---
Low flow alterations	NMR	---
Other flow regime alterations	NMR	---
Physical substrate habitat alterations	NMR	---
Other anthropogenic substrate alterations	NMR	---
Non-Native Aquatic Plants	NMR	---
Eurasian Water Milfoil, <i>Myriophyllum spicatum</i>	NMR	---
Zebra mussel, <i>Dreissena polymorph</i>	NMR	---
Other	Contact MassDEP	---

Notes:

NMR” indicates no monitoring required

“Total Phosphorus (freshwater)” indicates monitoring required for total phosphorus where stormwater discharges to a water body that is freshwater

“Total Nitrogen (marine water)” indicates monitoring required for total nitrogen where stormwater discharges to a water body that is a marine or estuarine water

APPENDIX H

Requirements Related to Discharges to Certain Water Quality Limited Waterbodies

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Attachment 1- Nitrogen Reduction Credits For Selected Structural BMPs

I. Discharges to water quality limited waterbodies and their tributaries where nitrogen is the cause of the impairment

1. Part 2.2.2.a.i. of the permit identifies the permittees subject to additional requirements to address nitrogen in their stormwater discharges because they discharge to waterbodies that are water quality limited due to nitrogen, or their tributaries, without an EPA approved TMDL. Permittees identified in part 2.2.2.a.i of the permit must identify and implement BMPs designed to reduce nitrogen discharges in the impaired catchment(s). To address nitrogen discharges each permittee shall comply with the following requirements:

a. Additional or Enhanced BMPs

i. The permittee remains subject to all the requirements of part 2.3. of the permit and shall include the following enhancements to the BMPs required by part 2.3 of the permit:

1. Part 2.3.2, Public education and outreach: The permittee shall supplement its Residential and Business/Commercial/Institution program with annual timed messages on specific topics. The permittee shall distribute an annual message in the spring (April/May) timeframe that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release 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 nitrogen to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP. All public education messages can be combined with requirements of Appendix H part II and III as well as Appendix F part A.III, A.IV, A.V, B.I, B.II and B.III where appropriate.

2. Part 2.3.6, Stormwater Management in New Development and Redevelopment: the requirement for adoption/amendment of the permittee's ordinance or other regulatory mechanism shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for nitrogen removal; retrofit inventory and priority ranking under 2.3.6.1.b shall include consideration of BMPs to reduce nitrogen discharges.
3. Part 2.3.7, Good House Keeping and Pollution Prevention for Permittee Owned Operations: establish requirements for use of slow release fertilizers on permittee owned property currently using fertilizer, in addition to reducing and managing fertilizer use as provided in 2.3.7.1; establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces; increase 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, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall).

b. Nitrogen Source Identification Report

- i. Within four years of the permit effective date the permittee shall complete a Nitrogen Source Identification Report. The report shall include the following elements:
 1. Calculation of total MS4 area draining to the water quality limited water segments or their tributaries, incorporating updated mapping of the MS4 and catchment delineations produced pursuant to part 2.3.4.6,
 2. All screening and monitoring results pursuant to part 2.3.4.7.d., targeting the receiving water segment(s)
 3. Impervious area and DCIA for the target catchment
 4. Identification, delineation and prioritization of potential catchments with high nitrogen loading
 5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment
- ii. The final Nitrogen Source Identification Report shall be submitted to EPA as part of the year 4 annual report.

c. Potential Structural BMPs

- i. The permittee shall identify in its SWMP all activities that have been implemented in accordance with the requirements of Appendix H part I.1. as of the applicable date to reduce nitrogen in its discharges, including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
- ii. The permittee shall continue to implement all requirements of Appendix H part I.1. required to be done prior to the date of determination or the date of the approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

II. Discharges to water quality limited waterbodies and their tributaries where phosphorus is the cause of the impairment

1. Part 2.2.2.b.i. of the permit identifies the permittees subject to additional requirements to address phosphorus in their stormwater discharges because they discharge to waterbodies that are water quality limited due to phosphorus, or their tributaries, without an EPA approved TMDL. Permittees identified in part 2.2.2.b.i. of the permit must identify and implement BMPs designed to reduce phosphorus discharges in the impaired catchment(s). To address phosphorus discharges each permittee shall comply with the following requirements:

- a. Additional or Enhanced BMPs

- i. The permittee remains subject to the requirements of part 2.3. of the permit and shall include the following enhancements to the BMPs required by part 2.3 of the permit:

1. Part 2.3.2, Public education and outreach: The permittee shall supplement its Residential and Business/Commercial/Institution program with annual timed messages on specific topics. 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 phosphorous-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 phosphorous to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP. All public education messages can be combined with requirements of Appendix H part I and III as well as Appendix F part A.III, A.IV, A.V, B.I, B.II and B.III where appropriate.
2. Part 2.3.6, Stormwater Management in New Development and Redevelopment: the requirement for adoption/amendment of the permittee's ordinance or other regulatory mechanism shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal; retrofit inventory and priority ranking under 2.3.6.1.b shall include consideration of BMPs that infiltrate stormwater where feasible.
3. Part 2.3.7, Good House Keeping and Pollution Prevention for Permittee Owned Operations: Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces; 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, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall).

b. Phosphorus Source Identification Report

- i. Within four years of the permit effective date the permittee shall complete a Phosphorus Source Identification Report. The report shall include the following elements:
 1. 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,
 2. All screening and monitoring results pursuant to part 2.3.4.7.d., targeting the receiving water segment(s)
 3. Impervious area and DCIA for the target catchment
 4. Identification, delineation and prioritization of potential catchments with high phosphorus loading
 5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment, including the removal of impervious area
- ii. The phosphorus source identification report shall be submitted to EPA as part of the year 4 annual report.

c. Potential Structural BMPs

- i. Within five years of the permit effective date, the permittee shall evaluate all permittee-owned 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 that are within the drainage area of the water quality limited water or its tributaries. The evaluation shall include:
 1. The next planned infrastructure, resurfacing or redevelopment activity planned for the property (if applicable) OR planned retrofit date;
 2. The estimated cost of redevelopment or retrofit BMPs; and
 3. The engineering and regulatory feasibility of redevelopment or retrofit BMPs.
- ii. The permittee shall provide a listing of planned structural BMPs and a plan and schedule for implementation in the year 5 annual report. The permittee shall plan and install a minimum of one structural BMP as a demonstration project within the drainage area of the water quality limited water or its tributaries within six years of the permit effective date. The demonstration project shall be installed targeting a catchment with high phosphorus load potential. The permittee shall install the

remainder of the structural BMPs in accordance with the plan and schedule provided in the year 5 annual report.

- iii. Any structural BMPs installed in the regulated area by the permittee or its agents shall be tracked and the permittee shall estimate the phosphorus removal by the BMP consistent with Attachment 3 to Appendix F. The permittee shall document 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 in each annual report.
2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix H part II.1. applicable to it when in compliance with this part.
 - a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
 - i. The receiving water and all downstream segments are determined to no longer be impaired due to phosphorus by MassDEP and EPA concurs with such determination.
 - ii. An EPA approved TMDL for the receiving water or downstream receiving water indicates that no additional stormwater controls for the control of phosphorus are necessary for the permittee's discharge based on wasteload allocations as part of the approved TMDL.
 - b. In such a case, the permittee shall document the date of the determination provided for in paragraph a. above or the approved TMDL date in its SWMP and is relieved of any additional requirements of Appendix H part II.1. as of the applicable date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities that have been implemented in accordance with the requirements of Appendix H part II.1. as of the applicable date to reduce phosphorus in its discharges, including implementation schedules for non structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix H part II.1. required to be done prior to the date of determination or the date of the approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

III. Discharges to water quality limited waterbodies where bacteria or pathogens is the cause of the impairment

1. Consistent with part 2.2.2.c.i. of the permit, permittees that discharge to waterbodies that are water quality limited due to bacteria or pathogens, without an EPA approved TMDL, are subject to the following additional requirements to address bacteria or pathogens in their stormwater discharges.
2. Additional or Enhanced BMPs
 - a. The permittee remains subject to the requirements of part 2.3. of the permit and shall include the following enhancements to the BMPs required by part 2.3 of the permit:
 - i. Part 2.3.2. Public Education and outreach: The permittee shall supplement its Residential program with an annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate. The permittee or its agents shall disseminate educational materials to dog owners at the time of issuance or renewal of a dog license, or other appropriate time. Education materials shall describe the detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for non-compliance. The permittee shall also provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria or pathogens. All public education messages can be combined with requirements of Appendix H part I and II as well as Appendix F part A.III, A.IV, A.V, B.I, B.II and B.III where appropriate.
 - ii. Part 2.3.4 Illicit Discharge: The permittee shall implement the illicit discharge program required by this permit. Catchments draining to any waterbody impaired for bacteria or pathogens shall be designated either Problem Catchments or HIGH priority in implementation of the IDDE program.
3. At any time during the permit term the permittee may be relieved of additional requirements in Appendix H part III.2. applicable to it when in compliance with this part.
 - a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
 - i. The receiving water is determined to be no longer impaired due to bacteria or pathogens by MassDEP and EPA concurs with such a determination.
 - ii. An EPA approved TMDL for the receiving water indicates that no additional stormwater controls are necessary for the control of bacteria or pathogens from the permittee's discharge based on wasteload allocations as part of the approved TMDL.
 - iii. The permittee's discharge is determined to be below applicable water quality criteria¹ and EPA agrees with such a determination. The permittee shall submit data to EPA that accurately characterizes the concentration of bacteria or pathogens in their discharge. The characterization shall include water quality

¹ Applicable water quality criteria are the state standards that have been federally approved as of the effective date of this permit and are compiled by EPA at <http://www.epa.gov/waterscience/standards/wqslibrary/>

and flow data sufficient to accurately assess the concentration of bacteria or pathogens in all seasons during storm events of multiple sizes and for the duration of the storm events including the first flush, peak storm flow and return to baseflow.

- b. In such a case, the permittee shall document the date of the determination, date of approved TMDL or date of EPA concurrence that the discharge meets water quality criteria in its SWMP and is relieved of any additional requirements of Appendix H part III.2. as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix H part III.2. to date to reduce bacteria or pathogens in its discharges, including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix H part III.3. required to be done prior to the date of determination date, date of approved TMDL, or date of EPA concurrence that the discharge meets water quality criteria, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications

IV. Discharges to water quality limited waterbodies where chloride is the cause of the impairment

1. Consistent with part 2.2.2.c.i. of the permit, permittees that discharge to waterbodies that are water quality limited due to chloride, without an EPA approved TMDL, are subject to the following additional requirements to address chloride in their stormwater discharges.
2. Permittees discharging to a waterbody listed as impaired due to chloride in categories 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act sections 303(d) and 305(b) shall develop a Salt Reduction Plan that includes specific actions designed to achieve salt reduction on municipal roads and facilities, and on private facilities that discharge to its MS4 in the impaired catchment(s). The Salt Reduction Plan shall be completed within three years of the effective date of the permit and include the BMPs in part IV.4. below. The Salt Reduction Plan shall be fully implemented five years after the effective date of the permit.
3. Permittees that, during the permit term, become aware that their discharge is to a waterbody that is impaired due to chloride must update their Salt Reduction Plan within 60 days of becoming aware of the situation to include salt reduction practices targeted at lowering chloride in discharges to the impaired waterbody. If the permittee does not have a Salt Reduction Plan already in place, then the permittee shall complete a Salt Reduction Plan that includes the BMPs in part IV 4) below within 3 years of becoming aware of the situation and fully implement the Salt Reduction Plan within 5 years of becoming aware of the situation.
4. Additional or Enhanced BMPs
 - a. For municipally maintained surfaces:
 - i. Tracking of the types and amount of salt applied to all permittee owned and maintained surfaces and reporting of salt use beginning in the year of the completion of the Salt Reduction Plan in the permittee's annual reports;
 - ii. Planned activities for salt reduction on municipally owned and maintained surfaces, which shall include but are not limited to the following unless the permittee determines one or more of the following is not applicable to its system and documents that determination as part of the Salt Reduction Plan:
 - Operational changes such as pre-wetting, pre-treating the salt stockpile, increasing plowing prior to de-icing, monitoring of road surface temperature, etc.;
 - Implementation of new or modified equipment providing pre-wetting capability, better calibration rates, or other capability for minimizing salt use;
 - Training for municipal staff and/or contractors engaged in winter maintenance activities;
 - Adoption of guidelines for application rates for roads and parking lots (see *Winter Parking Lot and Sidewalk Maintenance*

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<http://www.pca.state.mn.us/publications/parkinglotmanual.pdf>;

and the application guidelines on page 17 of *Minnesota Snow and Ice Control: Field Handbook for Snow Operators* (September 2012)

<http://www.mnltap.umn.edu/publications/handbooks/documents/snowice.pdf> for examples);

- Regular calibration of spreading equipment;
- Designation of no-salt and/or low salt zones;
- Measures to prevent exposure of salt stockpiles (if any) to precipitation and runoff; and
- An estimate of the total tonnage of salt reduction expected by each activity.

- b. For privately maintained facilities that discharge to the MS4:
 - i. Establish an ordinance, bylaw, or other regulatory mechanism requiring measures to prevent exposure of any salt stockpiles to precipitation and runoff at all commercial and industrial properties within the regulated area.
 - ii. Part 2.3.2. Public Education and Outreach: The permittee shall supplement its Commercial/Industrial education program with an annual message to private road salt applicators and commercial and industrial site owners on the proper storage and application rates of winter deicing material. The educational materials shall be disseminated in the November/December timeframe and shall describe steps that can be taken to minimize salt use and protect local waterbodies.
 - iii. Part 2.3.6, Stormwater Management in New Development and Redevelopment – establish procedures and requirements to minimize salt usage and require the use of salt alternatives where the permittee deems necessary.
 - c. The completed Salt Reduction Plan shall be submitted to EPA along with the annual report following the Salt Reduction Plan’s completion. Each subsequent annual report shall include an update on Plan implementation progress, any updates to the Salt Reduction Plan deemed necessary by the permittee, as well as the types and amount of salt applied to all permittee owned and maintained surfaces.
5. At any time during the permit term the permittee may be relieved of additional requirements in Appendix H part IV as follows:
- a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
 - i. The receiving water is determined to be no longer impaired due to chloride by MassDEP and EPA concurs with such a determination.
 - ii. An EPA approved TMDL for the receiving water indicates that no additional stormwater controls are necessary for the control of chloride from the

- permittee's discharge based on wasteload allocations as part of the approved TMDL.
- iii. The permittee's discharge is determined to be below applicable water quality criteria² and EPA agrees with such a determination. The permittee shall submit data to EPA that accurately characterizes the concentration of chloride in their discharge during the deicing season (November – March). The characterization shall include water quality and flow data sufficient to accurately assess the concentration of chloride in the deicing season during storm events of multiple sizes and for the duration of the storm events including the first flush, peak storm flow and return to baseflow and include samples collected during deicing activities.
 - b. In such a case, the permittee shall document the date of the determination, date of approved TMDL or date of EPA concurrence that the discharge meets water quality criteria in its SWMP and is relieved of any additional requirements of Appendix H part IV as of that date and the permittee shall comply with the following:
 - i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix H part IV to date to reduce chloride in its discharges, including implementation schedules for non-structural BMPs
 - ii. The permittee shall continue to implement all requirements of Appendix H part IV required to be done by the date of determination date, date of approved TMDL, or date of EPA concurrence that the discharge meets water quality criteria, including ongoing implementation of identified non-structural BMPs

² Applicable water quality criteria are the state standards that have been federally approved as of the effective date of this permit and are compiled by EPA at <http://www.epa.gov/waterscience/standards/wqslibrary/>

V. Discharges to water quality limited waterbodies and their tributaries where solids, oil and grease (hydrocarbons), or metals is the cause of the impairment

1. Consistent with part 2.2.2.c.i. of the permit, permittees that discharge to waterbodies that are water quality limited due to solids, metals, or oil and grease (hydrocarbons), without an EPA approved TMDL, are subject to the following additional requirements to address solids, metals, or oil and grease (hydrocarbons) in their stormwater discharges.
2. Additional or Enhanced BMPs
 - a. The permittee remains subject to the requirements of part 2.3. of the permit and shall include the following enhancements to the BMPs required by part 2.3 of the permit:
 - i. Part 2.3.6, Stormwater Management in New Development and Redevelopment: stormwater management systems designed on commercial and industrial land use area draining to the water quality limited waterbody shall incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event. EPA also encourages the permittee to require any stormwater management system designed to infiltrate stormwater on commercial or industrial sites to provide the level of pollutant removal equal to or greater than the level of pollutant removal provided through the use of biofiltration of the same volume of runoff to be infiltrated, prior to infiltration.
 - ii. Part 2.3.7, Good House Keeping and Pollution Prevention for Permittee Owned Operations: increased street sweeping frequency of all municipal owned streets and parking lots to a schedule determined by the permittee to target areas with potential for high pollutant loads. This may include, but is not limited to, increased street sweeping frequency in commercial areas and high density residential areas, or drainage areas with a large amount of impervious area. Prioritize inspection and maintenance for catch basins to ensure that no sump shall be more than 50 percent full. Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings. Each annual report shall include the street sweeping schedule determined by the permittee to target high pollutant loads.
3. At any time during the permit term the permittee may be relieved of additional requirements in Appendix H part V.2. applicable to it when in compliance with this part.
 - a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
 - i. The receiving water is determined to be no longer impaired due to solids, metals, or oil and grease (hydrocarbons) by MassDEP and EPA concurs with such a determination.
 - ii. An EPA approved TMDL for the receiving water indicates that no additional stormwater controls are necessary for the control of solids, metals, or oil and grease (hydrocarbons) from the permittee's discharge based on wasteload allocations as part of the approved TMDL.

- iii. The permittee's discharge is determined to be below applicable water quality criteria and EPA agrees with such a determination³. The permittee shall submit data to EPA that accurately characterizes the concentration of bacteria or pathogens in their discharge. The characterization shall include water quality and flow data sufficient to accurately assess the concentration of bacteria or pathogens in all seasons during storm events of multiple sizes and for the duration of the storm events including the first flush, peak storm flow and return to baseflow.
- b. In such a case, the permittee shall document the date of the determination, date of approved TMDL or date of EPA concurrence that the discharge meets water quality criteria in its SWMP and is relieved of any additional requirements of Appendix H part V.2. as of that date and the permittee shall comply with the following:
 - iv. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix H part V.2. to date to reduce solids, metals, or oil and grease (hydrocarbons) in its discharges, including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs
 - v. The permittee shall continue to implement all requirements of Appendix H part V.3. required to be done by the date of determination date, date of approved TMDL, or date of EPA concurrence that the discharge meets water quality criteria, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications

³ Applicable water quality criteria are the state standards that have been federally approved as of the effective date of this permit and are compiled by EPA at <http://www.epa.gov/waterscience/standards/wqslibrary/>

ATTACHMENT 1 TO APPENDIX H

The estimates of nitrogen load reductions resulting from BMP installation are intended for informational purposes only and there is no associated permittee-specific required nitrogen load reduction in the Draft Permit. Nitrogen load reduction estimates calculated consistent with the methodologies below may be used by the permittee to comply with future permit requirements providing the EPA determines the calculated reductions are appropriate for demonstrating compliance with future permit requirements. This attachment provides the method and an example to calculate the BMP nitrogen load as well as methods to calculate nitrogen load reductions for structural BMPs in an impaired watershed.

BMP N Load:

The **BMP N Load** is the annual nitrogen load from the drainage area to each proposed or existing BMP used by permittee. This measure is used to estimate the amount of annual nitrogen load that the BMP will receive or treat (BMP N Load).

To calculate the BMP N Load for a given BMP:

- 1) Determine the total drainage area to the BMP and sort the total drainage area into two categories: total impervious area (IA) and total pervious area (PA);
- 2) Calculate the nitrogen load associated with impervious area (N Load_{IA}) and the pervious area (N Load_{PA}) by multiplying the IA and PA by the appropriate land use-based nitrogen load export rate provided in Table 1; and
- 3) Determine the total nitrogen load to the BMP by summing the calculated impervious and pervious subarea nitrogen loads.

Table 1: Annual nitrogen load export rates

Nitrogen Source Category by Land Use	Land Surface Cover	Nitrogen Load Export Rate, lbs/ac/yr	Nitrogen Load Export Rate, kg/ha/yr
All Impervious Cover	Impervious	14.1	15.8
*Developed Land Pervious (DevPERV)- HSG A	Pervious	0.3	0.3
*Developed Land Pervious (DevPERV)- HSG B	Pervious	1.2	1.3
*Developed Land Pervious (DevPERV) – HSG C	Pervious	2.4	2.7
*Developed Land Pervious (DevPERV) - HSG C/D	Pervious	3.0	3.4
*Developed Land Pervious (DevPERV) - HSG D	Pervious	3.7	4.1
Notes: For pervious areas, if the hydrologic soil group (HSG) is known, use the appropriate value from this table. If the HSG is not known, assume HSG C/D conditions for the nitrogen load export rate.			

Example 1 to determine nitrogen load to a proposed BMP when the contributing drainage area is 100% impervious: A permittee is proposing a storm water infiltration system that will treat runoff from 1.49 acres of impervious area.

Table 1-1: Design parameters for Bio-filtration w/ ISR systems for Example 1

Components of representation	Parameters	Value
Ponding	Maximum depth	0.33 ft
	Surface area	645 ft ²
Soil mix	Depth	2.0 ft
	Porosity	0.24
	Hydraulic conductivity	2.5 inches/hour
Stone Reservoir (ISR)	Depth	2.50 ft
	Porosity	0.42
	Hydraulic conductivity	500 inches/hour
ISR Volume: System Storage Volume	Ratio	0.56
Orifices	Diameter	12 in
		Installed 2.5 above impermeable soil layer

Determine:

- A) Percent nitrogen load reduction (BMP Reduction %-N) for the specified bio-filtration w/ISR system and contributing impervious drainage area; and
- B) Nitrogen reduction in pounds that would be accomplished by the bio-filtration w/ISR system (BMP-Reduction lbs-N)

Solution:

- 1) The BMP is a bio-filtration w/ISR system that will treat runoff from 1.49 acres of impervious area (IA = 1.49 acre);
- 2) The available storage volume capacity (ft³) of the bio-filtration w/ISR system (BMP-Volume_{BMP-ft³}) is determined using the surface area of the system, depth of ponding, the porosity of the filter media and the porosity of the stone reservoir:

$$\begin{aligned}
 \text{BMP-Volume}_{\text{BMP-ft}^3} &= \text{Surface area} \times (\text{pond maximum depth} + (\text{soil mix depth} \times \text{soil mix porosity}) + \text{stone reservoir depth} \times \text{gravel layer porosity}) \\
 &= 520 \text{ ft}^2 \times (0.33 \text{ ft} + (2.0 \text{ ft} \times 0.24) + (2.5 \text{ ft} \times 0.42)) \\
 &= 1,200 \text{ ft}^3
 \end{aligned}$$

- 3) The available storage volume capacity of the bio-filtration w/ISR system in inches of runoff from the contributing impervious area (BMP-Volume_{IA-in}) is calculated using equation 1:

$$\text{BMP-Volume}_{\text{IA-in}} = (\text{BMP-Volume}_{\text{ft}^3} / \text{IA (acre)} \times 12 \text{ in/ft} \times 1 \text{ acre} / 43560 \text{ ft}^2) \text{ (Equation 1)}$$

Example 1 Continued:

$$\begin{aligned} \text{BMP-Volume}_{\text{IA-in}} &= (1,200 \text{ ft}^3/1.49 \text{ acre}) \times 12 \text{ in/ft} \times 1 \text{ acre}/43560 \text{ ft}^2 \\ &= \mathbf{0.22 \text{ in}} \end{aligned}$$

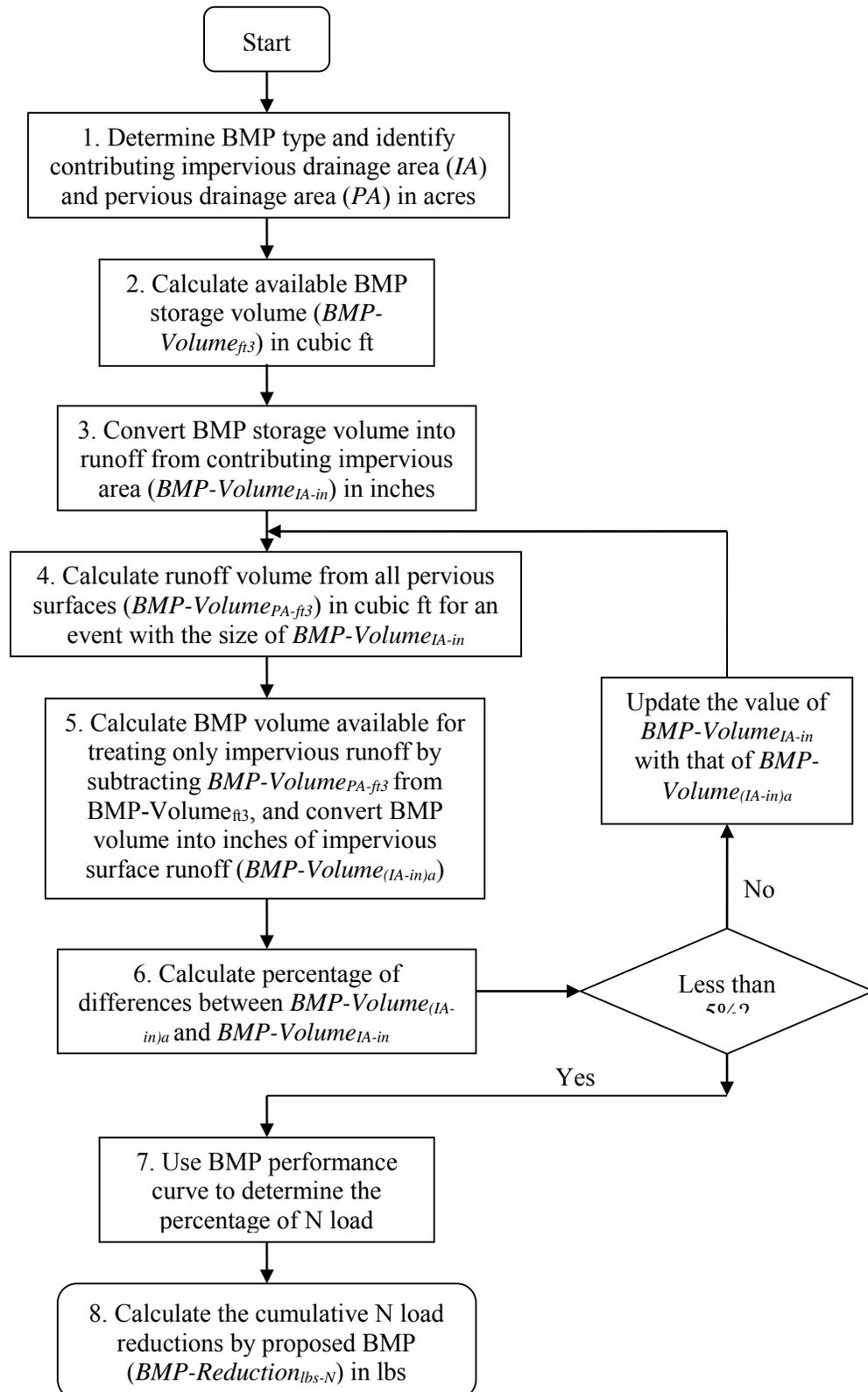
- 4) Using the Regional Performance Curve shown in Figure 1 for a bio-filtration w/ ISR system, a **61%** nitrogen load reduction (BMP Reduction %-N) is determined for a bio-filtration w/ ISR systems sized for 0.22 in of runoff from 1.49 acres of impervious area; and
- 5) Calculate the nitrogen load reduction in pounds of nitrogen for the bio-filtration w/ISR system (BMP Reduction lbs-N) using the BMP Load calculation method shown above in Example 1 and the BMP Reduction %-N determined in step 4 by using equation 2.

First, the BMP Load is determined as specified in Example 1:

$$\begin{aligned} \text{BMP Load} &= \text{IA (acre)} \times 14.1 \text{ lb/ac/yr} \\ &= 1.49 \text{ acres} \times 14.1 \text{ lbs/acre/yr} \\ &= 21.0 \text{ lbs/yr} \end{aligned}$$

$$\begin{aligned} \text{BMP Reduction}_{\text{lbs-N}} &= \text{BMP Load} \times (\text{BMP Reduction } \%-N/100) \text{ (Equation 2)} \\ \text{BMP Reduction}_{\text{lbs-N}} &= 21 \text{ lbs/yr} \times (61/100) \\ &= \mathbf{12.8 \text{ lbs/yr}} \end{aligned}$$

Method to determine the nitrogen load reduction for a structural BMP with a known storage volume when the contributing drainage area has impervious and pervious surfaces



Flow Chart 2 (previous page). Method to determine the nitrogen load reduction for a BMP with known storage volume when both pervious and impervious drainage areas are present.

- 1) Identify the type of structural BMP and characterize the contributing drainage area to the structural BMP by identifying the following information for the impervious and pervious surfaces:

Impervious area (IA) – Area (acre) and export rate (Table 1)

Pervious area (PA) – Area (acre) and runoff depth based on hydrologic soil group (HSG) and size of rainfall event. Table 2 provides values of runoff depth for various rainfall depths and HSGs. Soils are assigned to an HSG based on their permeability. HSG categories for pervious areas in the Watershed shall be estimated by consulting local soil surveys prepared by the National Resource Conservation Service (NRCS) or by a storm water professional evaluating soil testing results from the Watershed. If the HSG condition is not known, a HSG D soil condition should be assumed.

**Table 2: Developed Land Pervious Area Runoff Depths
based on Precipitation depth and Hydrological Soil Groups (HSGs)**

Rainfall Depth, Inches	Runoff Depth, inches		
	Pervious HSG A/B	Pervious HSG C	Pervious HSG D
0.10	0.00	0.00	0.00
0.20	0.00	0.01	0.02
0.40	0.00	0.03	0.06
0.50	0.00	0.05	0.09
0.60	0.01	0.06	0.11
0.80	0.02	0.09	0.16
1.00	0.03	0.12	0.21
1.20	0.04	0.14	0.39
1.50	0.11	0.39	0.72
2.00	0.24	0.69	1.08

Notes: Runoff depths derived from combination of volumetric runoff coefficients from Table 5 of *Small Storm Hydrology and Why it is Important for the Design of Stormwater Control Practices*, Pitt, 1999 and using the Stormwater Management Model (SWMM) in continuous model mode for hourly precipitation data for Boston, MA, 1998-2002.

- 2) Determine the available storage volume (ft³) of the structural BMP (BMP-Volume ft³) using the BMP dimensions and design specifications (e.g., maximum storage depth, filter media porosity);

- 3) To estimate the nitrogen load reduction of a BMP with a known storage volume capacity, it is first necessary to determine the portion of available BMP storage capacity (BMP-Volume_{ft³}) that would treat the runoff volume generated from the contributing impervious area (IA) for a rainfall event with a depth of *i* inches (in). This will require knowing the corresponding amount of runoff volume that would be generated from the contributing pervious area (PA) for the same rainfall event (depth of *i* inches). Using equation 3 below, solve for the BMP capacity that would be available to treat runoff from the contributing impervious area for the unknown rainfall depth of *i* inches (see equation 4):

$$\text{BMP-Volume}_{\text{ft}^3} = \text{BMP-Volume}_{(\text{IA-ft}^3)_i} + \text{BMP-Volume}_{(\text{PA-ft}^3)_i} \quad \text{(Equation 3)}$$

Where:

BMP-Volume_{ft³} = the available storage volume of the BMP
 BMP-Volume_{(IA-ft³)_i} = the available storage volume of the BMP that would fully treat runoff generated from the contributing impervious area for a rainfall event of size *i* inches
 BMP-Volume_{(PA-ft³)_i} = the available storage volume of the BMP that would fully treat runoff generated from the contributing pervious area for a rainfall event of size *i* inches

Solving for BMP-Volume_{(IA-ft³)_i}:

$$\text{BMP-Volume}_{(\text{IA-ft}^3)_i} = \text{BMP-Volume}_{\text{ft}^3} - \text{BMP-Volume}_{(\text{PA-ft}^3)_i} \quad \text{(Equation 4)}$$

To determine BMP-Volume_{(IA-ft³)_i}, requires performing an iterative process of refining estimates of the rainfall depth used to calculate runoff volumes until the rainfall depth used results in the sum of runoff volumes from the contributing IA and PA equaling the available BMP storage capacity (BMP-Volume_{ft³}). For the purpose of estimating BMP performance, it will be considered adequate when the IA runoff depth (in) is within 5% IA runoff depth used in the previous iteration.

For the first iteration (1), convert the BMP-Volume_{ft³} determined in step 2 into inches of runoff from the contributing impervious area (BMP Volume_{(IA-in)₁}) using equation 5.

$$\text{BMP-Volume}_{(\text{IA-in})_1} = (\text{BMP-Volume}_{\text{ft}^3} / \text{IA (acre)}) \times (12 \text{ in/ft} / 43,560 \text{ ft}^2/\text{acre}) \quad \text{(Equation 5)}$$

For iterations 2 through *n* (2...*n*), convert the BMP Volume_{(IA-ft³)_{2...n}}, determined in step 5a below, into inches of runoff from the contributing impervious area (BMP Volume_{(IA-in)_{2...n}}) using equation 6.

$$\text{BMP-Volume}_{(\text{IA-in})_{2...n}} = (\text{BMP-Volume}_{(\text{IA-ft}^3)_{2...n}} / \text{IA (acre)}) \times (12 \text{ in/ft} / 43,560 \text{ ft}^2/\text{acre}) \quad \text{(Equation 6)}$$

- 4) For 1 to *n* iterations, use the pervious runoff depth information from Table 2 and equation 7 to determine the total volume of runoff (ft³) from the contributing PA (BMP Volume

$_{PA-ft^3}$) for a rainfall size equal to the sum of BMP-Volume $_{(IA-in)1}$, determined in step 3. The runoff volume for each distinct pervious area must be determined.

$$\text{BMP Volume }_{(PA-ft^3)1..n} = \sum ((PA \times (\text{runoff depth})_{(PA1, PA2..PAN)}) \times (3,630 \text{ ft}^3/\text{acre-in}))$$

(Equation 7)

- 5) For iteration 1, estimate the portion of BMP Volume that is available to treat runoff from only the IA by subtracting BMP-Volume $_{PA-ft^3}$, determined in step 4, from BMP-Volume $_{ft^3}$, determined in step 2, and convert to inches of runoff from IA (see equations 8 and 9):

$$\text{BMP-Volume }_{(IA-ft^3)2} = ((\text{BMP-Volume}_{ft^3} - \text{BMP Volume }_{(PA-ft^3)1}) \quad \text{(Equation 8)}$$

$$\text{BMP-Volume }_{(IA-in)2} = (\text{BMP-Volume }_{(IA-ft^3)2}/\text{IA (acre)}) \times (12 \text{ in/ft} \times 1 \text{ acre}/43,560 \text{ ft}^2)$$

(Equation 9)

If additional iterations (i.e., 2 through n) are needed, estimate the portion of BMP volume that is available to treat runoff from only the IA (BMP-Volume $_{(IA-in)3..n+1}$) by subtracting BMP Volume $_{(PA-ft^3)2..n}$, determined in step 4, from BMP Volume $_{(IA-ft^3)3..n+1}$, determined in step 5, and by converting to inches of runoff from IA using equation 9):

- 6) For iteration A (an iteration between 1 and n+1), compare BMP Volume $_{(IA-in)a}$ to BMP Volume $_{(IA-in)a-1}$ determined from the previous iteration (a-1). If the difference in these values is greater than 5% of BMP Volume $_{(IA-in)a}$ then repeat steps 4 and 5, using BMP Volume $_{(IA-in)a}$ as the new starting value for the next iteration (a+1). If the difference is less than or equal to 5 % of BMP Volume $_{(IA-in)a}$ then the permittee may proceed to step 7.
- 7) Determine the % nitrogen load reduction for the structural BMP (BMP Reduction $_{\%N}$) using the appropriate BMP curve on Figure 1 or 2 and the BMP-Volume $_{(IA-in)n}$ calculated in the final iteration of step 5; and
- 8) Calculate the nitrogen load reduction in pounds of nitrogen for the structural BMP (BMP Reduction $_{lbs-N}$) using the BMP Load as calculated above in Example 1 and the percent nitrogen load reduction (BMP Reduction $_{\%N}$) determined in step 7 by using equation 10:

$$\text{BMP Reduction }_{lbs-N} = \text{BMP Load} \times (\text{BMP Reduction }_{\%N}/100) \quad \text{(Equation 10)}$$

Example 2: Determine the nitrogen load reduction for a structural BMP with a known design volume when the contributing drainage area has impervious and pervious surfaces

A permittee is considering an infiltration basin to capture and treat runoff from a portion of the Watershed draining to the impaired waterbody. The contributing drainage area is 16.55 acres and is 71% impervious. The pervious drainage area (PA) is 80% HSG D and 20% HSG C. An infiltration basin with the following specifications can be placed at the down-gradient end of the contributing drainage area where soil testing results indicates an infiltration rate (IR) of 0.28 in/hr:

Example continued:

Structure	Bottom area (acre)	Top surface area (acre)	Maximum pond depth (ft)	Design storage volume (ft ³)	Infiltration Rate (in/hr)
Infiltration basin	0.65	0.69	1.65	48,155	0.28

Determine the:

- A) Percent nitrogen load reduction (BMP Reduction %_{-N}) for the specified infiltration basin and the contributing impervious and pervious drainage area; and
- B) Nitrogen reduction in pounds that would be accomplished by the BMP (BMP-Reduction lbs_{-N})

Solution:

- 1) A surface infiltration basin is being considered. Information for the contributing impervious (IA) and pervious (PA) areas are summarized in below.

Impervious area characteristics

ID	% Impervious	Area (acre)
IA1	100	11.75

Pervious area characteristics

ID	Area (acre)	Hydrologic Soil Group (HSG)
PA1	3.84	D
PA2	0.96	C

- 2) The available storage volume (ft³) of the infiltration basin (BMP-Volume ft³) is determined from the design details and basin dimensions; BMP-Volume ft³ = 48,155 ft³.
- 3) To determine what the BMP design storage volume is in terms of runoff depth (in) from IA, an iterative process is undertaken:

Solution Iteration 1

For the first iteration (1), the BMP-Volume ft³ is converted into inches of runoff from the contributing impervious area (BMP Volume (IA-in)₁) using equation 5.

$$\begin{aligned} \text{BMP Volume (IA-in)}_1 &= (48,155 \text{ ft}^3 / 11.75 \text{ acre}) \times (12 \text{ in/ft} / 43,560 \text{ ft}^2/\text{acre}) \\ &= 1.13 \text{ in} \end{aligned}$$

Solution Continued:

4-1) The total volume of runoff (ft³) from the contributing PA (BMP Volume _(PA-ft³)) for a rainfall size equal to the sum of BMP Volume _{(IA-in)₁} determined in step 3 is determined

for each distinct pervious area using the information from Table 2 and equation 7.

Interpolation was used to determine runoff depths.

$$\begin{aligned} \text{BMP Volume}_{(PA-ft^3)_1} &= ((3.84 \text{ acre} \times (0.33 \text{ in}) + (0.96 \text{ acre} \times (0.13 \text{ in})) \times 3,630 \text{ ft}^3/\text{acre-in}) \\ &= 5052 \text{ ft}^3 \end{aligned}$$

5-1) For iteration 1, the portion of BMP Volume that is available to treat runoff from only the IA is estimated by subtracting the BMP Volume _{(PA-ft³)₁}, determined in step 4-1, from BMP Volume_{ft³}, determined in step 2, and converted to inches of runoff from IA:

$$\begin{aligned} \text{BMP Volume}_{(IA-ft^3)_2} &= 48,155 \text{ ft}^3 - 5052 \text{ ft}^3 \\ &= 43,103 \text{ ft}^3 \end{aligned}$$

$$\begin{aligned} \text{BMP Volume}_{(IA-in)_2} &= (43,103 \text{ ft}^3/11.75 \text{ acre}) \times (12 \text{ in/ft} \times 1 \text{ acre}/43,560 \text{ ft}^2) \\ &= 1.01 \text{ in} \end{aligned}$$

6-1) The % difference between BMP Volume _{(IA-in)₂}, 1.01 in, and BMP Volume _{(IA-in)₁}, 1.13 in is determined and found to be significantly greater than 5%:

$$\begin{aligned} \% \text{ Difference} &= ((1.13 \text{ in} - 1.01 \text{ in})/1.01 \text{ in}) \times 100 \\ &= 12\% \end{aligned}$$

Therefore, steps 4 through 6 are repeated starting with BMP Volume _{(IA-in)₂} = 1.01 in.

Solution Iteration 2

$$\begin{aligned} \text{4-2) BMP-Volume}_{(PA-ft^3)_2} &= ((3.84 \text{ acre} \times 0.21 \text{ in}) + (0.96 \text{ acre} \times 0.12 \text{ in})) \times 3,630 \text{ ft}^3/\text{acre-in} \\ &= 3,358 \text{ ft}^3 \end{aligned}$$

$$\begin{aligned} \text{5-2) BMP-Volume}_{(IA-ft^3)_3} &= 48,155 \text{ ft}^3 - 3,358 \text{ ft}^3 \\ &= 44,797 \text{ ft}^3 \end{aligned}$$

$$\begin{aligned} \text{BMP-Volume}_{(IA-in)_3} &= (44,797 \text{ ft}^3/11.75 \text{ acre}) \times (12 \text{ in/ft} \times 1 \text{ acre}/43,560 \text{ ft}^2) \\ &= 1.05 \text{ in} \end{aligned}$$

$$\begin{aligned} \text{6-2) \% Difference} &= ((1.05 \text{ in} - 1.01 \text{ in})/1.05 \text{ in}) \times 100 \\ &= 4\% \end{aligned}$$

The difference of 4% is acceptable.

Solution Continued:

- 7) The % nitrogen load reduction for the infiltration basin (BMP Reduction %-N) is determined by using the RR treatment curve in Figure 2 and the treatment volume (BMP-Volume_{Net IA-in} = 1.05 in) calculated in step 5-2 and is **BMP Reduction %-N = 56%**.
- 9) The nitrogen load reduction in pounds of nitrogen (BMP-Reduction_{lbs-N}) for the proposed infiltration basin is calculated by using equation 11 with the BMP Load (as determined by the procedure in Example 4-1) and the N_{target} of 56%.

$$\text{BMP-Reduction}_{\text{lbs-N}} = \text{BMP N Load} \times (\text{N}_{\text{target}} / 100) \quad \text{(Equation 11)}$$

Following example 1, the BMP load is calculated:

$$\begin{aligned} \text{BMP N Load} &= (\text{IA} \times \text{impervious cover nitrogen export loading rate}) \\ &\quad + (\text{PA}_{\text{HSG D}} \times \text{pervious cover nitrogen export loading rate, HSG D}) \\ &\quad + (\text{PA}_{\text{HSG C}} \times \text{pervious cover nitrogen export loading rate, HSG C}) \\ &= (16.55 \text{ acre} \times 15.4 \text{ lbs/acre/yr}) + (3.84 \text{ acre} \times 3.7 \text{ lbs/acre/yr}) + \\ &\quad (0.96 \text{ acre} \times 2.4 \text{ lbs/acre/yr}) \\ &= 271.4 \text{ lbs/yr} \end{aligned}$$

$$\text{BMP-Reduction}_{\text{lbs-N}} = 275.13 \text{ lbs/yr} \times 56/100 = \mathbf{152.0 \text{ lbs/yr}}$$

Figure 1: Regional BMP Performance Curve for Annual Nitrogen Load Removal: System Design by the University of New Hampshire Stormwater Center (UNHSWC)

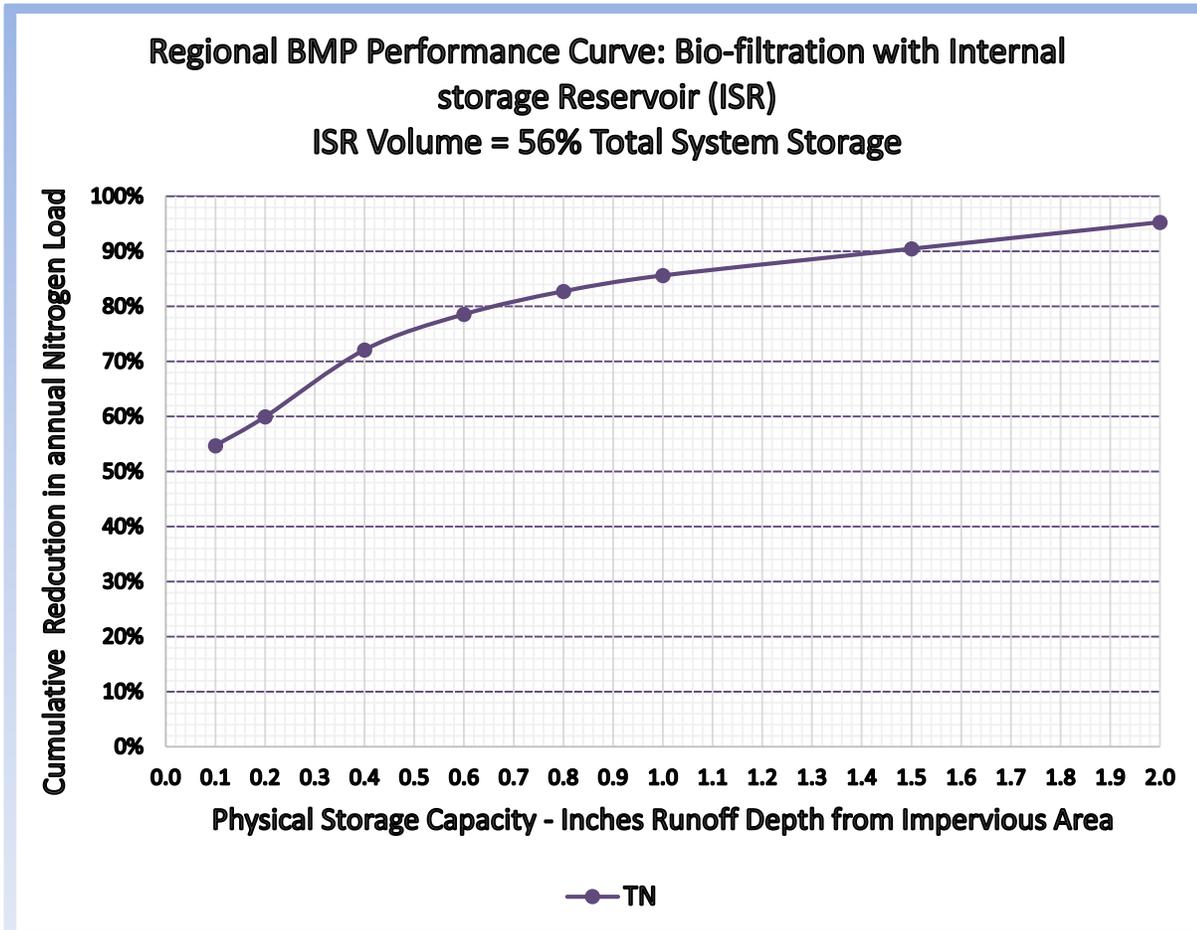
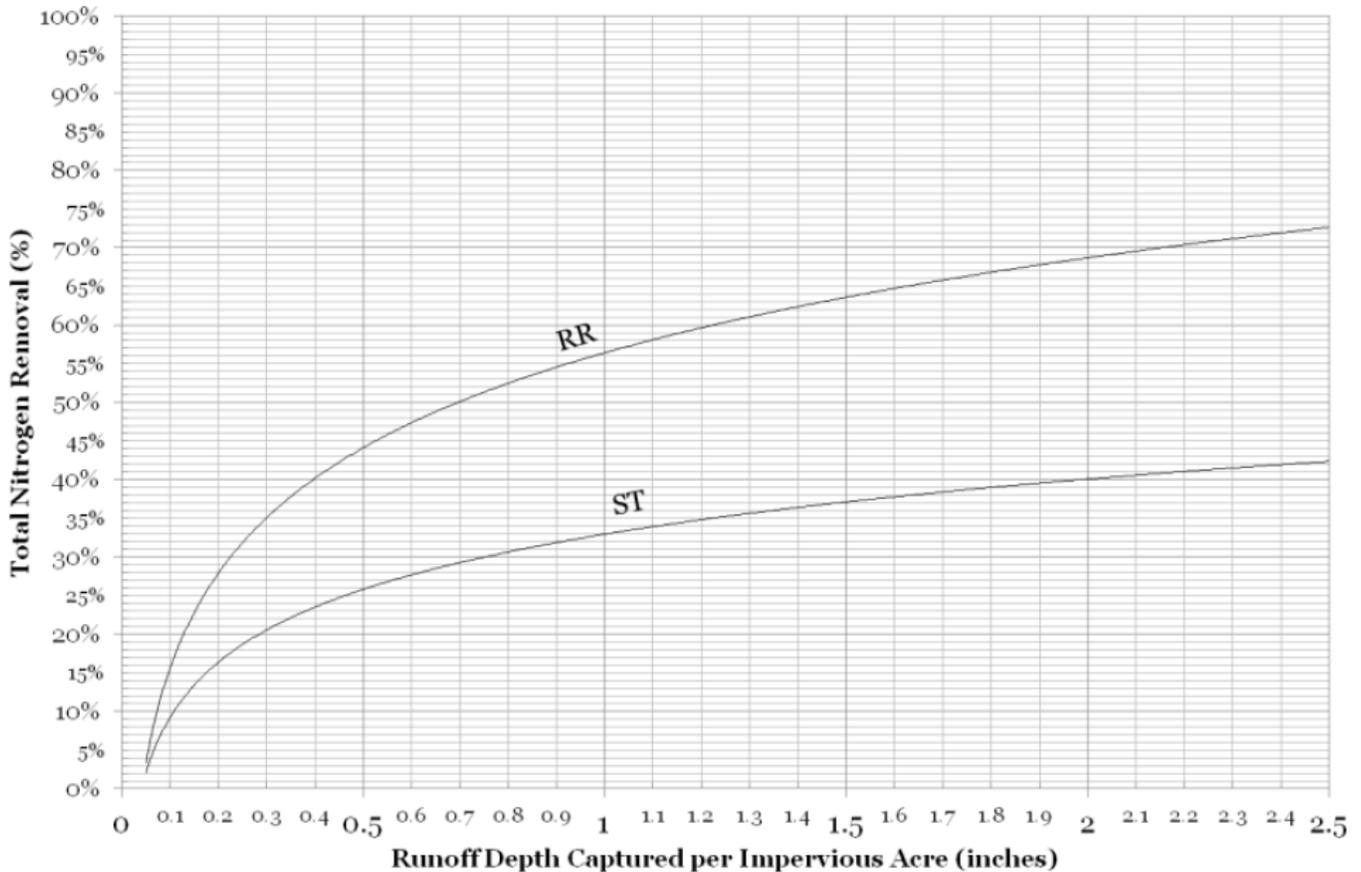


Table 3. Classification of BMP to Determine Nitrogen Reduction¹

Structural BMP	Classification
Infiltration Trench	Runoff Reduction (RR)
Infiltration Basin or other surface infiltration practice	Runoff Reduction (RR)
Bioretention Practice	Runoff Reduction (RR)
Gravel Wetland System	Stormwater Treatment (ST)
Porous Pavement	Runoff Reduction (RR)
Wet Pond or wet detention basin	Stormwater Treatment (ST)
Dry Pond or detention basin	Runoff Reduction (RR)
Water Quality Swale	Runoff Reduction (RR)

¹Recommendations of the Expert Panel to Define Removal Rates for New State Stormwater Performance Standards
<http://chesapeakestormwater.net/wp-content/plugins/download-monitor/download.php?id=25>, Retrieved 12/14/2012

Figure 2: Total Nitrogen Removal for RR and ST Practices

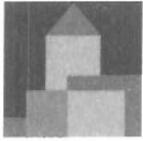


Adopted from: Final CBP Approved Expert Panel Report on Stormwater Retrofits
<http://chesapeakestormwater.net/wp-content/plugins/download-monitor/download.php?id=25>, Retrieved 12/14/2012

APPENDIX D

2016 MS4 Notice of Intent

Received 6/29/2018



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June 29, 2018

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ATTN: Newton Tedder

Re: Amendment No. 1 to Notice of Intent to be Covered Under
National Pollutant Discharge Elimination System Small MS4 General
Permit Previously Filed on March 22, 2018

Dear Mr. Tedder:

Please consider this letter an amendment to the Notice of Intent (the "NOI") filed by the Massachusetts Development Finance Agency ("MassDevelopment" or the "Agency"), for the Devens Regional Enterprise Zone ("Devens") to be covered under the United States Environmental Protection Agency National Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (the "General Permit")¹. The NOI was previously filed with Environmental Protection Agency ("EPA") on March 22, 2018. The General Permit has an effective date of July 1, 2018.

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lieutenant Governor

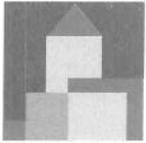
JAY ASH
Chairman

LAUREN A. LISS
President and CEO

We respectfully request that the Agency's original NOI submission be amended as set forth below:

Under Part III – Stormwater Management Program Summary, for Minimum Control Measure 5 – Post-Construction Stormwater Management for New Development and Redevelopment, please amend the Best Management Practice (BMP) entitled "Post Construction Stormwater Management Regulations" as follows. In the original submission, the BMP Description included a commitment to "Continue to require compliance with the Devens Enterprise Commission (DEC) regulatory requirements for post-construction runoff from new development and re-development as included

¹ The Agency has applied for coverage under the General Permit signed by EPA and the Massachusetts Department of Environmental Protection on April 4, 2016, as it may be amended prior to its effective date.



MASSDEVELOPMENT

Mr. Newton Tedder
June 29, 2018
Page 2

in 974 CMR 4.08 and 974 CMR 4.09.” We are hereby amending this description to add “and to comply with any federal permit requirements.”

The Devens Enterprise Commission currently has its own regulations in place (974 CMR 4.08 (Stormwater Management) and 4.09 (Water Resource Protection Overlay Districts)), which outline regulatory requirements for post-construction stormwater management. The Devens Enterprise Commission will also ensure compliance with any federal requirements of the permit, where applicable, such as EISA Section 438, which includes stormwater runoff requirements for federal development projects. Please note, however, that not all land within the Devens Enterprise Zone is under the jurisdiction of the Devens Enterprise Commission. Some land currently remains under the control of one of the following federal entities: the Department of Defense, the Department of Interior or the Department of Justice.

We look forward to your prompt authorization and would be pleased to answer any questions you may have or provide any additional information you require. If you have any questions regarding this amendment to the NOI, please contact John Marc-Aurele at 978-772-2926.

Kindly acknowledge receipt of this amendment by date stamping the enclosed copy of this letter and returning it to the messenger.

Sincerely,

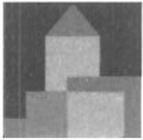
A handwritten signature in cursive script, appearing to read "Lauren A. Liss".

Lauren A. Liss
President and Chief Executive
Officer

cc: Robert M. Ruzzo, Deputy Director and General Counsel
John Marc-Aurele, Engineering Manager

Massachusetts Department of Environmental Protection
One Winter Street – 5th Floor
Boston, MA 02108
ATTN: Fred Civian, Stormwater Coordinator

Received
3/22/18



MASSDEVELOPMENT

99 High Street
Boston, Massachusetts
02110

Tel: 617-330-2000
800-445-8030

Fax: 617-330-2001

www.massdevelopment.com

March 22, 2018

Via Hand Delivery

United States Environmental Protection Agency
5 Post Office Square, Suite 100
Mail Code - OEP06-1
Boston, Massachusetts 02109-3912

ATTN: Newton Tedder

**Re: Notice of Intent to be Covered Under
National Pollutant Discharge Elimination System
Small MS4 General Permit**

Dear Mr. Tedder:

I enclose on behalf of the Massachusetts Development Finance Agency (the "Agency") a Notice of Intent (the "NOI") for the Devens Regional Enterprise Zone ("Devens") to be covered under the United States Environmental Protection Agency National Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (the "Permit")¹.

After serving as the U.S. Army's New England Headquarters for 79 years, Fort Devens was closed in 1996. With the endorsement of the voters in the host towns of Ayer, Harvard, and Shirley, and with the approval of the Commonwealth, a significant portion of the property was conveyed to the Agency (via the Massachusetts Government Land Bank, a predecessor-in-interest to the Agency). The Agency is tasked by the legislature with, among other things, (a) providing and maintaining certain municipal infrastructure within Devens and (b) strengthening the local economy of Devens, the Devens region and Massachusetts at large. For 20 years, the Agency has led the successful redevelopment of Devens by creating an award-winning, sustainable, and diverse business and residential community.

Based on the MS4 Permit Improvement Guide issued by the EPA in April of 2010, the Agency believes that Devens may be a regulated Small Municipal Separate Storm Sewer System ("MS4"). In accordance with section 1.2.1 of the Permit, Devens:

¹ The Agency is applying for the Permit signed by EPA and the Massachusetts Department of Environmental Protection on April 4, 2016, as it may be amended prior to its effective date.

1. has a separate storm sewer owned and operated by a public body created by or pursuant to state law, having jurisdiction over sewage, stormwater or other wastes;
2. is not a large or medium MS4;
3. is located partially within urbanized areas as determined by the 2010 Census; and
4. is located in a geographic area designated by the EPA as “automatically designated MS4 areas.” In this regard, I note that although Devens was not separately designated by EPA and has not received any notice from either EPA or the Commonwealth of Massachusetts that it is required to file for a stormwater permit, a portion of the geographic area of Devens is included among EPA’s “NPDES Phase II Stormwater Program Automatically Designated MS4 Areas” on the base maps for the towns of Ayer, Shirley, and Harvard, Massachusetts (based upon the 2010 census).

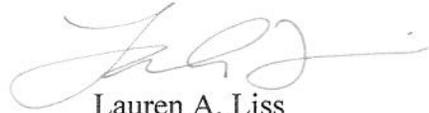
Notwithstanding the uncertainty as to whether Devens is a regulated small MS4, as part of its commitment to environmental stewardship and sustainability, the Agency was prepared to submit an NOI in 2017 but postponed that submission due to EPA’s announcement on June 29, 2017 that it was delaying the effective date of the Permit from July 1, 2017 to July 1, 2018. As you will see from the enclosed NOI, despite the delayed effective date, MassDevelopment, acting in concert with the Devens Enterprise Commission (“DEC” which acts as the regulatory and permitting authority for Devens) has already met or exceeded many of the requirements of the Permit. Moreover, the Agency’s NOI proposes deadlines that are more aggressive than the Permit requires. Regardless, the Agency stands ready and is eager to comply with the terms of the Permit when it becomes effective.

We look forward to your prompt authorization and would be pleased to answer any questions you may have or provide any additional information you require. If you have any questions regarding this NOI, please contact John Marc-Aurele at 978-772-2926.

Mr. Newton Tedder
March 22, 2018
Page 3

Kindly acknowledge receipt by date stamping the enclosed copy of this letter and returning it to the messenger.

Sincerely,

A handwritten signature in cursive script, appearing to read 'L. Liss', written in black ink.

Lauren A. Liss
President and Chief Executive
Officer

cc: Robert Ruzzo, Deputy Director and General Counsel
John Marc-Aurele, Engineering Manager

Massachusetts Department of Environmental Protection
One Winter Street – 5th Floor
Boston, MA 02108
ATTN: Fred Civian, Stormwater Coordinator

Part I: General Conditions

General Information

Name of Municipality or Organization: Devens/Massachusetts Development Finance Agency State: MA
EPA NPDES Permit Number (if applicable): N/A

Primary MS4 Program Manager Contact Information

Name: John P. Marc-Aurele Title: Engineering Manager
Street Address Line 1: 33 Andrews Parkway
Street Address Line 2:
City: Devens State: MA Zip Code: 01434
Email: JMarc-Aurele@Massdevelopment.com Phone Number: (978) 784-2926
Fax Number: (978) 772-7496

Other Information

Stormwater Management Program (SWMP) Location (web address or physical location, if already completed): To Be Completed During Permit Year 1 and Posted to Devens Community Website (2018-2019).

Eligibility Determination

Endangered Species Act (ESA) Determination Complete? Yes Eligibility Criteria (check all that apply): A B C
National Historic Preservation Act (NHPA) Determination Complete? No Eligibility Criteria (check all that apply): A B C

Check the box if your municipality or organization was covered under the 2003 MS4 General Permit

Click to lengthen table

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary

Identify the Best Management Practices (BMPs) that will be employed to address each of the six Minimum Control Measures (MCMs). For municipalities/organizations whose MS4 discharges into a receiving water with an approved Total Maximum Daily Load (TMDL) and an applicable waste load allocation (WLA), identify any additional BMPs employed to specifically support the achievement of the WLA in the TMDL section at the end of part III.

For each MCM, list each existing or proposed BMP by category and provide a brief description, responsible parties/departments, measurable goals, and the year the BMP will be employed (public education and outreach BMPs also requires a target audience). **Use the drop-down menus in each table or enter your own text to override the drop down menu.**

MCM 1: Public Education and Outreach

BMP Media/Category (enter your own text to override the drop down menu)	BMP Description	Targeted Audience	Responsible Department/Parties (enter your own text to override the drop down menu)	Measurable Goal	Beginning Year of BMP Implementation
Brochures/Pamphlets	Provide general stormwater educational pamphlets as well as topic specific pamphlets addressing lawn care, pet waste, etc.	Residents	Massachusetts Development Finance Agency ("MassDevelopment")	Distribute 2 pamphlets per year to residents.	2018
Brochures/Pamphlets	Provide general stormwater educational pamphlets as well as topic specific pamphlets addressing lawn/grounds maintenance, use of salt/de-icing materials and other facility specific materials, etc.	Businesses, Institutions and Commercial Facilities	Devens Enterprise Commission (DEC)/MassDevelopment (Engineering)	Distribute 2 pamphlets per year to businesses, institutions and commercial facilities.	2018

Brochures/Pamphlets	Distribute brochures to prospective developers and contractors providing general information on stormwater management and summary information on Devens rules and regulations.	Developers/Contractors (construction)	Devens Enterprise Commission / Mass Development (Engineering & C	Distribute brochure throughout permit term and maintain a list of all recipients.	2018
Brochures/Pamphlets	Distribute brochures to industrial facilities providing general information on stormwater management and summary information on Devens rules and regulations.	Industrial Facilities	Mass Development(Engineering)/Devens Enterprise Commission	Distribute brochure throughout permit term and maintain a list of all recipients.	2018
Web Page	Provide new/updated Devens website to provide public access to stormwater-related materials, documentation and procedures.	Residents	MassDevelopment (Operations/Engineering)	Update the website during Year 1 and track the number of visits to the website annually thereafter.	2018
Web Page	Provide new/updated Devens web site and update Devens Enterprise Commission website to provide access to stormwater-related materials, documentation, regulations and procedures.	Businesses, Institutions and Commercial Facilities	MassDevelopment (Operations/Engineering)/DEC	Update the website during Year 1 and track the number of visits to the website annually thereafter.	2018

Web Page	Provide new/updated Devens web site and update Devens Enterprise Commission website to provide access to stormwater-related materials, documentation, regulations and procedures.	Developers (construction)	MassDevelopment Operations/Engineering/DEC	Update the website during Year 1 and track the number of visits to the website annually thereafter.	2018
Web Page	Provide new/updated Devens website and update Devens Enterprise Commission website to provide access to stormwater-related materials, documentation, regulations and procedures.	Industrial Facilities	MassDevelopment Operations/Engineering/DEC	Update the website during Year 1 and track the number of visits to the website annually thereafter.	2018
School Curricula/Programs	Develop/distribute stormwater-related educational materials, posters, etc., to local schools for use in classrooms and for general use.	Students	MassDevelopment Operations/Engineering	Distribute materials to local schools annually.	2018
Meeting	Meet with businesses and institutions to review facilities and discuss specific discharge conditions.	Businesses/Institutions/Commercial	MassDevelopment Engineering/DPW and DEC	Meet with businesses and institutions annually.	2018
Meetings & Public Education Materials	Continue to meet and work with the Nashua River Watershed Association to develop and distribute materials to educate the public on protecting the water quality of the Nashua River.	General Public	MassDevelopment Engineering and DEC	Meet and collaborate with the Nashua River Watershed Association annually to educate the general public.	2018

Presentation	Conduct a presentation on Stormwater Operation & Maintenance Plan Requirements	Businesses/Institutions/Commercial	MassDevelopment Engineering and DEC	Make presentation annually and track the number of commercial entities that attend the presentation.	2018
Web Page	Continue to provide information to residents via the MassDevelopment "Devens Community" website and the Devens Enterprise Commission website on "Living Green" including how to reduce water use and reduce waste generated.	Residents	MassDevelopment/Devens Enterprise Commission	Send link to website where information is posted to residents and track number of residents contacted and the number of visits to the website.	2018
Web Page	Continue to provide information to residents via the MassDevelopment "Devens Community" website and the Devens Enterprise Commission website on "Living Green" including how to reduce water use and reduce waste generated.	Businesses/Institutions/Commercial	MassDevelopment/Devens Enterprise Commission	Send link to website where information is posted to local businesses and track number of businesses contacted and the number of visits to the website.	2018

<p>Brochures/Pamphlets</p>	<p>Continue to make available to developers information on green infrastructure guidelines for construction projects in Devens.</p>	<p>Developers (construction)</p>	<p>MassDevelopment/Devens Enterprise Commission</p>	<p>Post information on the Devens Enterprise Commission website and handout information to developers as new development projects are introduced to the Commission - keep a list of developers to which the information is distributed.</p>	<p>2018</p>
<p>Web Page</p>	<p>Continue to make available to operators of industrial facilities information on Best Management Practices focused on stormwater pollution prevention</p>	<p>Industrial Facilities</p>	<p>MassDevelopment/Devens Enterprise Commission</p>	<p>Post information on the Devens Enterprise Commission website and e-mail a link to the information to owners/operators of industrial facilities within Devens. Track the number of owners/operators e-mailed and the number of visits to the website.</p>	<p>2018</p>
	<p>***Additional messaging will be included to meet impaired waters requirements per Part 2.1.1 and Appendix H of the Permit as outlined in Part III and Part IV of this Notice of Intent.</p>				

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 2: Public Involvement and Participation

BMP Categorization	Brief BMP Description (enter your own text to override the drop down menu)	Responsible Department/Parties (enter your own text to override the drop down menu)	Additional Description/ Measurable Goal	Beginning Year of BMP Imple- mentation
Public Review	Provide for Public Review of SWMP and Annual Reports.	MassDevelopment (Engineering)/Devens Enterprise Commission	Make SWMP and annual reports available to public at MassDevelopment Offices & on Devens website.	2018
Public Participation	Provide Public Opportunity to Participate in SWMP Development.	MassDevelopment (Engineering)/Devens Enterprise Commission	Allow public to comment on stormwater management plan annually.	2018
Public Participation	Continue to provide public access to Recycling Drop-Off.	MassDevelopment (DPW)	Continue to provide public access to the recycling drop off at the DPW Facility.	2018
Public Participation	Continue public access to Regional Household Haz. Waste Collection C	MassDevelopment	Continue participation in Devens Regional Household Hazardous Products Collection Center.	2018
Public Participation	Continue participation in the Nashua River Watershed Association .	Devens Enterprise Commission/MassDevelopment	Attend or participate in at least one meeting or event annually of the Nashua River Watershed Association.	2018
Public Participation	Provide community access to clean up days, tree plantings, etc.	Devens Enterprise Commission/MassDevelopment	Sponsor one activity annually for public involvement.	2018
Public Participation	Continue participation in the Devens Eco-Efficiency Center.	Devens Enterprise Commission	Provide at least one program/service annually to assist local businesses in reducing the amount of waste they generate and disposal costs.	2018

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 3: Illicit Discharge Detection and Elimination (IDDE)

BMP Categorization (enter your own text to override the drop down menu)	BMP Description	Responsible Department/Parties (enter your own text to override the drop down menu)	Measurable Goal (all text can be overwritten)	Beginning Year of BMP Implementation
Illicit Discharge Detection & Elimination Regulations	Review existing regulatory prohibitions and update as needed to provide required legal authority to prohibit, investigate, and eliminate illicit discharges. The general provisions of 974 CMR 4.08(2) currently require all projects to comply with MA DEP Stormwater Management Standards and submit a completed and endorsed stormwater management form which includes a signed Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the site. Failure to prevent illicit discharges constitutes a violation of the Unified Permits issued for development at Devens and is subject to enforcement procedures outlined in 974 CMR 1.14.	MassDevelopment (Engineering & Utilities)	Review existing authority and prohibitions. Amend existing Devens regulations for enforcement as needed. Complete within 3 years of permit effective date.	2018

Sanitary Sewer Overflow (SSO) Inventory	Continue to maintain inventory of where SSOs have discharged over the last five years.	MassDevelopment (Utilities)/Devens Enterprise Commission (BOH)	Continue to maintain and update existing SSO Inventory annually and provide updates in annual MS4 reports.	2018
Storm Sewer System Map	Review and update existing drainage map to include catchment delineations, interconnections, and impaired waters. Update annually thereafter to incorporate drainage improvements, including drainage from new developments and re-developments.	MassDevelopment (Engineering)	Incorporate additional permit requirements and continue to review and update existing drainage GIS map annually.	2018
Written IDDE Program	Create written IDDE program to meet permit conditions.	MassDevelopment (Engineering/DPW/Operations)	Complete within 4 years of the effective date of permit and update as required.	2020
Outfall and Interconnection Inventory	All outfalls and interconnections have been mapped. Update outfall and interconnection inventory as needed to incorporate condition information.	MassDevelopment (Engineering/DPW Operations)	Review existing GIS and update inventory as needed. Complete within 4 years of permit effective date	2021
Priority Ranking	Assess and rank potential for catchments to have illicit discharges.	MassDevelopment (Engineering/DPW Operations)	Complete within 4 years of permit effective date.	2018
Dry Weather Screening	Conduct in accordance with outfall screening procedure and permit conditions	MassDevelopment (Engineering/DPW Operations)	Complete in conjunction with outfall & interconnection inventory and within 6 years of permit effective date.	2021
Follow-Up Ranking	Update ranking as dry weather screening information becomes available	MassDevelopment (Engineering/DPW Operations)	Complete within 6 years of permit effective date.	2021

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 4: Construction Site Stormwater Runoff Control

BMP Categorization (enter your own text to override the drop down menu or entered text)	BMP Description	Responsible Department/Parties (enter your own text to override the drop down menu)	Measurable Goal (all text can be overwritten)	Beginning Year of BMP Implementation
Construction Site Stormwater Runoff Control Regulations	Continue compliance with Devens Enterprise Commission (DEC) regulatory requirements for Erosion & Sediment Control (ESC) Plan under 974 CMR 3.02(3)(e).	Devens Enterprise Commission/MassDevelopment	Continue compliance with existing regulations.	2018
Site Inspection and Enforcement of Erosion and Sediment	Continue implementation of 974 CMR 3.02(3)(e) and conditions of all site development approvals that require ESC plan and DEC inspection of all controls prior to commencement of construction. Standards conditions of approval also require Applicant maintain an ESC log for all controls that is to be made available for inspection by DEC. Document existing inspection procedures.	Devens Enterprise Commission/MassDevelopment	Continue existing site inspection and enforcement procedures. Document inspection and enforcement procedures. Procedures must be in written format within three years of permit effective date or by July 2021.	2020

<p>Site plan review</p>	<p>Continued compliance with DEC regulatory requirements for ESC plan under 974 CMR 3.02 (3)(e) , protection of steep slopes 974 CMR 3.06, earth removal 974 CMR 4.07 and stormwater management 974 CMR 4.08. Document existing site plan review procedures.</p>	<p>Devens Enterprise Commission/Engineering</p>	<p>Continue existing site plan review procedures. Document existing site plan review procedures. Procedures must be in written format within three years of permit effective date or by July 2021.</p>	<p>2020</p>
<p>Erosion and Sediment Control</p>	<p>Continue compliance with DEC regulatory requirements for ESC Plan under 974 CMR 3.02 (3)(e) and 974 CMR 3.06.</p>	<p>Devens Enterprise Commission/MassDevelopment</p>	<p>Continue compliance with existing requirements for erosion and sediment control at construction sites. Ensure BMPs are appropriate for site conditions.</p>	<p>2018</p>
<p>Waste Control</p>	<p>Continue requiring waste disposal and recycling affidavits as part of building permit process: http://www.devensec.com/forms/Building_Permit_2016.pdf (see page 2). DEC Determination of Completeness requirements also require applicants to identify waste disposal methods as part of site plan (recycling, composting, reuse): http://www.devensec.com/forms/DOC_Form_2012.pdf (see page 3).</p>	<p>Devens Enterprise Commission/MassDevelopment</p>	<p>Continue to require compliance with existing requirements for waste control.</p>	<p>2018</p>

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment

BMP Categorization (enter your own text to override the drop down menu or entered text)	BMP Description	Responsible Department/Parties (enter your own text to override the drop down menu)	Measurable Goal (all text can be overwritten)	Beginning Year of BMP Implementation
Post Construction Stormwater Management Regulations	Continue to require compliance with Devens Enterprise Commission (DEC) regulatory requirements for post-construction runoff from new development and re-development as included in 974 CMR 4.08 and 4.09.	Devens Enterprise Commission/MassDevelopment (Engineering & Operations)	Continue compliance with existing regulations.	2018
Target Properties to Reduce Impervious Cover	Identify and priority rank at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious cover and update annually.	MassDevelopment (Engineering/DPW Operations)	Complete within 6 years of permit effective date and report annually on retrofitted properties.	2023

<p>Allow Green Infrastructure</p>	<p>Continue to require LID practices for all stormwater management projects where feasible: 974 CMR 3.04(4)(a)1. & 974 CMR 4.08. Continue to utilize and improve on green infrastructure guidelines to guide, regulate and incentivize green infrastructure on all development and redevelopment projects: http://www.devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf. Continue to monitor impervious surface reductions in Devens Sustainable Indicators Reports.</p>	<p>Devens Enterprise Commission</p>	<p>Continue to require LID practices and, as well as monitor and track sustainable indicators including impervious surface reductions resulting from incorporation of LID.</p>	<p>2018</p>
<p>Street Design and Parking Lot Guidelines</p>	<p>Continue to require LID practices for all stormwater management projects where feasible: 974 CMR 3.04(4)(a)1. & 974 CMR 4.08. Continue to monitor impervious surface reductions in Devens Sustainable Indicators Reports.</p>	<p>Devens Enterprise Commission/MassDevelopment (Engineering)</p>	<p>Continue to require LID practices and, as well as monitor and track sustainable indicators including impervious surface reductions resulting from incorporation of LID.</p>	<p>2018</p>
<p>Ensure any stormwater controls or management practices for new development and redevelopment meet the retention or treatment requirements of the permit and all applicable requirements of the Massachusetts Stormwater Handbook.</p>	<p>Review existing regulatory requirements and amend requirements as needed to meet permit conditions.</p>	<p>Devens Enterprise Commission</p>	<p>Complete within 4 years of permit effective date.</p>	<p>2021</p>

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 6: Municipal Good Housekeeping and Pollution Prevention

BMP Categorization (enter your own text to override the drop down menu or entered text)	BMP Description	Responsible Department/Parties (enter your own text to override the drop down menu)	Measurable Goal (all text can be overwritten)	Beginning Year of BMP Implementation
Inventory of all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Develop inventory of permittee-owned facilities and equipment, and update annually.	MassDevelopment (Engineering/DPW Operations)	Complete within 4 years from permit effective date and update annually as needed.	2021
Written O&M procedures	Create written O&M procedures for parks and open spaces, buildings and facilities, and vehicles and equipment	MassDevelopment (Engineering/DPW Operations)	Complete within 4 years of permit effective date.	2021
Infrastructure O&M	Formalize written program for operation and maintenance of MS4 infrastructure	MassDevelopment (Engineering/DPW Operations)	Complete within 4 years of permit effective date.	2021
Catch Basin Cleaning Optimization	Continue current practice of inspecting all catch basins annually, and quantifying the amount of sediment removed from each basin. Continue to utilize information collected to optimize existing cleaning practices.	MassDevelopment (Engineering/DPW Operations)	Continue to track sediment removed and optimize catch basin cleaning operations. Complete optimization plan within 4 years of permit effective date.	2018
Catch basin cleaning	Continue to target areas where catch basins fill up with sediment more quickly to ensure that each catch basin is no more than 50% full. Modify cleaning schedule and frequency as needed.	MassDevelopment (Engineering/DPW Operations)	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material removed annually.	2018

Street sweeping program	Continue to sweep all streets and permittee-owned parking lots at least annually in accordance with permit conditions.	MassDevelopment (Engineering/DPW Operations)	Sweep all streets and permittee-owned parking lots at least once per year in the spring and report annually.	2018
Road salt use optimization program	Continue to calibrate equipment annually. Continue to review and enhance existing practices to minimize the use of road salt.	MassDevelopment (Engineering/DPW Operations)	Continue current efforts and modify existing practices where feasible for further optimization of road salt use. Complete optimization plan within 4 years of permit effective date.	2021
Inspections and maintenance of stormwater treatment structures	Continue to inspect detention ponds annually and clean as needed. Establish and implement inspection and maintenance procedures and frequencies for other stormwater treatment structures.	Devens Enterprise Commission/MassDevelopment (Engineering/DPW Operations)	Review existing procedures and optimize. Inspect and maintain treatment structures at least annually. Begin annual inspections within 4 years of permit effective date.	2021
Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPPs for waste-handling facilities not already covered under the Multi-Sector General Permit.	MassDevelopment (Engineering/DPW Operations)/Devens Enterprise Commission	Develop SWPPPs within 4 years of permit effective date and complete inspections and training annually thereafter.	2021

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

Actions for Meeting Requirements Related to Water Quality Limited Waters

Use the drop-down menus to select the pollutant causing the water quality limitation and enter the waterbody ID(s) experiencing excursions above water quality standards for that pollutant. Choose the action description from the dropdown menu and indicate the responsible party. If no options are applicable, or more than one, **enter your own text to override drop-down menus.**

Pollutant	Waterbody ID(s)	Action Description	Responsible Department/Parties <small>(enter your own text to override the drop down menu)</small>
Phosphorus	Nashua River (Segment MA-81-05)	Adhere to requirements in part II of Appendix H	Mass Development/Devens Enterprise Commission
E. Coli	Nashua River (Segment MA-81-05); Catacoonamug Brook (Segment MA 81-74)	Adhere to requirements in part III of Appendix H	Mass Development/Devens Enterprise Commission
	** Specific requirements related to impaired waters are included as a supplement to this Notice of Intent.		

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Part IV: Notes and additional information

Use the space below to indicate the part(s) of 2.2.1 and 2.2.2 that you have identified as not applicable to your MS4 because you do not discharge to the impaired water body or a tributary to an impaired water body due to nitrogen or phosphorus. Provide all supporting documentation below or attach additional documents if necessary. Also, provide any additional information about your MS4 program below.

Devens does not currently discharge to any water bodies or tributaries of any water bodies that have approved TMDLs.

Devens does discharge to water bodies that have phosphorus and E.coli impairments which require development of a TMDL. The Nashua River is impaired for both phosphorus and E.coli, and the Catacoonamug Brook is impaired for E.coli. Per Part III of this Notice of Intent, and per Part 2.2.2. and Appendix H of the 2016 MS4 General Permit, best management practices that will be implemented to meet requirements related to water quality impaired waters are summarized in the attached supplemental information.

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part V: 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:

Lauren A. Liss

Title:

President and Chief Executive Officer

Signature:

Robert M. Russo for Lauren A. Liss

Date:

03/22/18

[To be signed according to Appendix B, Subparagraph B.11, Standard Conditions]

Note: When prompted during signing, save the document under a new file name

Supplemental Information

Notice of Intent for Coverage under the Small MS4 General Permit – Supplemental Information

Devens, MA

2003 MS4 Permit Requirements

Based on the 2000 census, Devens was not considered an urbanized area and therefore was not regulated under the 2003 MS4 Permit. Although not required to apply for coverage under the 2003 MS4 Permit, Devens is already in compliance with many of the 2003 MS4 permit requirements. All outfalls and receiving waters in Devens have been mapped. A GIS drainage map of the storm drain system in Devens has been prepared and a copy is attached. In addition, both Construction and Post-Construction Stormwater Runoff Management Regulations were approved by the Devens Enterprise Commission on September 27, 2011 and became effective on December 9, 2011. With respect to the Illicit Discharge Detection and Elimination (IDDE) regulatory requirements, Devens plans to review existing authority and prohibitions, and amend the existing Devens regulations for enforcement as needed. It is anticipated that Devens will be in compliance with the IDDE regulatory requirements prior to 2021.

The schedule outlined for implementation of Best Management Practices included in the NOI demonstrates, for the most part, an accelerated schedule that exceeds the schedule outlined in the 2016 MS4 General Permit for new permittees.

ESA

Mass Development is certifying Endangered Species Act (ESA) eligibility for coverage under the permit according to USFWS Criterion C. Based on the online review performed, it has been determined that there are two threatened species within Devens. These include the Northern Long-eared Bat and the Small Whorled Pogonia. Please see attached correspondence from the United States Department of the Interior dated October 10, 2017 identifying the presence of these two species within Devens. It is our belief that existing stormwater discharges regulated under the permit will have no adverse impact on these federally threatened species. Prior to the installation of any structural BMPs, an endangered species screening will be conducted for the proposed site. The USFWS will be contacted if it is determined that the new activity “may affect” or is “not likely to adversely affect” listed species or critical habitat under the jurisdiction of the USFWS.

Impaired Waters

Devens discharges to water bodies that have phosphorus and E.coli impairments which require development of a TMDL. The Nashua River is impaired for both phosphorus and E.coli, and the Cataconamug Brook is impaired for E.coli. Per Part III of this Notice of Intent, and per Part 2.2.2. and Appendix H of the 2016 MS4 Permit, best management practices that will be implemented to meet requirements related to water quality impaired waters include:

- H.II.1.a.i.1 Distribution of educational message to residential and business/commercial/institutional property owners annually in March/April on the proper use and disposal of grass clippings and the proper use of slow-release and phosphorous-free fertilizers. Begin within 3 years of permit effective date. Beginning year of implementation: 2020.

- H.II.1.a.i.1 Distribution of pet waste management message to residential property owners annually in June/July starting within 3 years of the permit effective date. Beginning year of implementation: 2020.
- H.II.1.a.i.1 Distribution of leaf litter disposal message to Residential/Business/Commercial property owners annually August-October starting within three years of the permit effective date. Beginning year of implementation: 2020.
- H.II.1.a.i.2 Modification of stormwater management regulations to require that new development and re-development stormwater BMPs are optimized for phosphorus removal within 4 years of permit effective date. Beginning year of implementation: 2021.
- H.II.1.a.i.2 Inventory and priority ranking of permittee-owned property and infrastructure that can be retrofitted with BMPs to include consideration of BMPs that infiltrate stormwater within 6 years of permit effective date. Beginning year of implementation: 2023.
- H.II.1.a.i.3 Development of a program to manage grass clippings and leaf litter on permittee owned property within 4 years of permit effective date. Beginning year of implementation: 2021.
- H.II.1.a.i.3 An increase in frequency of sweeping of public streets and municipal parking lots to a minimum of two times per year in drainage areas tributary to the Nashua River within 3 years of permit effective date. Beginning year of implementation: 2020.
- H.II.1.b Development of a Phosphorus Source Identification Report within 6 years of the permit effective date. Beginning year of implementation: 2023.
- H.II.1.c Evaluation of all permittee-owned properties identified as presenting retrofit opportunities or areas for structural BMP installation or identified in the Phosphorus Source Identification Report that are within the drainage area of the Nashua River or its tributaries within 7 years of permit effective date. Beginning year of implementation: 2024.
- H.II.1.c Planning/installation of one structural BMP demonstration project within 8 years of the permit effective date. Beginning year of implementation: 2025.
- H.II.1.c Installation of remaining BMP retrofits in accordance with the plan and schedule identified in the Phosphorus Source Identification Report.
- H.II.1.c Tracking and reporting of BMP installations and estimated phosphorus removal annually starting in Year 9. Beginning year of implementation: 2026.
- H.III.2.a.i Distribution of residential message on pet waste management annually within 3 years of permit effective date. Beginning year of implementation: 2020.
- H.III.2.a.i Dissemination of required public education information to dog owners at license renewal within 3 years of the permit effective date. Beginning year of implementation: 2020.

- H.III.2.a.i Distribution of public education materials to septic system owners within three years of permit effective date. Beginning year of implementation: 2020.
- H.III.2.a.ii Ranking of catchments tributary to bacteria/pathogen impaired waters as Problem or High in catchment ranking within three years of permit effective date. Beginning year of implementation: 2020.

**Correspondence from the United States Department of the Interior
October 10, 2017**



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
<http://www.fws.gov/newengland>



In Reply Refer To:

October 10, 2017

Consultation Code: 05E1NE00-2018-SLI-0109

Event Code: 05E1NE00-2018-E-00237

Project Name: Devens MS4 Compliance

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the

human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Project Summary

Consultation Code: 05E1NE00-2018-SLI-0109

Event Code: 05E1NE00-2018-E-00237

Project Name: Devens MS4 Compliance

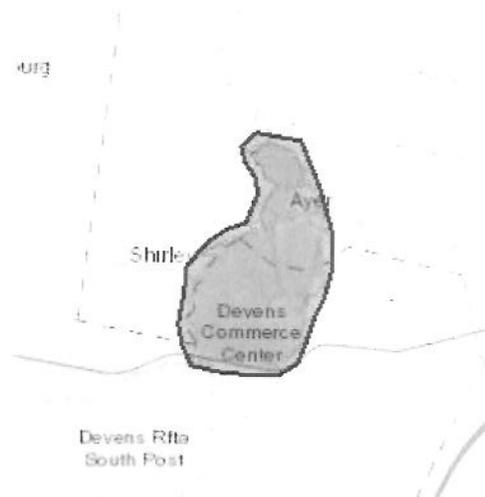
Project Type: ** OTHER **

Project Description: The purpose is to perform an Endangered Species Act review to confirm that existing stormwater discharges will have no adverse impact on any identified endangered species.

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/42.54807677161482N71.61098619641359W>



Counties: Middlesex, MA | Worcester, MA

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Flowering Plants

NAME	STATUS
Small Whorled Pogonia <i>Isotria medeoloides</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

There are no critical habitats within your project area under this office's jurisdiction.

Part I: General Conditions

General Information

Name of Municipality or Organization: State:

EPA NPDES Permit Number (if applicable):

Primary MS4 Program Manager Contact Information

Name: Title:

Street Address Line 1:

Street Address Line 2:

City: State: Zip Code:

Email: Phone Number:

Fax Number:

Other Information

Stormwater Management Program (SWMP) Location (web address or physical location, if already completed):

Eligibility Determination

Endangered Species Act (ESA) Determination Complete?

National Historic Preservation Act (NHPA) Determination Complete?

Eligibility Criteria (check all that apply): A B C

Eligibility Criteria (check all that apply): A B C

Check the box if your municipality or organization was covered under the 2003 MS4 General Permit

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment

BMP Categorization (enter your own text to override the drop down menu or entered text)	BMP Description	Responsible Department/Parties (enter your own text to override the drop down menu)	Measurable Goal (all text can be overwritten)	Beginning Year of BMP Implementation
Post Construction Stormwater Management Regulations	Continue to require compliance with Devens Enterprise Commission (DEC) regulatory requirements for post-construction runoff from new development and re-development as included in 974 CMR 4.08 and 4.09. and to comply with any federal permit requirements	Devens Enterprise Commission/MassDevelopment (Engineering & Operations)	Continue compliance with existing regulations.	2018
Target Properties to Reduce Impervious Cover	Identify and priority rank at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious cover and update annually.	MassDevelopment (Engineering/DPW Operations)	Complete within 6 years of permit effective date and report annually on retrofitted properties.	2023



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

VIA EMAIL

March 6, 2019

Lauren A Liss
President and Chief Executive Officer

And;

John P. Marc-Aurele
Engineering Manager
33 Andrews Parkway
Devens, MA. 01434
JMarc-Aurele@Massdevelopment.com

Re: National Pollutant Discharge Elimination System Permit ID #: MAR042048,
Devens/Massachusetts Development Finance Agency

Dear John P. Marc-Aurele:

The 2016 NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (MS4 General Permit) is a jointly issued EPA-MassDEP permit. Your Notice of Intent (NOI) for coverage under this MS4 General Permit has been reviewed by EPA and appears to be complete. You are hereby granted authorization by EPA and MassDEP to discharge stormwater from your MS4 in accordance with the applicable terms and conditions of the MS4 General Permit, including all relevant and applicable Appendices. This authorization to discharge expires at midnight on **June 30, 2022**.

For those permittees that certified Endangered Species Act eligibility under Criterion C in their NOI, this authorization letter also serves as EPA's concurrence with your determination that your discharges will have no effect on the listed species present in your action area, based on the information provided in your NOI.

As a reminder, your first annual report is due by **September 30, 2019** for the reporting period from May 1, 2018 through June 30, 2019.

Information about the permit and available resources can be found on our website:
<https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit>. Should you have

any questions regarding this permit please contact Newton Tedder at tedder.newton@epa.gov or (617) 918-1038.

Sincerely,



Thelma Murphy, Chief
Stormwater and Construction Permits Section
Office of Ecosystem Protection
United States Environmental Protection Agency, Region 1

and;



Lealdon Langley, Director
Wetlands and Wastewater Program
Bureau of Water Resources
Massachusetts Department of Environmental Protection

APPENDIX E

MS4 Checklists By Permit Year

Checklist for Year 1 MS4 Permit Requirements – Devens

Completion Due Date	Requirement	Task	Permit Section for Reference	Completed?
10/1/2018	Notice of Intent (NOI)	Prepare and Submit NOI for Permit Coverage 90 days from the permit effective date	1.7.2 & Appendix E	Yes
6/30/2019	Stormwater Management Plan (SWMP)	Develop written SWMP	1.10	Yes
6/30/2019	Public Education	Fulfill public education initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.2	Yes
6/30/2019	Public Participation	Fulfill public participation initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.3	Yes
6/30/2019	Street Sweeping	Sweep streets a minimum of once a year in the spring. Include miles cleaned or volume or mass of material removed in the annual report.	2.3.7.a.iii.3	Yes
6/30/2019	Catch Basin Cleaning	Clean catch basins annually to ensure the no catch basin is more than 50% full. Report catch basins cleaned and volume of material removed annually.	2.3.7.a.iii.3	Yes

Checklist for Year 2 MS4 Permit Requirements – Devens

Completion Due Date	Requirement	Task	Permit Section for Reference	Completed?
6/30/2020	Stormwater Management Plan (SWMP)	Update written SWMP	1.10	Yes
6/30/2020	Public Education	Fulfill public education initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.2	Yes
6/30/2020	Public Participation	Fulfill public participation initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.3	Yes
6/30/2020	Street Sweeping	Sweep streets a minimum of once a year in the spring. Include miles cleaned or volume or mass of material removed in the annual report.	2.3.7.a.iii.3	Yes
6/30/2020	Catch Basin Cleaning	Clean catch basins annually to ensure the no catch basin is more than 50% full. Report catch basins cleaned and volume of material removed annually.	2.3.7.a.iii.3	Yes

Checklist for Year 3 MS4 Permit Requirements – Devens

Completion Due Date	Requirement	Task	Permit Section for Reference	Completed?
6/30/2021	Stormwater Management Plan (SWMP)	Update written SWMP	1.10	Yes
6/30/2021	Phosphorus Impaired Water Bodies	Implement public education initiatives; Sweep streets and municipal parking lots a minimum of two times per year in catchments tributary to phosphorus impaired water bodies	H.II.1.a.i.1; H.II.1.a.i.3	Yes
6/30/2021	Bacteria Impaired Water Bodies	Implement public education initiatives	H.III.2.a.i; H.III.2.a.ii	Yes
6/30/2021	Public Education	Fulfill public education initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.2	Yes
6/30/2021	Public Participation	Fulfill public participation initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.3	Yes
6/30/2021	Illicit Discharge Detection and Elimination (IDDE) Bylaw	Adopt regulatory mechanism providing legal authority to prohibit/investigate/eliminate illicit discharges.	2.3.4.a	Yes
6/30/2021	Construction Site Stormwater Runoff Control Bylaw	Verify and document that existing regulations require sediment and erosion controls for disturbances of one acre or more	2.3.5.a	Yes
6/30/2021	Construction Site Runoff Control Regulatory Updates/SOPs	Create written procedures for inspection of construction sites for proper sediment & erosion controls, and conducting site plan reviews. Incorporate requirements for waste control. Reference Stormwater Manual for Sediment & Erosion Control BMPs.	2.3.5.c	Yes
6/30/2021	Post-Construction Stormwater Management Bylaw for New Development and Redevelopment	Verify and document that existing regulations require post-construction stormwater management for disturbances of one acre or more	2.3.6.a	Yes

6/30/2021	Street Sweeping	Sweep streets a minimum of once per year in the spring. Include miles cleaned or volume or mass of material removed in the annual report.	2.3.7.a.iii.3	Yes
6/30/2021	Catch Basin Cleaning	Clean catch basins annually to ensure the no catch basin is more than 50% full. Report catch basins cleaned and volume of material removed annually.	2.3.7.a.iii.3	Yes
6/30/2021	Winter Road Maintenance SOP	Develop and implement winter road maintenance procedures including use and storage of sand/salt, and snow storage practices.	2.3.7.a.iii.5	Yes
6/30/2021	Stormwater BMP Inspection & Maintenance	Inspect all stormwater treatment structures (BMPs) at least annually and conduct maintenance as necessary. Track number of structures maintained and inspected annually.	2.3.7.a.iii.6	Yes

Checklist for Year 4 MS4 Permit Requirements – Devens

Completion Due Date	Requirement	Task	Permit Section for Reference	Completed?
6/30/2022	Stormwater Management Plan (SWMP)	Update written SWMP	1.10	Yes
6/30/2022	Phosphorus Impaired Water Bodies	Implement public education initiatives; Modify stormwater regulations to require that new development and redevelopment BMPs are optimized for phosphorus removal; Development of a program to manage grass clippings and leaf litter on permittee-owned property; Sweep streets and municipal parking lots a minimum of two times per year in catchments tributary to phosphorus impaired water bodies	H.II.1.a.i.1; H.II.1.a.i.2; H.II.1.a.i.3	Yes
6/30/2022	Bacteria Impaired Water Bodies	Implement public education initiatives; Rank catchments tributary to bacteria/pathogen impaired waters as Problem or High in catchment ranking	H.III.2.a.i; H.III.2.a.ii	Yes
6/30/2022	Public Education	Fulfill public education initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.2	Yes
6/30/2022	Public Participation	Fulfill public participation initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.3	Yes
6/30/2022	Illicit Discharge Detection and Elimination (IDDE) Plan	Develop written IDDE plan to satisfy permit requirements.	2.3.4.6	Yes
6/30/2022	Sanitary Sewer Overflow (SSO) Inventory	Document all SSOs that have occurred in the last 5 years	2.3.4.4.b	Yes
6/30/2022	Catchment Delineation	Delineate outfall & interconnection catchment areas.	2.3.4.5	Yes
6/30/2022	Catchment Prioritization & Ranking	Assess and rank the potential for all catchments to have illicit discharges.	2.3.4.7	Yes
6/30/2022	IDDE Employee Training	Begin to train municipal employees on illicit discharge detection and monitoring.	2.3.4.11	No – will begin in Permit Year 5

6/30/2022	Post-Construction Stormwater Runoff Control Regulatory Updates	Update existing stormwater regulations as needed to include compliance with the Stormwater Management Standards, to meet retention and treatment requirements, to meet as-built requirements and provide for long term operation & maintenance of BMPs.	2.3.6.a.ii	Yes
6/30/2022	Inventory of Municipal Facilities	Develop an inventory of all permittee-owned facilities.	2.3.7.a.ii	Yes
6/30/2022	Operation and Maintenance Procedures	Develop a written set of O&M procedures for municipal facilities, activities and MS4 infrastructure	2.3.7.a.i & 2.3.7.a.iii	Yes
6/30/2022	Catch Basin Cleaning Optimization	Develop and implement a catch basin cleaning schedule with a goal of ensuring no catch basin is more than 50 % full.	2.3.7.a.iii.2	MassDevelopment actively collecting data to build plan.
6/30/2022	Street Sweeping	Sweep streets a minimum of once a year in the spring. Include miles cleaned or volume or mass of material removed in the annual report.	2.3.7.a.iii.3	Yes
6/30/2022	Catch Basin Cleaning	Clean catch basins annually to ensure the no catch basin is more than 50% full. Report catch basins cleaned and volume of material removed annually.	2.3.7.a.iii.3	Yes
6/30/2022	Stormwater BMP Inspection & Maintenance	Inspect all stormwater treatment structures (BMPs) at least annually and conduct maintenance as necessary. Track number of structures maintained and inspected annually.	2.3.7.a.iii.6	Yes
6/30/2022	Stormwater Pollution Prevention Plans (SWPPP)	Develop written SWPPPs for municipal waste handling facilities.	2.3.7.b	Yes

Checklist for Year 5 MS4 Permit Requirements – Devens

Completion Due Date	Requirement	Task	Permit Section for Reference	Completed?
6/30/2023	Stormwater Management Plan (SWMP)	Update written SWMP	1.10	
6/30/2023	Phosphorus Impaired Water Bodies	Implement public education initiatives; Sweep streets and municipal parking lots a minimum of two times per year in catchments tributary to phosphorus impaired water bodies	H.II.1.a.i.1; H.II.1.a.i.3; H.II.1.c	
6/30/2023	Bacteria Impaired Water Bodies	Implement public education initiatives	H.III.2.a.i	
6/30/2023	Public Education	Fulfill public education initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.2	
6/30/2023	Public Participation	Fulfill public participation initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.3	
6/30/2023	Update Drainage Map	Update MS4 mapping to include impaired waters, BMPs, interconnections, and open channel conveyances.	2.3.4.5	
6/30/2023	IDDE Employee Training	Continue to train municipal employees on illicit discharge detection and monitoring.	2.3.4.11	
6/30/2028	IDDE Investigation of Problem Catchments	Begin investigation of problem catchments	2.3.4.8.a	
6/30/2023	Street Sweeping	Sweep streets a minimum of once a year in the spring. Include miles cleaned or volume or mass of material removed in the annual report.	2.3.7.a.iii.3	
6/30/2023	Catch Basin Cleaning	Clean catch basins annually to ensure the no catch basin is more than 50% full. Report catch basins cleaned and volume of material removed annually.	2.3.7.a.iii.3	
6/30/2023	Stormwater BMP Inspection & Maintenance	Inspect all stormwater treatment structures (BMPs) at least annually and conduct maintenance as necessary. Track number of structures	2.3.7.a.iii.6	

		maintained and inspected annually.		
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Checklist for Year 6 MS4 Permit Requirements – Devens

Completion Due Date	Requirement	Task	Permit Section for Reference	Completed?
6/30/2024	Stormwater Management Plan (SWMP)	Update written SWMP	1.10	
6/30/2024	Phosphorus Impaired Water Bodies	Implement public education initiatives; Inventory and priority ranking of permittee-owned property and infrastructure that can be retrofitted with BMPs to include consideration of BMPs that infiltrate stormwater Sweep streets and municipal parking lots a minimum of two times per year in catchments tributary to phosphorus impaired water bodies; Develop Phosphorus Source Identification Report;	H.II.1.a.i.1; H.II.1.a.i.2; H.II.1.a.i.3; H.II.1.b	
6/30/2024	Bacteria Impaired Water Bodies	Implement public education initiatives	H.III.2.a.i	
6/30/2024	Public Education	Fulfill public education initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.2	
6/30/2024	Public Participation	Fulfill public participation initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.3	
6/30/2024	IDDE Employee Training	Continue to train municipal employees on illicit discharge detection and monitoring.	2.3.4.11	
6/30/2024	Dry Weather Outfall Screening and Sampling	Sample all outfalls and interconnections (excluding problem outfalls and excluded outfalls) for dry weather flow and sample flow if present.	2.3.4.7.b	
6/30/2024	Update Catchment Ranking	Update catchment ranking and prioritization based on dry weather outfall sampling data.	2.3.4.7.b.iii.c.iii	

6/30/2024	IDDE Investigation of Problem Catchments	Continue investigation of problem catchments	2.3.4.8.a	
6/30/2028	Begin IDDE Investigation of High and Low Priority Catchments	Begin investigation of high and low priority catchments	2.3.4.8.a	
6/30/2024	Street Design and Parking Lot Guidelines	Develop a report assessing requirements that affect the creation of impervious cover to determine if design standards for streets and parking lots can be modified to support low impact design options.	2.3.6.b	
6/30/2024	Green Infrastructure Practices	Develop a report assessing the barriers and incentives for Green Infrastructure/LID techniques.	2.3.6.c	
6/30/2024	BMP Retrofit Identification	Identify 5 permittee-owned properties that could be retrofitted with stormwater BMPs.	2.3.6.d	
6/30/2024	Street Sweeping	Sweep streets a minimum of once a year in the spring. Include miles cleaned or volume or mass of material removed in the annual report.	2.3.7.a.iii.3	
6/30/2024	Catch Basin Cleaning	Clean catch basins annually to ensure the no catch basin is more than 50% full. Report catch basins cleaned and volume of material removed annually.	2.3.7.a.iii.3	
6/30/2024	Stormwater BMP Inspection & Maintenance	Inspect all stormwater treatment structures (BMPs) at least annually and conduct maintenance as necessary. Track number of structures maintained and inspected annually.	2.3.7.a.iii.6	

Checklist for Year 7 MS4 Permit Requirements – Devens

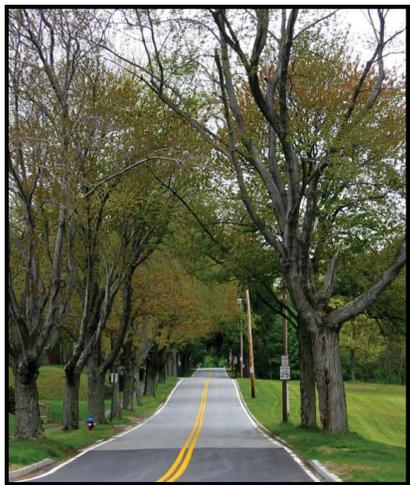
Completion Due Date	Requirement	Task	Permit Section for Reference	Completed?
6/30/2025	Stormwater Management Plan (SWMP)	Update written SWMP	1.10	
6/30/2025	Phosphorus Impaired Water Bodies	Implement public education initiatives; Sweep streets and municipal parking lots a minimum of two times per year in catchments tributary to phosphorus impaired water bodies; Evaluate all permittee-owned properties identified as presenting retrofit opportunities or areas for structural BMP installation or identified in the Phosphorus Source Identification Report & Develop implementation plan and schedule	H.II.1.a.i.1; H.II.1.a.i.3; H.II.1.c	
6/30/2025	Bacteria Impaired Water Bodies	Implement public education initiatives	H.III.2.a.i	
6/30/2025	Public Education	Fulfill public education initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.2	
6/30/2025	Public Participation	Fulfill public participation initiatives aimed at target audiences as outlined in the NOI and this SWMP	2.3.3	
6/30/2025	Update Drainage Map	Update town-wide drainage mapping as needed to include MS4 infrastructure.	2.3.4.5	
6/30/2025	IDDE Investigation of Problem Catchments	Continue investigation of problem catchments	2.3.4.8.a	
6/30/2031	IDDE Investigation of High and Low Priority Catchments	Continue investigation of high and low priority catchments	2.3.4.8.a	

6/30/2025	IDDE Employee Training	Continue to train municipal employees on illicit discharge detection and monitoring.	2.3.4.11	
6/30/2025	Street Sweeping	Sweep streets a minimum of once a year in the spring. Include miles cleaned or volume or mass of material removed in the annual report.	2.3.7.a.iii.3	
6/30/2025	Catch Basin Cleaning	Clean catch basins annually to ensure the no catch basin is more than 50% full. Report catch basins cleaned and volume of material removed annually.	2.3.7.a.iii.3	
6/30/2025	Stormwater BMP Inspection & Maintenance	Inspect all stormwater treatment structures (BMPs) at least annually and conduct maintenance as necessary. Track number of structures maintained and inspected annually.	2.3.7.a.iii.6	

APPENDIX F

Public Education Materials

Triple Bottom-Line Benefits of Street Trees in Devens



1. ECONOMIC:

Increased property value: realtor estimates of tree-lined streets vs. comparable non tree-lined streets have shown anywhere between 5-18% increase in home/business value. People prefer tree-lined streets!

Reduced Energy Costs: streets and parking lots can increase local temperatures which can significantly impact energy costs to homeowners and consumers. The shade provided from street trees, can reduce energy bills for a household by as much as 10%.

Return on Investment: for a planting cost of \$250-600, a single street tree returns over \$90,000 of direct benefits (not including aesthetic, social and environmental) in the lifetime of the tree.

Extended pavement life: the shade of street trees reduces daily heating and cooling (expansion/contraction) of asphalt (gray infrastructure) and can extend the life of pavement up to 60% longer. This translates into a significant cost reduction for maintaining street systems.

Energy: Biomass from trees is a potential source of renewable energy for Municipalities.

2. ENVIRONMENTAL:

Grey Infrastructure to Green Infrastructure: The leaves, branches and trunks of street trees (green infrastructure) can capture up to 30% of a typical rainfall event through absorption and evaporation. Tree root systems can absorb up to another 30%, resulting in reduced stormwater runoff and potential flooding. This also results in less man-made drainage infrastructure (catch basins, piping, detention ponds).

Climate Change Mitigation: leaves absorb harmful pollutants like carbon dioxide (CO₂), carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_x), and particulate matter (PM) such as dirt, dust and soot. Street trees absorb nine times more pollutants than more distant trees, converting those harmful gasses back into oxygen and other useful and natural gasses.

Air Quality: shading provided by trees can reduce local temperatures by up to 15°F, which helps reduce the creation of ground-level ozone – a major contributor to smog & respiratory problems in kids & adults.

Habitat: street trees provide a canopy, root structure and setting for important insect & bacterial life below the surface. Above the surface, they provide biomass, nutrients and habitat for birds & other wildlife.

3. SOCIAL:

Public Safety: street trees help reduce solar glare and define the roadside edge and their canopy cover provides shading and separation from the road that can help protect pedestrians, guide motorists movements and help them better assess their speed. These attributes lead many motorists to exercise greater caution, resulting in reduced speeds (by as much as 15mph) as well as fewer accidents on streets lined with trees.

Public Health: trees reduce UV exposure for pedestrians and have a natural calming effect which can help reduce "road rage", local crime and vandalism, further improving the safety of streets and neighborhoods. Visual access to trees has also been shown to have a rehabilitating impact on our recovery from illness.

Noise Reduction: slower vehicle speeds as a result of street trees can reduce engine and tire noise. Their leafy vegetation can also absorb a great deal of noise in neighborhoods.

Aesthetics: trees provide a general softening of the urban environment and also provide a screen for utility poles, light poles, on-street and off-street parking and other features that create visual pollution. The aesthetics of tree lined streets and green spaces have been shown to have positive psychological benefits including lower rates of stress, blood pressure and mental illness.

Tree Removal/Replacement in Devens:

For all of the above reasons, the Devens Enterprise Commission (DEC) regulates tree removal. Residents/business owners should contact the DEC **prior** to removing trees from their property. For a list of noninvasive street tree species recommendations, visit www.devensec.com/rules-regs/decreqs307.html

MassDevelopment, in conjunction with the DEC, has also conducted a street tree inventory in an effort to better care for and manage street trees within Devens. Annual assessments, trimming and replacement will help ensure street trees continue to thrive within Devens and benefit everyone's triple bottom-line!



Triple Bottom-Line Benefits of Street Trees in Devens



Facts and Figures:

- “There are about 60– to 200-million spaces along our city streets where trees could be planted. This translates to the potential to absorb 33 million more tons of CO² every year, and saving \$4 billion in energy costs.” —*National Wildlife Federation*
- “The net cooling effect of a young, healthy tree is equivalent to ten room-size air conditioners operating 20 hours a day. Trees properly placed around buildings can reduce air conditioning needs by 30 percent and can save 20–50 percent in energy used for heating.” —*USDA Forest Service*
- “Healthy, mature trees add an average of 10 percent to a property’s value.” —*USDA Forest Service*
- “One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people.” —*U.S. Department of Agriculture*
- “Trees can be a stimulus to economic development, attracting new business and tourism. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent.” —*The Arbor Day Foundation*
- “In laboratory research, visual exposure to settings with trees has produced significant recovery from stress within five minutes, as indicated by changes in blood pressure and muscle tension.” —*Dr. Roger S. Ulrich Texas A&M University*

WATER QUALITY IN THE NASHUA RIVER

Did you know – **stormwater runoff**, or the rain and snowmelt that falls on the streets and is collected by storm drains, is one of the most significant sources of pollution in our waterways?

Did you know – the Nashua River is **impaired** for phosphorus and bacteria, which means that the concentrations of phosphorus and bacteria in the river are higher than state Water Quality Standards?

Did you know – many activities like salt use, dumpster placement, and infrequent parking lot sweeping contribute to stormwater pollution and can harm water quality?

Here's how Devens' businesses can help reduce stormwater pollution and improve water quality:

Parking Lot Sweeping



Street and parking lot sweeping are critical in reducing stormwater

pollution! Debris from streets and parking lots include soil, sand, leaves, and trash, all of which are better off in a landfill than in the Nashua River. Parking lots should be swept with mechanical equipment at least once per year.

Snow and Ice Removal



Any road salt, sand, or deicing chemical used in your parking lot is

eventually carried to waterways by melting snow. Businesses should use these chemicals carefully and ensure they are properly stored when not in use. When possible, use natural deicing products that are not toxic to plants and animals.



Landscaping, Fertilizer, and Watering

Fertilizers with phosphorus are regulated in Massachusetts, and should only be used when planting a new lawn or if a soil test shows that the lawn needs phosphorus to grow. Chemicals used on lawns can run off into the storm drain, especially when lawns are over-watered, and contribute to pollution in the Nashua River.

Most landscaping in Massachusetts only needs to be watered once per week. Run your sprinklers early in the morning when possible, and make sure they are not watering the sidewalk or parking lot.



Waste and Material Storage

Uncovered dumpsters or material storage areas can contaminate stormwater with bacteria, nutrients like phosphorus, and sediments. All dumpsters and material storage areas should be covered, placed in a confined area, and inspected regularly for signs of leaks.

Operation and Maintenance of Stormwater Best Management Practices (BMPs)

Many businesses and commercial properties have on-site stormwater management systems, or stormwater BMPs, which capture stormwater before it reaches the drainage system or the Nashua River. Typical BMPs include rain gardens and infiltration basins, which allow the ground to slowly absorb stormwater. BMPs must be regularly maintained to work properly. Tell your property manager if you notice any problems with the on-site stormwater system, such as pools of stormwater around catch basins or overgrown infiltration basins.

Questions?

More information is available at:
www.devensec.com
www.devenscommunity.com

WATER QUALITY IN THE NASHUA RIVER

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Did you know – the Nashua River is **impaired** for phosphorus and bacteria, which means that the concentrations of phosphorus and bacteria in the river are higher than state Water Quality Standards?

Did you know – **residential activities** like yard care, car washing, and dog walking contribute to stormwater pollution and can harm water quality?

Here's how Devens residents can help reduce stormwater pollution and improve water quality:



Pet Waste

Pick up after your dog! Pet Waste belongs in the trash, not in the storm drain.



Leaf Litter

Leaves and other yard waste can be bagged for curbside pickup or composted for use as fertilizer. Do not dump leaves in the storm drain: decomposing leaves release excess nutrients into waterbodies, and leaf buildup in the drainage system can cause flooding.



Lawns, Fertilizer, and Watering

Fertilizers with phosphorus are regulated in Massachusetts, and should only be used when planting a new lawn or if a soil test shows that the lawn needs phosphorus to grow. Chemicals used on lawns can run off into the storm drain, especially when lawns are over-watered, and contribute to pollution in the Nashua River.



Grass Clippings

Grass clippings can be bagged for curbside pickup, brought to the Devens DPW, or composted and used for natural fertilizer! Do not dump grass clippings or other yard waste in the storm drain or in waterways.

Questions?

More information is available at:
www.devenscommunity.com/live
www.devensec.com

Buy a Rain Barrel!



You can keep rainwater on your property by connecting rain barrels to your downspouts! Captured rainwater can be used to water the lawn or garden later, and reduces the amount of polluted stormwater that will reach the Nashua River.

Car Care and Maintenance

Fluids and washwater from your car can contribute to stormwater pollution, especially when cars are stored outside. To reduce pollution potential, be sure to recycle motor oil and antifreeze, wash your car over the grass instead of on the driveway, use low-phosphate detergents when washing the car at home, and check for fluid leaks regularly.



Dear Property Owner or Current Resident:

It is important to remember that yard waste, such as leaves, grass clippings, brush and tree branches should not be disposed of in or adjacent to stream beds or wetlands. Even debris left on stream banks can be washed into the stream bed during heavy rains, blocking channels and pipes and leading to flooding. Leaves and yard waste thrown in catch basins and dumped along roadsides can block culverts and pipes causing severe flooding and damage to streets.



In addition to flooding problems, dumping yard waste into or adjacent to streams and wetlands also contributes to water quality degradation. As it decomposes, yard waste can release excessive amounts of nutrients that can seep into and deprive streams of oxygen needed for aquatic life. Fertilizers in grass clippings can cause algal blooms in streams and ponds. Yard waste dumped along stream

embankments can also provide refuge for rodents and stifle plant growth whose roots protect the stream bank from erosion.

If you are planning any vegetation removal, digging or construction activity within 100 feet of a pond, stream, or possible wetland area you should contact the Devens Enterprise Commission at (978) 772-8831 to determine if the activity is regulated.

If you observe dumping of yard waste or any other materials in storm drains, in wetlands or along streams, please call the Devens Department of Public Works at (978) 772-1864 or the Devens Enterprise Commission at (978) 772-8831.

We appreciate your cooperation in helping to keep the Devens environment clean and healthy.



Devens Engineering Department

Devens Department of Public Works

Devens Enterprise Commission



Devens Yard Waste Disposal and Composting

CURBSIDE PICK-UP

- Beginning the first Monday in April through November 30, the DPW will pick up yard waste in residential areas every Monday morning. In the event a holiday lands on a Monday curbside pickup will be the following Tuesday.
- Yard waste includes grass clippings, leaves, and tree limbs.
- Yard waste must be placed at the curb in the front of the house with no trash or sand mixed in.
- Leaves and grass clippings must be packaged in biodegradable paper bags.
- Branches and limbs should be cut into lengths of not more than 4 feet and bundled together.

Christmas trees will be picked up the first two Mondays in January.

COMPOSTING AT HOME

It's easy to compost yard waste and food scraps on your own and the Devens Department of Public Works makes it easier by offering rodent-resistant low-cost home composting bins. DPW has a limited supply available at 99 Buena Vista St. in Devens on a first come first serve basis.

To purchase one, please contact:

Melissa Ouellette
(978) 772-1864
mouellette@massdevelopment.com.

Additional information and details on how to compost can be found at:

<https://tinyurl.com/devenscomposting>

Recycling and Hazardous Waste Disposal Information

Devens Department of Public Works at 99 Buena Vista Street provides a recycling drop off area and also hosts The Devens Regional Household Hazardous Products Collection Center for residents and small commercial businesses in Devens and the surrounding region.

Complete details are available on-line at:

<https://tinyurl.com/devensrecycling>

or by calling Devens Public Works at (978)772-1864.

For more information on these and other topics to help protect and preserve the waters of the Commonwealth refer to <https://www.thinkbluemassachusetts.org/for-residents>

Low-Impact Development Techniques for Stormwater Management at Devens



Total Traditional Project Cost: \$1,004,000

LID Reduced site paving -\$32,000

LID Reduced curbing -\$50,000

LID Reduced stormwater piping -\$14,000

LID Reduced stormwater structures -\$68,000

LID Increased landscaping +\$12,000

LID Increased site preparation +\$10,000

LID Increased soil mix +\$18,000

Total Estimated LID Savings: -\$124,000 (12%)



Apex bio-filtration landscape islands (Phase 1)



Apex bio-filtration landscape islands (Phase 2)

Low-Impact Development Techniques for Stormwater Management at Devens



Greening Infrastructure Upgrades

- Vegetated roadside swales
- Micro-basins (local recharge)
- Native wildflower and grasses (low maintenance, increased infiltration)



Low-Impact Development Techniques for Stormwater Management at Devens



Evergreen Solar bio-filtration landscape islands



Natural open drainage vs. piping and catch basins



Devens Common underground infiltration systems



Devens Common cisterns collecting roof runoff

Pick Up After Your Pet to Protect Water Quality

Pet waste is a form of non-point source pollution that can have devastating impacts. Do your part to protect water quality by picking up after your pet and properly disposing of the waste.

WHY IS PET WASTE A CONCERN?

The majority of water pollution comes from small, cumulative sources. As rain falls on the ground, excess runoff collects, flows, and transports soil, pet waste, salt, pesticides, fertilizer, oil and grease, litter and other pollutants. These pollutants combine together and are referred to as non-point source pollution or NPS. NPS is the leading cause of water quality problems in the US.

WHY PICK UP AFTER MY DOG? WON'T THE RAIN WASH IT AWAY?

There are a lot of pets, producing a lot of waste, and while pet waste is not the most significant pollutant, it can contribute to pollution levels over time. Every time it rains the potential exists for thousands of pounds of pet waste to wash down storm drains and into streams, rivers and lakes. Pet waste may pose a health threat to plants, animals, wetlands and watercourses, as well as fish, swimmers and even other pets. It can pollute the water, cause algae blooms, and lead to beach closures.

HEALTH RISKS POSSIBLY ASSOCIATED WITH PET WASTE

Pet waste can contain bacteria and parasites, causing infections such as the following:

- **Campylobacteriosis:** A bacterial infection that causes diarrhea in humans.
- **Giardiasis:** A protozoan infection of the small intestine that can cause diarrhea, cramping, fatigue, and weight loss.

- **Salmonellosis:** Symptoms include fever, muscle and head aches, vomiting, diarrhea.
- **Toxocariasis:** An animal-to-human infection that is caused by roundworms found in the intestines of dogs. The parasite can cause vision loss, rash, fever, or cough, and is a particular threat to children exposed to parasite eggs in sand and soil.

I ONLY HAVE A SMALL DOG; IT CAN'T REALLY HARM THE WATER, CAN IT?

It can be hard to picture how a single dog depositing a small amount of waste can result in water pollution. However, studies have shown that the combined impact of all pets within a watershed can be significant when it comes to water quality and human health.



BE AWARE

- When animal waste ends up in the water, it decomposes, using up oxygen. During summer months, low dissolved -oxygen levels harm fish and other aquatic life
- Lakes rivers and streams may be closed for fishing or water contact activities if disease-causing bacteria and virus levels are too high. Pet waste can be a cause of test results that close waterbodies to human contact – this includes Mirror lake too!
- Devens requires pet owners to pick up and remove fecal matter from public property. Fines can be imposed on those caught violating these laws.

BUT PET WASTE IS NATURAL?

- However, efficient road drainage systems make it easy for pet waste to travel far and reach wetland and watercourses.
- Waste left on the ground either passes through storm sewers untreated or washes directly into lakes, and streams.
- Pet waste is unpleasant and can pose health risks when left on lawns, parks, sidewalks or other public and private places.
- To make sure your pet isn't contributing to the problem, always clean up after your pet and deposit waste in an appropriate manner. It is not fertilizer.

QUICK TIPS

- Reuse old bags (e.g. grocery, sandwich, newspaper, produce, or bread bags) to pick up and contain pet waste.
- Buy compostable non-plastic bags for more environmentally responsible disposal.
- Keep a supply of bags near your dog's leash. Tie bags onto the leash if you don't have a pocket or pack.

DO MORE TO PROTECT WETLANDS AND WATERCOURSES

- Always carry a bag to pick up your pet's waste.
- Do not throw pet waste near a storm drain; use a trash can. Pet waste can also be flushed down a toilet, but please don't flush the bag.
- Make sure to dispose of pet waste in a sealed bag, so it doesn't spill during trash collection.
- Pick up pet or wildlife waste from your property and properly dispose of it.
- Obey local leash laws.
- Remember:



For More Information:

Devens Enterprise Commission
33 Andrews Parkway
Devens, MA 01434
978.772.8831
www.devensec.com

July 2020



APPENDIX G

Regulatory Mechanisms



RULES AND REGULATIONS

Regulatory Authority: Devens Enterprise Commission

Agency Contact: Peter C. Lowitt

Phone: 978.772.8831 ext 3313

Address: 33 Andrews Parkway, Devens, MA 01434

Massachusetts Register Number 1211

Effective Date: June 2012

974 CMR 1.00: ADMINISTRATION

1.14 : Enforcement

1. Right to Inspect. The DEC, its staff, and consultants shall have the right to enter all properties at Devens at reasonable times, for the purpose of observing and investigating construction and/or operations on the site in regard to enforcement of the Regulations or the By-Laws.

2. Enforcement Powers. The DEC's enforcement powers include:

- (a) withholding of building and occupancy permits;
- (b) power to assess penalties for violations of the Reuse Plan, By-Laws, or 974 CMR in amounts no more than \$300 per day per violation, provided that each day such violation continues shall constitute a separate offense;
- (c) power to institute actions in Court to compel the removal, alteration, or relocation of any structure that violates the Reuse Plan, By-Laws, or 974 CMR;
- (d) zoning enforcement powers;
- (e) enforcement powers available to a zoning board of appeals;
- (f) power to require security for the construction of ways and municipal services to a subdivision that was approved by the DEC;
- (g) powers available to enforce the subdivision control and lotting sections of the By-Laws and the Regulations;
- (h) powers available to the DEC to enforce the Historic District Acts;
- (i) powers provided to the DEC to make and enforce reasonable public health regulations including, but not limited to, the issuance of permits and the assessment of fines related to the violation of the By-Laws and 974 CMR including the removal and transport of garbage or other offensive substances, atmospheric pollution, disposal of cesspool and septic-tank waste, [illicit connections or discharges to the drainage system](#), and the construction, maintenance, and alteration of certain sewage disposal systems; and
- (j) other powers expressly and implicitly conferred on the DEC pursuant to St. 1993, c. 498.

3. Complaint Process.

- (a) Within 14 days of receipt of a written complaint, the Director or Building Official shall investigate, inspect the location, and determine if a violation exists. If no violation is found, the Director or Building Official shall make a written response to the complainant within 14 days explaining the finding.
- (b) If a violation exists, the property owner and offending party shall be notified in writing of the violation and given a specified period of time to correct or eliminate the violation. The complainant shall receive a copy of the notice. At the end of the specified time, the Director or Building Official shall re-inspect and determine whether the violation has been corrected or eliminated. If not, the Director or Building Official shall notify the property owner and offending party in writing that the

violation still exists and may commence the assessment of fines. After continued violation and with the consent of the DEC, Court action may be taken.

(c) If the public health or safety is endangered, the Director shall seek immediate correction and may, with the consent of the DEC, cause a complaint to be filed in Superior Court or in District Court in accord with MGL Chapter 40: Section 21D, Noncriminal Disposition. Alternatively, the DEC may correct the problem and file a complaint in Superior Court to recover the costs of repairs.

4. Wetlands Enforcement Orders.

(a) **Process.** Enforcement Orders for work in the wetlands conducted without an Order of Conditions or done improperly after the issuance of an Order of Conditions may be issued by the DEC. The goal of enforcement is to secure prompt and continued compliance with 974 CMR 4.06 and the Order of Conditions. The DEC oversees work under Superseding and Final Orders issued by DEP and can issue enforcement orders under them.

(b) **Ratification of Enforcement Orders.** The policy of the DEC is to issue Enforcement Orders after a vote at a regularly-scheduled meeting of the DEC, unless the violation is of a very serious or emergency nature. If the Order is issued prior to a vote of the DEC, to remain in effect, said Order must be ratified by the DEC at its next meeting. The Order shall be delivered to the applicant by hand or by certified mail, and shall contain specifics of the violations, required actions, and deadlines for response. Further, it is the role of the DEC to enforce DEP Orders as well as local orders. The DEC shall promptly notify the DEP of all enforcement action taken.

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RULES AND REGULATIONS

Regulatory Authority: Devens Enterprise Commission

Agency Contact: Peter C. Lowitt

Phone: 978.772.8831 ext 3338

Address: 33 Andrews Parkway, Devens, MA 01434

Massachusetts Register Number 881

Effective Date: November 2013

974 CMR 3.00 SITE PLAN

3.02 : Requirements

1. Site Plan Review is required when a proposed project involves one or more of the following:
 - (a) Construction of a new building, regardless of land use;
 - (b) Extension or increase in the area of a nonconforming use in an existing building;
 - (c) Construction or expansion of a parking lot, structure, or loading dock;
 - (d) Construction of an ancillary building on-site (denoting use for storing equipment, maintenance supplies, and similar items, or for housing building systems equipment), if the building contains more than 800 square feet of gross floor area; and
 - (e) Construction of a project that will result in changes to the existing land surface area of 10% or more of the lot size, or that will disturb one acre or more. This includes disturbances of less than one acre that are part of a larger common plan of development that will disturb one acre or more.
 - (f) Construction or improvement(s) of Streets and/or Roads in conjunction with residential developments

2. **Submission Requirements.** When the Site Plan is submitted with other Unified Permit components, submission of duplicate information shall be minimized. Specific submission requirements shall be established by the Director during the scoping session prior to the pre-permitting conference. An Applicant for Site Plan review shall file the following:
 - (a) A completed Permit Submission form.
 - (b) The required Administrative and Peer Review Fee.
 - (c) Seven (7) copies of the Site Plan, unless another number of plans has been specified by the Director. A digital copy of the Site Plan and all supporting information shall also be provided, in a format approved by the LUA.
 - (d) A List of Abutters, certified if abutters are not located in Devens and a sketch plan showing the proximity of the abutters to the site.
 - (e) Stormwater management design and accompanying drainage calculations and Stormwater Operations and Maintenance Plan prepared by an Engineer in accordance with 974 CMR 3.04(4) and 974 CMR 4.08.
 - (f) Request for Determination of Applicability (RFD) or a Notice of Intent (NOI) shall be submitted in accordance with Article XII of the By-Laws and 974 CMR 1.05.
 - (g) Copies of all existing Easements, covenants, restrictions and Institutional Controls applying to the lot.
 - (h) Soil suitability tests and analysis.

- (i) A list of Waivers requested by the Applicant, identified as Waivers of Submission and Plan Form and Contents requirements or Design Standards, with the applicable section of the Regulations clearly identified or a statement that no waivers are being requested.
- (j) Copy of any variance applying to the land, granted or filed concurrently with the Site Plan.
- (k) A narrative demonstrating compliance with the Reuse Plan and By-Laws meeting the specifications of 974 CMR 1.02.
- (l) If proposed by the Applicant, a plan for the phasing of the construction of the required improvements, including a description, schedule, and plan showing the location of each phase.
- (m) A written statement of compliance with the Devens Open Space and Recreation Plan (DOSRP) and the Devens Main Post Trails report dated July 2001, to determine the effects, if any, of proposed development on Resource Areas, proposed trail Rights-of-Way, active and passive recreation areas, and other amenities included in the DOSRP.
- (n) If an Applicant proposes parking lot construction phasing, a written statement demonstrating that the portion to be constructed is sufficient for the needs of the users of the proposed structure, comparing the number of spaces required by the By-Laws to the number the Applicant believes are adequate, written certification that no building or permanent accessory structure will be placed on the area reserved for additional parking spaces, and a draft covenant that the parking will be built when the DEC determines it is required.
- (o) An estimate of the number of vehicle trips daily and for the morning and evening peak periods (trip generation rates shall be based on the ITE "Trip Generation Manual" most recent edition, and, if applicable, data about similar developments in Massachusetts) and a description of traffic mitigation measures proposed including traffic management plans, trip reduction methods, and car/vanpooling preferential parking. The LUA may require a traffic study. In all cases, Applicants shall provide a written statement agreeing to participate in the Devens Transportation Demand Management Program (TDM) to reduce single occupancy vehicle trips and promote alternative forms of transportation.
- (p) An erosion and sedimentation control plan as per 974 CMR 3.04(4) and the Devens Stormwater Pollution Prevention Plan.
- (q) A landscape treatment maintenance and water management plan as per 974 CMR 3.04(8)(m).
- (r) A narrative demonstrating compliance with the Industrial Performance Standards.
- (s) The sustainable sites section of US Green Building Council LEED™ Green Building Rating System™ Checklist (<http://www.usgbc.org/>) most recent version, the remainder of the completed checklist to be submitted when the building permit application is submitted. For residential projects, Applicants shall submit a completed copy of the most recent version of the LEED for Neighborhood Development Checklist (all sections at time of application).
- (t) Building elevations or perspectives of those portions of the building visible from Streets and residential and open space zoning districts showing the general appearance, massing, building materials, proposed colors, and relationship to abutting premises, and, prior to the Public Hearing, the design review letter from Mass Development.
- (u) Building design review materials and if located within the Viewshed District, viewshed impact analysis.
- (v) All Slope Resource Areas as identified in 974 CMR 3.06 Appendix B Figures (13) Figure M within the proposed plan area shall be shown on the site plan.

- (w) Climate change mitigation, adaptation and greenhouse gas emissions mitigation measures in accordance with the requirements of 974 CMR 4.11.
- (x) Residential projects shall comply with the applicable provisions of 974 CMR 2.04, 2.06 and 2.07, 974 CMR 5.00, and include the following:
1. Location and proposed uses of Open Space and a narrative demonstrating compliance with the DOSRP.
 2. List the number of Single, Two-Family, and Multi-Family Dwelling Units, whether they are rental and or for sale, and the number of bedrooms for each Dwelling Unit.
 3. Show on a plan, the location of each type of Dwelling Unit.
 4. Provide model drawings of all housing styles.
 5. List the number and style of Moderate-Income Dwelling Units and show where they will be located.
 6. Provide a narrative and plans of methods (including traffic calming measures) to be used to foster the creation of a Universal Design, pedestrian and bike-friendly community, to control truck and non-resident traffic through the development, and to control vehicle operating speeds at or below the design speed limit(s).
- (y) All project submittals subject to DEC review shall require the stamp and signature of a registered Professional Engineer in the Commonwealth of Massachusetts certifying that the project complies with the requirements of 974 CMR 3.04(4), Stormwater Management Design Standards, and 974 CMR 4.08. General: Stormwater Management.

3. Plan Form and Contents.

- (a) **Surveying and Drafting Plan Requirements.** The Site Plan shall be 24" x 36" and at a scale of 1" = 40', unless an alternative scale is authorized by the Director. The Site Plan must comply with 974 CMR 2.04(3), Plan Form and Contents, and conform to the Registry of Deeds requirements for recording. The Site Plan must also show:
1. The names and addresses of the record owner of the land and the Applicant and the name, seal, and address of the designer, Engineer, Surveyor, and Registered Landscape Architect who made the plan, all of which shall appear in the lower right-hand corner.
 2. The name of the development, scale, date of plan, and legend.
 3. A locus plan indicating the general location of the site in relation to all adjacent and nearby roads, railroads, and waterways.
 4. Ties from the development site to the nearest town and county bounds if within 1000' of the site. Bearings and curve data/distances of all lot lines, names of all adjoining property owners as they appear in the most recent tax list, and the location of Easements, Rights-of-Way, and public and private ways.
 5. Devens Parcel ID number, if available.
 6. Topography for the entire site in 2' intervals with contours and principal elevations of significant existing and proposed features related to the National Geodetic Vertical Datum (NGVD) of 1929. Existing contours shall be shown as dashed lines and, along with all other existing features, shall be screened. Proposed contours are to be shown as solid lines.
 7. A space for the DEC's endorsement of the Site Plan by a majority of the members of the DEC on the front sheet and space for the chairperson or designee to sign all other sheets.
 8. Lines of existing abutting Streets and Roads showing drainage and driveway locations and curb cuts.
 9. ~~Surveyed property lines showing distances and monument locations, all existing and proposed Easements, Rights-of-Way, utilities and other encumbrances, the size of the~~

~~10.9.~~ entire parcel, and the delineation and number of square feet of the land area to be disturbed.

(b) **Administrative Plan Requirements.** The Site Plan shall also include:

1. Zoning district(s) and any boundary of zoning districts within the site, along any existing or proposed lot line, or within 50 feet.
2. The location, dimensions (including height), and general use of all existing and proposed buildings and structures to remain, including ground coverage, gross floor area, open area uses, and other facilities and improvements. Location of buildings existing on the site to be developed and on adjacent land under the same ownership within 500' of the lot line, indicating whether existing buildings are to be retained, modified or removed.
3. A statement noting the area of the site, the percentage of the site to be covered by impervious surfaces (such as buildings and parking areas), the area to be devoted to open space, the area to be paved for Streets, Roads, parking, driveways, loading spaces, and sidewalks, the number of proposed parking spaces and the number required by the By-Laws, the number of employees expected per shift, and the gross floor area of each proposed (commercial, industrial, office, or other) use. This data shall be tabulated to show the relationship of the required versus the proposed quantities.
4. Existing and proposed Front, Side, and Rear Yard setback dimensions.
5. Driveways, parking lots and loading docks, showing entrances and exits designed for safe ingress and egress, curb cuts, layout of parking spaces, aisles, off-street loading facilities, pedestrian walks, bicycle racks or storage facilities, handicap ramps, and representative cross-sections of service and parking areas and driveways.
6. Landscape Treatment:
 - a. Existing and proposed landscape features such as street trees, fences, walls, planting areas, wooded areas, and walks. Scattered trees to be preserved shall also be shown as well as all "specimen trees" (trees exceeding a minimum caliper of 12" within 100' of existing or proposed lot lines have been identified and indicated on the plan. All existing landscape features, especially existing trees and woodland to remain, shall be shown on ALL site plan sheets, such as site preparation and demolition, layout, grading, utilities, and erosion control, as well as planting plans. Landscaping Plans, Planting Plans, Planting Detail sheets, Landscape Maintenance Plans, and Planting Specifications shall be prepared by a Landscape Architect registered in the Commonwealth of Massachusetts and shall bear the seal and signature of the Registered Landscape Architect who prepared them.
 - b. Planting Plans shall indicate the locations of proposed Street, Road and site lighting, even if site lighting is shown elsewhere on a separate plan and designed by separate consultant. Planting plans shall also include details and locations for walks, walls, and fences including dimensions, materials, and finishes.
 - c. Quantities, species, and spacing of plantings in lot setback areas, screens, parking and loading areas, and other landscaped areas shall be shown at a minimum scale of 1"=40'. Detail plans for areas such as landscape treatments adjacent to buildings, tree clusters or shrub beds, landscaped islands in parking areas, or other densely landscaped areas shall be shown at a scale of 1"=20'.
 - d. If an irrigation system is proposed, the Submission shall include an irrigation plan complying with 974 CMR 8.09(11) showing the complete layout and of all components, complete schematic diagrams of all systems, a functional and sequential description of all systems, and irrigation details for installation of all components, including but not limited to piping, valves, valve boxes, sprinkler

heads, backflow preventers, automatic control systems, pumps, meters, associated cabinets, and all appurtenances as needed.

7. Proposed means of fire equipment access.
8. Proposed traffic circulation systems, including the volume and proposed direction of traffic flows into, out of, and within the site for both vehicles and pedestrians for an average day and for peak hours.
9. Location and dimensions (including height) of all storage facilities for equipment, material, and other like items and the location of all aboveground and underground fuel, combustible, and flammable liquid storage tanks greater than two hundred and fifty (250) gallons.
10. Location and dimensions (including height) of facilities for garbage, rubbish, recycling, and other waste collection and disposal.
11. Garage and pedestrian entrances and exits.
12. Maximum size vehicle, including trailers, expected to use the site after construction, by length, width, height, and American Association of State Highway and Transportation Officials (AASHTO) designation.
13. Location and dimensions (including height) of existing and/or proposed free-standing signs and the manner of illumination. All proposed signs shall conform with Article XIII of the By-Laws and 974 CMR 6.00: Sign Control.
14. Existing and proposed public and private utilities, above and below grade, along with their type, size, and class.
15. If the project is to be phased, a plan for the phasing of the construction of the required improvements, including a description, schedule, and plan of affected areas.
16. Any additional details that may be pertinent or required by the Director during the scoping or Pre-Permitting sessions.

(c) Industrial Performance Standards Plan Requirements.

1. The site lighting information shall be provided on the Site Plan, including types of fixtures, heights, wattage, foot candle output directly under the light source, foot candle output at the lot line, and a photometric layout/diagram showing direction and intensity of outdoor lighting. The plan shall also designate which lights (if any) shall remain on overnight (between 11 p.m. and 7 a.m.) to provide adequate illumination for night operations.
2. Notes shall be provided on the Site Plan stating:
 - a. Existing or proposed use will not generate electromagnetic interference to any sensitive receptor. Interference with the Harvard-Smithsonian radio telescope (1400-1720 MHz) is specifically prohibited.
 - b. Proposed or existing use will not cause pronounced, multiple patterns of noise or vibration nuisance to, or interfere with, any sensitive receptor.
 - c. Either "A Massachusetts Department of Environmental Protection (DEP) air quality permit application has been made" or "A DEP air quality permit is not required."
3. Locations or uses deemed by the Director to be sensitive receptors in any given area of impact may be subject to field identification of the receptor and/or special documentation or field data that helps to clarify the existence or absence of subject impacts. This documentation and data includes existing secondary data and studies, limited field testing

by the Applicant, or in the worst case scenario, retention of additional professional consultants to conduct further testing. Specifications for any additional information will be identified by the Director during the pre-permitting conference and shall be incorporated in the Site Plan Submission.

(d) **Resource Areas/Flood Plain Plan Requirements.** The Site Plan shall include:

1. All Resource Areas as defined by 974 CMR 4.06, , Federal Emergency Management Agency (FEMA) flood plain elevations on and/or adjacent to the lot, Flood Insurance Rate Map (FIRM) panel number, zone designation, and base flood elevation;
2. Erosion and Sediment Control Plan in accordance with 974 CMR 3.02(3)(e);
3. Location of all private wells on or within 200' of the boundaries of the property;
4. Location of all public and community water supply wells on or within 1,000' of the boundaries of the property;
5. Proposed conservation restrictions and Easements, if any;
6. For any site plan that stores fuel, combustible and flammable liquids, as defined by 42 U.S.C. section 6901-6922i, G.L. c. 148, and 527 CMR 9.00, compliance with 974 CMR 4.09 and an addendum to the DSPCC and the location of on-site materials and equipment for spill response in accordance with its specific DSPCC are required.

(e) All site plan submissions shall include an Erosion and Sediment Control Plan containing sufficient information to describe the nature and purpose of the proposed development, pertinent conditions of the site and the adjacent areas, and proposed erosion and sedimentation controls. The plan shall include such detail as is necessary to demonstrate that the proposed development will comply with Massachusetts Department of Environmental Protection Stormwater Management Standards, the Devens Stormwater Pollution Prevention Plan and 974 CMR 3.04 design standards. The Erosion and Sediment Control Plan shall also include the following:

1. Location and description of Resource Areas including:
 - a. Watercourses and water bodies, wetlands (including a 100' upland review area, riparian zones and all floodplain information, including the 100-year flood elevation based upon the most recent Flood Insurance Rate Map;
 - b. Existing vegetation including tree lines, shrub layer, ground cover and herbaceous vegetation, and trees with a caliper 12" or larger, noting specimen trees and forest communities;
 - c. Habitats mapped by the Massachusetts Natural Heritage & Endangered Species Program as Endangered, Threatened or of Special Concern, Estimated Habitats of Rare Wildlife and Certified Vernal Pools, Potential Vernal Pools, and Priority Habitats of Rare Species within 500' of any construction activity.
2. Existing soils (type, hydrologic group, erodibility) and the volume and nature of imported soil materials.
3. Drainage patterns, watersheds and sub-watersheds, with calculations of proposed land disturbance within each sub-watershed and areas of soil to be disturbed in each watershed throughout the duration of the proposed land disturbance activity.
4. A description of construction and waste materials expected to be stored on-site. The Plan shall include a description and details of controls to reduce pollutants from these materials, including storage practices to minimize exposure of the materials to stormwater, and spill prevention and response.

5. Location and details of all erosion and sediment control measures with a narrative of the construction sequence/phasing of the project, including both Operation and Maintenance for structural and non-structural control measures and best management practices, interim grading, and material stockpiling areas in accordance with the Devens Stormwater Pollution Prevention Plan and Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas. Such narrative and Operation and Maintenance Plan for temporary and permanent erosion control measures during Construction, shall be included on the erosion and sediment control plan and include but not be limited to, the following requirements:
- a. Prior to any land disturbance activities commencing on the site, the Applicant/contractor shall be responsible for physically marking the limits of construction on the site with tape, signs, or orange construction fence, so that workers understand the areas to be protected. The physical markers shall be inspected daily and repaired as necessary throughout the duration of the project.
 - b. Perimeter sediment control system shall be installed prior to soil disturbance and maintained to contain soils on-site. Areas outside of the perimeter sediment control system must not be disturbed unless the Applicant has obtained prior approval from the DEC.
 - c. Measures shall be taken to control erosion within the project area. Sediment in runoff water shall be trapped and retained within the project area and street sweeping of adjacent Streets and Roads shall be included where necessary.
 - d. All Resource Areas shall be protected from sediment.
 - e. Monitoring and maintenance of erosion and sediment control measures throughout the course of construction shall be required. Sediment shall be removed once the volume reaches $\frac{1}{4}$ to $\frac{1}{2}$ the height of the erosion control.
 - f. Divert runoff from offsite and undisturbed areas away from construction to minimize soil erosion and sedimentation on and off-site. Temporarily stabilize all highly erodible soils and slopes immediately.
 - g. Land disturbance activities exceeding ~~two-one~~ acres in size shall not be disturbed without a sequencing plan that requires stormwater controls to be installed and exposed soils stabilized, as disturbance beyond the ~~two-one~~ acres continues. A construction phasing plan, including erosion and sediment control plan for each phase, shall be submitted to the DEC prior to any construction on the site. Mass clearings and grading of the entire site shall be avoided.
 - h. Soil stockpiles must be stabilized or covered at the end of each workday. Stockpile side slopes shall not be greater than 2:1. All stockpiles shall be surrounded by sediment controls.
 - i. Disturbed areas remaining idle for more than 14 days shall be temporarily or permanently stabilized.
 - j. Permanent seeding shall be undertaken in the spring from March through May, and in late summer and early fall from August to October 15. During the peak summer months and in the fall after October 15, when seeding is found to be impractical, an appropriate temporary mulch and/or non-asphaltic soil tackifier with winter rye shall be applied. Permanent seeding may be undertaken during the summer if plans provide for adequate mulching and watering.
 - k. Anti-tracking pad(s) shall be constructed at all entrance/exist points of the site to reduce the amount of soil carried onto roadways and off the site. Dust shall also be controlled at the site.

- l. All slopes steeper than 3:1 (h:v, 33.3%), as well as perimeter dikes, sediment basins or traps, and embankments must, upon completion, be immediately stabilized with sod, seed and anchored straw mulch, or other approved stabilization measures.
 - m. Temporary sediment trapping devices must not be removed until permanent stabilization is established in all construction areas associated with the project. Similarly, stabilization must be established prior to converting temporary sediment traps/basins into permanent (post-construction) stormwater management facilities. All facilities used for temporary measures shall be cleaned and re-stabilized prior to being put into final operation.
 - n. All temporary erosion and sediment control measures shall be removed after final site stabilization. Disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized within 30 days of removal.
6. Other applicable controls and/or information as may be required by the DEC.
 7. All plans, reports and calculations required as part of the erosion and sediment control plan must be stamped and certified by a professional engineer.
 8. Projects disturbing one acre or more are required to obtain a Construction General Permit (CGP) from the US EPA. A copy of the CGP must be filed with the DEC prior to issuance of a building permit for all applicable projects.

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974 CMR 4.00 INDUSTRIAL PERFORMANCE STANDARDS AND GENERAL REGULATIONS

4.08 General: Stormwater Management**1. Objectives:**

- (a) To replicate natural conditions of infiltration, evapotranspiration, and runoff. In typical natural conditions, approximately 50 percent of stormwater infiltrates, 40 percent leaves land through evapotranspiration, and ten (10) percent leaves the land as runoff.
- (b) To promote decentralized stormwater management systems modeled after natural hydrologic features and infiltration practices that facilitate local groundwater recharge [Low-Impact Development (“LID”) techniques].
- (c) To promote water conservation and efficiency through stormwater capture, treatment and reuse.

2. General Provisions.

(a) The stormwater design standards and criteria shall apply to all projects under DEC review.

~~(a)~~(b) All Applications, regardless of whether the project is subject to the Wetlands Protection Act or not, shall design the stormwater management system in compliance with the Massachusetts DEP Stormwater Management Standards, January, 2008, as amended (“SMS”) and the Massachusetts Stormwater Handbook, February 2008, as amended (“Handbook”). The Applicant shall submit a completed and endorsed Stormwater Management Form that indicates compliance with the SMS, in addition to any supporting calculations indicating compliance with the required standards.
<http://www.mass.gov/dep/water/laws/policies.htm#storm>.

~~(b)~~(c) Stormwater management systems shall comply with the following:

- i. The Handbook which includes the SMS, Stormwater Best Management Practices, Documenting Compliance, Stormwater Report Checklist and TSS Removal Calculation Sheet.
- ii. Devens Stormwater Pollution Prevention Plan (Stormwater Plan).
- iii. Devens Water Resources Protection Report.

iv. The Design Standards and Criteria outlined in §4.08(3) .

~~(e)~~(d) _____ Where there is a conflict between the requirements set forth below and the Handbook and/or Plan, the Plan and the requirements below shall govern.

- i. There shall be no negative impact from stormwater runoff on abutting properties and to any public or private water supply or designated potential future supply.
- ii. Irrigation water shall be derived from detained treated stormwater (stormwater harvesting), or roof drainage to the maximum extent feasible. On-site cisterns may be installed to store water for irrigation.
- iii. For all stormwater improvements, drainage calculations shall be prepared by the Applicant's Engineer in accordance with the SMS requirements and shall include design criteria, pre- and post-development drainage areas, and other information to verify the size and effectiveness of the proposed stormwater management technique. "Pre-development" drainage areas shall be considered to be "green fields" regardless of any development or improvements on the site at the time of application. Calculations shall be made separately for each drainage facility, showing its location, the total upstream drainage area, the underlying soil types and the flow paths for the times of concentration, the design runoff, facility size, slope, and capacity and velocity of water through all the site drainage system.
- iv. Proposed activity that will temporarily or permanently disturb any land area at or below the elevation of the 100-year floodplain shall be avoided to the maximum extent feasible unless there are exceptional circumstances where such areas cannot be avoided. Under such circumstances, the Applicant shall demonstrate, to the satisfaction of the DEC, that there shall be no temporary or permanent loss of flood storage area. For any areas within the 100-year floodplain where the DEC authorizes disturbance, temporary stabilization measures shall be implemented at all times, until permanent stabilization is achieved. No construction laydown areas or equipment shall be stored within the 100-year floodplain without emergency removal/relocation measures in place and approved by the DEC.
- v. Recharge may not be required for land designated as an Area of Concern, if, according to the Base Closure Team in accordance with Base Realignment and Closure Act requirements, recharge will negatively impact ongoing environmental remediation.

vi. All projects, including flood management and culvert replacement projects, shall incorporate LID techniques for stormwater management to the maximum extent feasible. For projects proposing traditional closed drainage systems, the Applicant shall demonstrate to the satisfaction of the DEC why LID stormwater management design methods are not feasible. For LID stormwater controls not referenced in this section (974 CMR 4.08) or the Handbook, or for which pollutant removal rates have not been provided, the effectiveness and pollutant removal of the structural control must be documented through prior studies, literature reviews, or other means and receive approval from the DEC before being included in the design of a stormwater management system.

- In addition to LID controls outlined in this section (974 CMR 4.08) or the Handbook, flood management and culvert replacement projects shall assess, and to the maximum extent feasible implement, stream daylighting¹ and improved channel connectivity².

3. **Design standards and criteria:** All stormwater management systems shall meet the following:

(a) Biofiltration basins shall be the preferred method to reduce curbing, piping and structures and provide additional overland treatment and recharge. They shall be designed in accordance with the Handbook, in addition to the following:

1. Any low-flow outlets shall be designed to prevent clogging.
2. For bioretention cells, abutting pavement, that are designed to capture sheet flow, the edge of pavement shall be reinforced to ensure the integrity of pavement is maintained (curb stops, stone, turf, landscape timbers, plantings or other acceptable methods or combination thereof.)

(b) All projects shall manage all stormwater onsite, unless granted an exemption by the DEC that this requirement is not feasible.

- i. If a project is granted an exemption under §4.08(3)(b), all stormwater runoff from the site must satisfy the requirements of 974 CMR 3.04(4)(b) before being discharged to the Devens Municipal Separate Storm Sewer System (MS4).

¹ “Stream daylighting” means the practice of exposing some or all of a previously buried river, stream, and/or stormwater drainage and restoring the watercourse to a more natural condition.

² “Channel connectivity” means the degree to which hydrologic components of a river system or watershed are joined, or connected, by various transport mechanisms including streams, non-tidal wetlands, riparian buffers, or underground aquifers.

ii. If a project is granted an exemption in accordance with §4.08(3)(b)(i), the developer of the project shall propose a Mitigation Project to be implemented as a component of project approval, and the DEC will publicize the project's annual Total Suspended Solids (TSS) removal worksheets on the DEC's website. A "mitigation project" shall mean an infrastructure project designed to mitigate adverse water quality impacts from a previously completed project, or from an area which has no stormwater treatment and management facilities, by improving the quality of stormwater runoff onsite or at an off-site location.

~~(b)~~(c) In addition to compliance with the SMS, the post-development peak rate of stormwater discharge off-site shall not be greater than the pre-development peak rate of stormwater discharge for the 2, 10, 25, 50 and 100-year storm events from any point of discharge on the site. In accordance with Section 2.d.iii. above, pre-development peak rate calculations shall reflect the "green field" site condition, regardless of any existing development or impervious coverage on the site at the time of application.

~~(e)~~(d) There shall be no stormwater structures and/or point source discharges within 25 feet of the boundaries of any Resource Area unless the Applicant can demonstrate no adverse impact to the Resource Area.

~~(d)~~(e) Side slopes above the design water level shall be 3:1 (horizontal to vertical) or flatter and conform to the slope of the existing topography without abrupt or unnatural breaks in slope, unless otherwise permitted under 974 CMR 4.08(4).

~~(e)~~(f) Banks of wet ponds, swales not within maintained landscaped areas (such as lawns or parking lots), and other channels shall be vegetated with native woody plant material within ten feet of the high water elevation and with herbaceous plant material at the edge of the pond at the high water elevation. Trees shall not be planted on fill embankments.

~~(f)~~(g) Shelves below the design water level (as described in the Stormwater Plan) shall be vegetated with hydrophytic native plant species at a density needed to establish full coverage by the next growing season. Plant plugs or pre-vegetated coir-mesh blankets or carpets are recommended materials.

~~(g)~~(h) Recommended post-construction erosion control methods include geotextile and /or biodegradable erosion control fabrics staked or anchored to the slope, with loose weave to allow vegetative cover to be established. Vegetative cover shall consist of native woody plant species installed as live brush or nursery stock, or native grasses.

~~(h)~~(i) Stormwater management systems shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 60% of the average annual load of Total Phosphorus (TP) related to the total post-construction area on the site³.

- i. Average annual pollutant removal requirements in §4.08(-3)-(h) are achieved through one of the following methods:
- Installing BMPs that meet the pollutant removal percentages developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved design guidance or performance standards (e.g. the Handbook) may be used to calculate BMP Performance; or
 - Retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface on the development site, or
 - Meeting a combination of retention and treatment that achieves the above standards; or
 - Utilizing offsite mitigation in accordance with §4.08(3)(b) that meets the above standards within the same USGS HUC12 as the development site.
- ii. Maintenance and redevelopment activities related to existing roads including repaving, drainage infrastructure improvements, adding shoulder, or correcting intersections shall be exempt from other requirements in this part. Projects of this nature should consider options to improve any existing conditions by incorporating LID techniques or other stormwater best management practices and include in the construction permit application process a narrative describing that investigation's conclusions and chosen results when possible. Any road construction that increases the impervious surface by more than a single land width will not be covered under this exemption and shall be subject to all requirements in §4.08.3.(h).

~~(i)~~(j) To support compliance with the MS4 Permit, all BMPs must be optimized for the removal of phosphorus. The justification and design of such BMPs must also include a methodology for assessing BMP performance. Pollutant removal shall be consistent with EPA Region 1's evaluation tool.

³ Pollutant removal is calculated based on average annual loading and not on the basis of any individual storm event.

4. **Design standards and criteria for detention/retention/recharge basins:** The design of stormwater and infiltration basins and associated structures shall:
- (a) Minimize basin size to 5,000 square feet per basin or less (by using smaller catchment areas and/or alternative stormwater management design methods) and minimize disturbance to natural or re-established vegetated areas to the maximum extent feasible. If a basin exceeds 5,000 square feet, the Applicant shall demonstrate to the satisfaction of the DEC why a smaller size is not feasible. If a basin is a constructed stormwater wetland, it may exceed 5,000 square feet upon approval by the DEC. Constructed stormwater wetlands shall be designed in compliance with the SMS.
 - (b) Be located in naturally occurring low spots. Layout of the basins shall complement the natural topographic movement of the site [see 974 CMR 3.08(4) Figure D)] Rigid basin layout [see 974 CMR 3.08(5) Figure E] shall be avoided in all instances unless the basin's layout complements the overall design concept of the Site Plan.
 - (c) Utilize banks steeper than 3:1 (horizontal to vertical) only to tie into headwall/outfall structures. Banks steeper than 3:1 shall transition to slopes of less than 3:1 as quickly as possible to minimize areas of potential erosion. Specific post-construction erosion control methods shall be detailed to ensure temporary and permanent stabilization of such areas will be achieved. Rip-rap/trap rock solutions shall not be acceptable, except as water dissipaters below storm water outfalls or as channel liners for steep swales.
 - (d) Have an emergency outlet to accommodate storm flows in excess of the 100-year storm event. A minimum 1-foot freeboard distance shall be established between the 100-year flood elevation and the top of embankment.
 - (e) Design basins/infiltration structures using the Natural Resource Conservation Service TR-20 methodology in accordance with the SMS.
 - (f) Locate the floor of all basins/infiltration structure/swales a minimum of four feet above the high groundwater elevation. High groundwater testing shall be conducted before the basin design at the proposed location of each basin in compliance with Title V (310 CMR Section 15.103), as most recently amended or reliable data pursuant thereto shall be provided.

- (g) Conduct a falling head soil permeability test in retention/infiltration basins before the basin design in all basins and infiltration structures. Soil with a percolation rate of 2 minutes per inch or faster can be used to confirm the first NRCS Hydrologic Soil Group A with a Texture Class of Sand and an infiltration rate of 8.27 Inches per hour from the Rawls, et.al. table in the SMS. To use infiltration rates faster than 8.27 inches per hour, use 50% of the infiltration rate obtained from the falling head soil permeability test.

- (h) Conduct percolation tests in detention basins before the basin design and shall be conducted in compliance with Title V (310 CMR Section 15.105), as most recently amended.

- (i) Include fencing and/or screening of stormwater detention/retention basins if the DEC determines that safety or appearance require such measures.

5. Design Standards and Criteria for Certain Structural LID Techniques:

- (a) Vegetated Roofs - shall comply with the Handbook and the DEC Policy for Construction of Vegetated Roofs dated August 2011, as amended.
 - 1. For the purposes of stormwater management system design, the area of roof covered by vegetation may be considered pervious and subtracted from the total proposed impervious area.
 - 2. Vegetated Roofs within the Viewshed Overlay district shall comply with 974 CMR 3.04(8) (i) 5 and 6.
 - 3. Landscaping plans for projects incorporating vegetated roofs and/or walls shall show the design and location of vegetated roofs and walls.

- (b) Permeable paving [Porous asphalt, paving stones and pervious concrete] - May be used where the underlying soils have a permeability of at least 0.3" per hour but shall not be used on high-traffic/high speed areas or on stormwater "hotspots" with high pollutant loads. Permeable paving shall meet the SMS specifications (or alternatives approved by the DEC), in addition to the following:
 - 1. Lined on the sides with a non-woven geotextile fabric to prevent influx of fines (no liner on bottom).

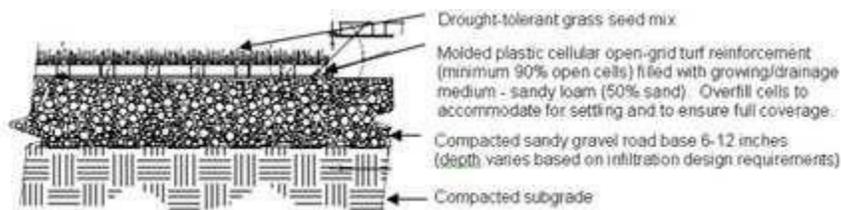
2. A gravel trench surrounding the edge of the pavement connecting to the stone reservoir below the surface of the pavement may be required as a backup in the event of surface clogs.
3. Installed by a qualified contractor with experience in permeable paving installation.
4. Specification layer depths required by the SMS may be increased based on volume storage requirements

(c) Additional Requirements for Pervious concrete –

1. Top layer: 6 inches of pervious concrete placed in two 3-inch courses.
2. Second layer: 4 inch course consisting of 1-1/3 inch crushed stone (structural support).
3. Third layer: 14 inches of open graded “bank run gravel” (Reservoir base).
4. Fourth layer: 6 inches of 3/8” crushed gravel (Capillary barrier).

(d) Reinforced Turf Parking/Emergency Access - May be constructed where the underlying soils have a permeability of at least 0.3” per hour but shall not be used on high-traffic/high speed area or on stormwater “hotspots” with high pollutant loads. Turf parking shall be designed to meet the SMS and the following specifications:

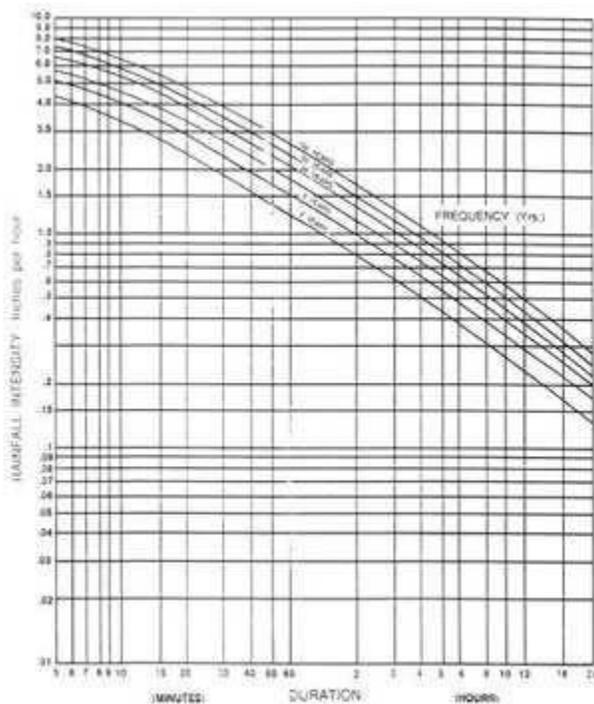
~~(d)~~



Alternative comparable reinforcement methods will be considered by the DEC on a case by case basis.

6. Closed Drainage Systems.

- (a) LID swale systems shall be utilized in parking lots not subject to truck traffic, truck and container storage, and other railroad related vehicles/equipment, to the maximum extent feasible.
- (b) Closed Drainage Systems (CDS) and swales shall be designed to accommodate the 25-year storm event based on the Rational Method without surcharging. The CDS shall be designed in accordance with the SMS. Intensity/duration/frequency curves for the Worcester area, as presented in Technical Paper 40 of the National Weather Service and the Massachusetts Hydrology Handbook for Conservation Commissioners, March 2002, as amended, shall be used in the drainage design calculations. The minimum time of concentration shall be five minutes.



Intensity – Duration – Frequency Curve for Worcester, MA

- (c) All drainage structures shall be constructed of pre-cast concrete.

- (d) Catch basins shall have oil traps and provide a four-foot sump.
- (e) Details for all drainage structures shall be provided.
- (f) Flow capacities shall be calculated, using two feet per second (fps) minimum velocity and 10 fps maximum velocity under a 2-to-25 year design storm event. The designer shall account for partial pipe flow capacities, if applicable to the design.
- (g) Catch basin to catch basin connections are prohibited in paved areas.
- (h) Sub-surface infiltration systems are considered closed drainage systems and shall at a minimum meet an 80% TSS removal rate prior to infiltration to reduce maintenance and potential for system failure and replacement

7. **Monitoring and Maintenance of Stormwater Facilities. An Operation and Maintenance Plan (O&M Plan) for stormwater management** systems is required at the time of application for all projects. The O&M Plan shall be designed to ensure compliance with the Massachusetts Surface Water Quality Standards (314 CMR 4.00), the Stormwater Plan and the DEC annual stormwater reporting form requirements. The O&M Plan shall be shown on the site plan(s) and shall include at a minimum the following:

- (a) The name(s) of the owner(s) for all components of the system.
- (b) A statement that the Applicant is responsible for the operation and maintenance of the entire on-site system, including emergency repairs.
- (c) If applicable, a statement providing stormwater management easements to the DEC as necessary for access for facility inspections and maintenance, and preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event. The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.
- (d) An O&M Inspection and Maintenance Schedule which shall include:
 1. Parking Lot Sweeping: with mechanized cleaning equipment on an annual basis.

2. Catch Basin Cleaning: Catch Basins and Infiltration Chambers shall be inspected on a bi-annual basis. Any sediment accumulations in excess of half of the unit's sump depth shall be removed. Material shall be removed by a licensed contractor, who shall be responsible for disposing of the material off-site in a manner consistent with all local, state and federal regulations.
3. Infiltration Swales: Ensure proper establishment of full vegetative cover. Swale embankments and side slopes must be properly maintained to ensure long-term stability. Annual and seasonal inspections are required to ensure a healthy groundcover is maintained to avoid erosion and promote infiltration. Bare spots shall be repaired and planted with native ground cover material. Saplings and large shrubs shall be removed to maintain integrity of the swale. Level spreader shall be inspected seasonally to remove any build up of sediment and ensure proper drainage flows.
4. Detention/Retention Basin Inspection and Maintenance: Wet and dry basins shall be inspected annually to ensure inlets and outlets remain unobstructed. Inlets and outlets and forebays shall also be inspected for potential sediment, erosion, cracking, tree growth, damage to the emergency spillway and erosion within the basin and on within the banks. Upper side slopes, embankment and emergency spillway shall be mowed annually. Any tree saplings shall be removed. Accumulated sediment shall be removed as necessary and at least once every ten years. Bare spots shall be repaired and planted with native ground cover material.
5. Biofiltration Systems: Quarterly inspections for accumulated sediment shall be performed. Debris, sediment accumulation, erosion shall be removed/repared at least twice a year. Any dead or damaged plantings shall be replaced. All invasive species shall be removed on an annual basis. Re-mulch any void areas by hand. Native grasses and plants shall be maintained by hand without the use of fertilizers and limited use of organic herbicides. Trimming of surrounding grasses shall be restricted to a minimum of 5 inches. When cation exchange capacity of soil media decreases, the soil media shall be replaced to prevent contaminants from reaching the groundwater.
6. Sediment Trap/Oil-Water Separator: Shall be inspected annually for sediment and debris accumulation. Any sediment accumulations in excess of half of the unit's sump depth shall be removed. Material shall be removed by a licensed contractor, who shall be responsible for disposing of the material off-site in a manner consistent with all regulations.

7. Sub-Surface Infiltration Systems: Shall be inspected annually for proper function and sediment accumulation. Accumulations of sediment and/or materials that negatively impact the infiltration capacity of the system shall be removed.

8. Constructed Stormwater Wetlands: In the first three years after construction, Applicants shall inspect the constructed stormwater wetlands twice a year during both the growing and non-growing seasons. After three years such inspections shall occur on a periodic basis. During these inspections, the following information shall be recorded:
 - a. The types and distribution of the dominant wetland plants in the marsh;
 - b. The presence and distribution of planted wetland species;
 - c. The presence and distribution of invasive wetland species (invasives shall be removed);
 - d. Indications that other species are replacing the planted wetland species;
 - e. Percentage of standing water that is unvegetated (excluding the deep water cells which are not suitable for emergent plant growth);
 - f. The maximum elevation and the vegetative condition in this zone, if the design elevation of the normal pool is being maintained for wetlands with extended zones;
 - g. Stability of the original depth zones and the micro-topographic features; and
 - h. Accumulation of sediment in the forebay and micropool; and survival rate of plants (cells with dead plants must be replanted). Sediment forebays must be cleaned annually.

- (e) Applicants shall submit annual stormwater monitoring and maintenance reports to the DEC addressing inspection and maintenance of the BMPs. The reports shall include:
 1. Descriptions of the condition of the BMPs,
 2. Descriptions of maintenance performed and,
 3. Receipts for maintenance performed.

For ease of reporting, the DEC and MassDevelopment have created standard annual reporting templates for use by all Applicants. Failure to submit the required annual report is a violation of the Unified Permit.

- (f) The O&M Plan must be signed by the owner and must include a provision that the transfer of responsibilities is understood by future owners.

8.10 Severability Discharges to the Public Storm Drain System.
If any provision of 974CMR 8.00 is held unconstitutional, invalid or void, it shall not effect any other provision of 974 CMR 8.00 or the administration thereof. Increased and contaminated stormwater runoff is a major cause of impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater; contamination of drinking water supplies; alteration or destruction of aquatic and wildlife habitat; and flooding. Regulation of illicit connections and discharges to the municipal storm drain system is necessary for the protection of waterbodies and groundwater within the Devens Enterprise Zone, and to safeguard public health, safety, welfare and the environment.

(1) Purpose:

- a. To prevent pollutants from entering the public or municipal separate storm sewer system (MS4) within the Devens Enterprise Zone;
- b. To prohibit illicit connections and unauthorized discharges to the MS4;
- c. To require the removal of all such illicit connections;
- d. To comply with state and federal statutes and regulations relating to stormwater discharges; and
- e. To establish the legal authority to ensure compliance with the provisions of this section through inspection, monitoring, and enforcement in accordance with 974 CMR 1.14.

(2) Definitions:

Authorized Enforcement Agency: The Devens Enterprise Commission (hereafter the DEC), the Massachusetts Development Finance Agency (MassDevelopment), or their staff or consultants designated to enforce these regulations in accordance with §1.14.

Best Management Practice (BMP): An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of stormwater runoff.

Clean Water Act: The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) as hereafter amended.

Discharge of Pollutants: The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

Groundwater: Water beneath the surface of the ground.

Illicit Connection: A surface or subsurface drain or conveyance, which allows an illicit discharge into the municipal storm drain system, including without limitation sewage, process wastewater, or wash water and any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved before the effective date of this regulation.

Illicit Discharge: Direct or indirect discharge to the municipal storm drain system that is not composed entirely of stormwater, except as exempted in Section 6. The term does not include a discharge in compliance with an NPDES Storm Water Discharge Permit or a Surface Water Discharge Permit, or resulting from fire-fighting activities exempted pursuant to Section 6, subsection 4, of this regulation.

Impervious Surface: Any material or structure on or above the ground that prevents water infiltrating the underlying soil. Impervious surfaces include without limitation roads, paved parking lots, sidewalks, and rooftops.

Municipal Separate Storm Sewer (MS4) or Municipal Storm Drain System: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the DEC.

National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit: A permit issued by United States Environmental Protection Agency or jointly with the State that authorizes the discharge of pollutants to waters of the United States.

Non-Stormwater Discharge: Discharge to the municipal storm drain system not composed entirely of stormwater.

Person: An individual, partnership, association, firm, company, trust, corporation, agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

Pollutant: Any element or property of sewage, residential, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment

works or waters of the Commonwealth. Pollutants shall include without limitation:

- paints, varnishes, and solvents;
- oil and other automotive fluids;
- non-hazardous liquid and solid wastes and yard wastes;
- refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnances, accumulations and floatables;
- pesticides, herbicides, and fertilizers;
- hazardous materials and wastes; sewage, fecal coliform and pathogens;
- dissolved and particulate metals;
- animal wastes;
- rock, sand, salt, soils;
- construction wastes and residues; and
- and noxious or offensive matter of any kind.

Process Wastewater: Water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any material, intermediate product, finished product, or waste product.

Recharge: The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

Stormwater: Storm water runoff, snow melt runoff, and surface water runoff and drainage.

Surface Water Discharge Permit: A permit issued by the Department of Environmental Protection (DEP) pursuant to 314 CMR 3.00 that authorizes the discharge of pollutants to waters of the Commonwealth of Massachusetts.

Toxic or Hazardous Material or Waste: Any material, which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as Toxic or Hazardous under G.L. Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

Uncontaminated Pumped Groundwater: Discharges of pumped groundwater which has not come into contact with any Pollutants as

described above. Such discharges must originate outside of a structure (residence, commercial building, etc.) to meet the exemption criteria outlined in Section 6.

Watercourse: A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

Waters of the Commonwealth: All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and groundwater.

Wastewater: Any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning, or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

- (3) Applicability. This regulation shall apply to flows entering the public storm drain system.
- (4) Responsibility for Administration. The DEC and MassDevelopment shall administer, implement, and enforce this regulation. Any powers granted to or duties imposed upon the DEC or MassDevelopment may be delegated in writing by the DEC or MassDevelopment to its employees or agents.
- (5) Prohibited Activities.

 - a. Illicit Discharges. No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into the public storm drain system, into a watercourse, or into the waters of the commonwealth.
 - b. Illicit Connections. No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation, or custom at the time of construction.
 - c. Obstruction of the Public Storm Drain System. No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without prior written approval from the DEC.
 - d. Sump Pump Discharges. Discharges of a sump pump to the storm drain system are prohibited unless a permit has been obtained from MassDevelopment's Public Works Department.

- (6) Exceptions. The following non-stormwater discharges or flows are exempt from the prohibition of non-stormwater discharges provided that the source is not a significant contributor of a pollutant to the public storm drain system:
- a. Discharge or flow from fire-fighting activities;
 - b. Waterline flushing;
 - c. Flow from potable water sources;
 - d. Springs;
 - e. Natural flow from riparian habitats and wetlands;
 - f. Diverted stream flow;
 - g. Rising groundwater;
 - h. Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater;
 - i. Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems), crawl space pumps, or air conditioning condensation;
 - j. Discharge from landscape irrigation or lawn watering;
 - k. Water from individual residential car washing;
 - l. Discharge from dechlorinated swimming pool water (less than one ppm chlorine) provided the water is allowed to stand for one week prior to draining and the pool is drained in such a way as not to cause a nuisance;
 - m. Street wash waters;
 - n. Residential building wash waters without detergents;
 - o. Non-stormwater discharges permitted under an NPDES permit or a Surface Water Discharge Permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency or the Department of Environmental Protection, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations; and
 - p. Discharge for which advanced written approval is received from the DEC or MassDevelopment as necessary to protect public health, safety, welfare or the environment.
- (7) Emergency Suspension of Storm Drain System Access. The DEC or MassDevelopment, or their employee, agent, or other authorized party may suspend access to the public storm drain system to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened discharge of pollutants that presents imminent risk of harm to the public health, safety, welfare or the environment. If any person fails to comply with an emergency suspension order, the Authorized Enforcement Agency may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

(8) Notification of Spills. Notwithstanding other requirements of local, state or federal law, as soon as a person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information or suspects a release of materials at that facility or operation resulting in or which may result in discharge of pollutants to the public storm drain system or waters of the Commonwealth, the person shall take all necessary steps to ensure containment, and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the Devens Fire and Police Departments, the DEC, and MassDevelopment. In the event of a release of non-hazardous material, the reporting person shall provide the Authorized Enforcement Agency written confirmation of all telephone, facsimile or in-person notifications within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain a written record of the discharge and the actions taken to prevent its recurrence onsite. Such records shall be retained for at least three years.

(9) Enforcement.

- a. The DEC, its staff, and consultants, shall enforce this regulation, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.
- b. Civil Relief. If a person violates the provisions of this regulation, notice, or order issued thereunder, the DEC may seek injunctive relief in a court of competent jurisdiction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.
- c. Orders. The DEC, its staff, and consultants may issue a written order to enforce the provisions of this regulation, which may include:
 - i. Elimination of illicit connections or discharges to the public storm drain system;
 - ii. Performance of monitoring, analyses, and reporting;
 - iii. That unlawful discharges, practices, or operations shall cease and desist; and
 - iv. Remediation of contamination in connection therewith.

If the enforcing person or entity determines that abatement or remediation of contamination is required, the order shall set forth a deadline by which such abatement or remediation must be completed. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the DEC may, at its option, undertake such work at the expense of the violator. In the case where a violation poses an immediate threat to public health and the environment

and requires emergency repair, the DEC may, at its discretion, perform the necessary repair without administering a written order. Such emergency work will also be conducted at the expense of the violator.

Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the DEC, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the DEC within thirty (30) days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within thirty (30) days following a decision of the DEC affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in MGL Ch. 59, §57 after the thirty-first day at which the costs first become due.

- d. Criminal Penalty. Any person who violates any provision of this regulation, order, or permit issued thereunder shall be punished by a fine assessed by the DEC but not more than \$300. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.
- e. Entry to Perform Duties Under this Regulation. To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the DEC, its staff and consultants may enter upon privately owned property for the purpose of performing their duties under this regulation and may make or cause to be made such examinations, surveys, or sampling as the DEC deems reasonably necessary.
- f. Appeals. The decisions or orders of the DEC shall be final. Further relief shall be to a court of competent jurisdiction.
- g. Remedies Not Exclusive. The remedies listed in this regulation are not exclusive of any other remedies under any applicable federal, state, or local law.

(10) Severability. The provisions of this regulation are hereby declared to be severable. If any provision, paragraph, sentence, or clause, of this regulation or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this regulation.

(11) Transitional Provisions. Residential property owners shall have 60 days from the effective date of this regulation to comply with its

provisions provided good cause is shown for the failure to comply with the regulation during that period.

8.11 Severability

If any provision of 974CMR 8.00 is held unconstitutional, invalid or void, it shall not effect any other provision of 974 CMR 8.00 or the administration thereof.

REGULATORY AUTHORITY

974 CMR 4.00: St. 1993, c. 498.



Devens Enterprise Commission As-Built Record Drawings Policy

As per 974 CMR 3.03(4), the Devens Enterprise Commission (DEC) requires as-built plans be submitted to verify completed construction in accordance with the approved plans. To aid Applicants in meeting this requirement, the DEC has established an "As-Built" procedure. As-Built information shall be provided to the DEC, prior to the issuance of a final Certificate of Occupancy.

All As-Built information shall be obtained by a Professional Land Surveyor based on an on-the-ground survey and completed in accordance with the standards established in 250 CMR 6.00.

As-Built Record Drawings shall consist of:

1. Certification from a registered land surveyor, professional land surveyor, or professional engineer that all construction has been completed in accordance with the approved Development Plan; and
2. A stamped As-Built Plan (Record Drawing) showing the following information:
 - _ Project title/development name
 - _ Date of Plan, site address and parcel number
 - _ Owner's name, address, and telephone number
 - _ Developer's name, address, fax and telephone number
 - _ Date(s) of as-built survey
 - _ North arrow and Scale
 - _ Engineer's and Surveyor's names, address, fax and telephone number
 - _ Engineer's and Surveyor's Stamp and signature
 - _ Surveyors certification stating the following: I hereby certify that the information shown on this/these plan(s) accurately depicts field conditions based on an as-built survey by (*name of as-built surveyor*) performed on (*date of as-built survey*)
 - _ Engineer's certification stating the following: I hereby certify that the as-built information shown on this plan is in conformance with the approved site plans dated (date of latest approved site plan)
 - _ Plan survey datum shall reference Massachusetts State Plane (NAD 83) and National Geodetic Vertical Datum of 1929 (NGVD 1929). This reference shall be shown on the plans.
 - _ Zoning "required vs. actual" table showing zone, all as-built site, building, parking, impervious coverage, setbacks and landscaping requirements
 - _ Property line information-bearings, distances, bounds, etc...
 - _ Label building and provide building information (number of stories, square footage, proposed use, etc...)
 - _ Dimension building setbacks per zoning
 - _ First floor elevation/Sill elevations
 - _ Label all as-built improvements including but not limited to building footprint, curb, sidewalks, ramps, parking lot, retaining walls, fences, guard rail, lighting fixtures, signage, crosswalks, landscaping, etc...
 - _ Provide critical dimensions (lane widths, parking stall widths and depths (typical), curb radius, entrance width, width of sidewalk, etc...)
 - _ Provide driveway spot grades
 - _ Existing topography
 - _ 2' contours clearly labeled
 - _ Label critical slopes
 - _ The survey shall be tied into at least two points on the Devens Survey Control Network. Show location and coordinates of all control points used or set for the project.
 - _ Retaining wall elevations
 - _ Show all utilities including but not limited to water, sewer, drainage, gas, electric, telephone, hydrants, detention basins, etc...
 - _ Label all utility structures including but not limited to manholes, catch basins, gates, valves, shutoffs, detention basin inlet and outlet structures (including elevations of weirs/spillways and extent of rip rap and any other materials)
 - _ Rim elevations
 - _ Invert elevations
 - _ Bottom of sump elevations
 - _ Pipe type, length, diameter, slope
 - _ Show ties to all utility structures including but not limited to manholes, catch basins, gates, valves, shutoffs, etc...

Prior to the issuance of the occupancy permit, one (1) As-Built Plan will be provided to the DEC Director who will compare the As-Built Plans with the approved plans during a site inspection and note any discrepancies or changes. All deficiencies and errors noted by the Director shall be corrected prior to submittal of the final stamped As-Built plans.

Once the Director is satisfied that the project has been constructed according to the approved plan two (2) copies of the stamped As-Built Plan and As-Built Certificate will be provided to the DEC along with two (2) electronic copies in both AutoCAD and PDF format.



OVERVIEW OF DEVENS ENTERPRISE COMMISSION PERMITTING PROCESS PROCEDURES FOR SITE PLAN REVIEW, INSPECTION, AND ENFORCEMENT

Role of the Devens Enterprise Commission (DEC):

The DEC acts as the regulatory and permitting authority for the Devens Regional Enterprise Zone. It functions as a Board of Health, Conservation Commission, Zoning Board of Adjustment, and Planning Board. It carries out these duties in the context of a unique and innovative one-stop, or unified permitting system, which greatly streamlines the local regulatory process. Section 9 of Chapter 498 of the Acts of 1993, which created the DEC, lists the complete roles and responsibilities of the Commission [http:// www.devensec.com/devserv.html](http://www.devensec.com/devserv.html). There are twelve DEC commissioners. Six commissioners are nominated by Ayer, Harvard, and Shirley. Six additional regional commissioners are appointed by the Governor. The Governor appoints the Chairperson.

Meeting Schedule and Application Timelines:

The DEC holds regular monthly meetings on the first Thursday after the first Tuesday of each month. Public hearings are generally held on the last Tuesday of each month. Most development permit applications are acted on within 75 days.

Application Review Process:

The Devens By-laws and DEC's Development Rules and Regulations provide for Level One and Level Two permit application review processes. Level One actions allow rapid approval at the Administrative level (generally within 14 days), and are appropriate for the following proposed activities:

1. Relatively minor adjustments to approved site plans
2. Minor lot line adjustments
3. Architectural modifications in historic areas
4. Wetland certificates of compliance
5. Issuance of a building or occupancy permit where no other Commission action or site plan review is required

Level Two actions require a full public hearing, and generally involve larger scale undertakings such as most new construction, adaptive reuse of existing buildings and any major private and/or public infrastructure improvements. Anything not specifically identified as a Level One action requires Level Two review.

The application review process for Level Two permits typically consists of the following:

1. **Scoping Session:** The Director of the DEC shall meet with the Applicant to determine the components of the Permit, the timing of the submission and permitting process, and general scope of the project submittal items.
2. **Determination of Zoning Compliance:** The DEC shall determine whether the proposed uses and activities are permitted within the zoning district in which the development site is located and if proposed uses comply with the development goals of that zoning district. Such determination is made by the Commission at a public meeting. Applicants must submit a statement indicating how the proposed use and development comply with the applicable zoning district (as per the By-Laws and Reuse Plan).
3. **Pre-Permitting and Final Conferences:** The Director shall conduct pre-permitting Conferences with the developer to review which development issues are critical, Submission and Plan Form and Contents requirements, Waivers of Design Standards and preliminary time schedules.

4. **Determination of Completeness (DOC):** Upon completion of the Final Pre-Permitting Conference, the Director shall render a written DOC within 14 calendar days. "Complete" means that a Submission complies with the Plan Form and Contents and Submission requirements of all applicable DEC Rules and Regulations (see 974 CMR 3.02 for requirements). Sites proposing land disturbance of one acre or more, or sites disturbing less than one acre that are part of a larger plan of development disturbing one acre or more, must also comply with the industrial performance standards for stormwater management outlined in 974 CMR 4.08. Submissions can be determined conditionally complete, however a schedule for the submission of deficient or additional items shall be attached to the DOC.
5. **Town Comment Period:** The DEC provides surrounding towns (Ayer, Harvard and Shirley) 30 days to render comments to the DEC on the submission. The public hearing shall not be closed until the thirty-day town comment period is concluded.
6. **Public Hearing Requirement and Abutter Notices:** The DEC provides notice of public hearings to the general public and to abutting property owners.
7. **Public Hearing Continuances:** The DEC may, with the consent of the Applicant, agree to one or more continuances of public hearings of up to 30 days each.
8. **The Voting Process:** All DEC votes are by a majority of a quorum (seven DEC members). Seven votes are required for a Variance and Reconsideration. Eight votes are required to adopt or amend Regulations.
9. **Record of Decision (ROD).** The ROD is issued within 10 days from the date of the DEC's vote. The Applicant shall record the ROD with the Registry of Deeds for both Worcester and Middlesex Counties and provide proof thereof to the DEC prior to the issuance of a building permit.
10. **Endorsement.** After the appeal period has expired (30-days), the Applicant submits plans for endorsement by the DEC. Plans are recorded with the Registry of Deeds for both Worcester and Middlesex Counties and proof of recordation submitted to the DEC prior to the issuance of a building permit.

Permit Duration. Site Plan approvals are valid for 2 years. Work must commence within 6 months of approval or the approval expires. Extension of these timeframes is possible.

Application Fees:

Unified Permit fees cover all DEC activities from the Pre-Permitting Conference through the Building Permit. The fee is based on the total value of all construction and improvements, including site preparation, construction, engineering and site testing, roads, paving, parking lots, landscaping, and other improvements. The cost of the building must be included in the total value of all construction for the purposes of calculating the fee. The fee consists of a base fee and a value increment based on the gross value of the project.

UNIFIED PERMIT FEE

Gross value of project (inclusive of the buildings and all site development work and infrastructure improvements)	Base fee	Plus value increment (if any)
\$1,000,000 or less	\$1,300	Plus \$13 per \$1000 of work above \$100,000
\$1,000,000 and above	\$13,000	\$11.00 for each additional \$1000 in work above \$1,000,000

Peer Review Fees. The DEC may seek review and analysis from outside consultants (peer review). Applicants are required to pay 100% of the consultants' fees. Outside consultants employed by the DEC for plan review routinely include civil engineers, landscape architects, wetlands scientists, and attorneys and may include additional specialists, depending on level of complexities of a Submission or "special environmental conditions". Peer review deposits are retained until the project is completed.

Site Inspections:

Upon approval of a Level 1 or Level 2 Permit, the DEC, its staff, and consultants shall have the right to enter all properties at Devens at reasonable times, for the purpose of observing and investigating construction and/or operations on the site in regard to enforcement of the Regulations, By-laws, or conditions of permit approval. At a minimum, the DEC, its staff, or consultant shall conduct an inspection at the following stages of construction:

1. Initial inspection of erosion and sedimentation controls and signage prior to any land disturbance to assess overall effectiveness for protecting resources;
2. Inspection of the excavation for the stormwater management system to ensure adequate separation of the stormwater system from groundwater and the presence of the approved soil type.;
3. Inspection of the completed stormwater management system, prior to backfilling of any underground drainage or stormwater conveyance structures; and
4. Final Inspection: The DEC shall inspect the site in its final state to ensure that the stormwater management system is functioning as designed. No Certificate of Completion or Occupancy Permit shall be issued until the Final Inspection has occurred.

The DEC, its staff, or consultant shall also make biweekly or monthly visits to active construction sites to check the status of erosion and sedimentation controls and ensure they are operating as intended. Inspections shall also be conducted after incidents of heavy rainfall (0.25 inches or more in 24 hours).

Inspectors shall complete the Construction Site Inspection Report included in the SOP. The written report documenting compliance with the approved erosion and sedimentation controls shall be maintained by the developer and made available to the DEC for review upon request.

Enforcement Actions:

Pursuant to 974 CMR 1.14, enforcement, the DEC's enforcement powers include, but are not limited to:

1. Withholding of building and occupancy permits;
2. Power to assess penalties for violations of the Reuse Plan, By-Laws, or 974 CMR in amounts no more than \$300 per day per violation, provided that each day such violation continues shall constitute a separate offense; and
3. Power to institute actions in Court to compel the removal, alteration, or relocation of any structure that violates the Reuse Plan, By-Laws, or 974 CMR.

If a violation of the conditions of an issued permit are found, the property owner and offending party shall be notified in writing of the violation and given a specified period of time to correct or eliminate the violation. At the end of the specified time, the Director or Building Official shall re-inspect and determine whether the violation has been corrected or eliminated. If not, the Director or Building Official shall notify the property owner and offending party in writing that the violation still exists and may commence the assessment of fines. After continued violation and with the consent of the DEC, Court action may be taken.

The complete Devens Bylaws and Rules and Regulations are available on-line at www.devensec.com

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Site-Specific BMPs

Customize the following BMPs to be consistent with the SWPPP for the site being inspected.

	BMP Description	Installed and Operating Properly?	Corrective Action Needed
1		Yes <input type="checkbox"/> No <input type="checkbox"/>	
2		Yes <input type="checkbox"/> No <input type="checkbox"/>	
3		Yes <input type="checkbox"/> No <input type="checkbox"/>	
4		Yes <input type="checkbox"/> No <input type="checkbox"/>	
5		Yes <input type="checkbox"/> No <input type="checkbox"/>	
6		Yes <input type="checkbox"/> No <input type="checkbox"/>	
7		Yes <input type="checkbox"/> No <input type="checkbox"/>	
8		Yes <input type="checkbox"/> No <input type="checkbox"/>	
9		Yes <input type="checkbox"/> No <input type="checkbox"/>	
10		Yes <input type="checkbox"/> No <input type="checkbox"/>	
11		Yes <input type="checkbox"/> No <input type="checkbox"/>	
12		Yes <input type="checkbox"/> No <input type="checkbox"/>	
13		Yes <input type="checkbox"/> No <input type="checkbox"/>	
14		Yes <input type="checkbox"/> No <input type="checkbox"/>	
15		Yes <input type="checkbox"/> No <input type="checkbox"/>	
16		Yes <input type="checkbox"/> No <input type="checkbox"/>	
17		Yes <input type="checkbox"/> No <input type="checkbox"/>	
18		Yes <input type="checkbox"/> No <input type="checkbox"/>	
19		Yes <input type="checkbox"/> No <input type="checkbox"/>	
20		Yes <input type="checkbox"/> No <input type="checkbox"/>	



Erosion and Sediment Control (ESC) on Construction Sites

Document any of the following issues found on the construction site, and the corrective action(s) required for each.

Issue	Status	Corrective Action Needed
Have all ESC features been constructed before initiating other construction activities?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is the contractor inspecting and maintaining ESC devices regularly?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is existing vegetation maintained on the site as long as possible?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is construction staged so as to minimize exposed soil and disturbed areas?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are disturbed areas restored as soon as possible after work is completed?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is clean water being diverted away from the construction site?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are sediment traps and sediment barriers cleaned regularly?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are vegetated and wooded buffers protected and left undisturbed?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are soils stabilized by mulching and/or seeding when they are exposed for a long time?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Has vegetation been allowed to establish itself before flows are introduced to channels?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is regular, light watering used for dust control?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is excessive soil compaction with heavy machinery avoided, to the extent possible?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

(continued)



Issue	Status	Corrective Action Needed
Are erosion control blankets used when seeding slopes?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are trees and vegetation that are to be retained during construction adequately protected?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are areas designated as off-limits to construction equipment flagged or easily distinguishable?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
If excavated topsoil has been salvaged and stockpiled for later use on the project, are stockpiles adequately protected?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are temporary slope drains or chutes used to transport water down steep slopes?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Do all entrances to the storm sewer system have adequate protection?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

Overall Site Conditions

Document any of the following issues found on the construction site, and the corrective action(s) required for each.

Issue	Status	Corrective Action Needed
Are slopes and disturbed areas not being actively worked properly stabilized?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are material stockpiles covered or protected when not in use?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are natural resource areas protected with sediment barriers or other BMPs?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are perimeter controls and sediment barriers installed and maintained?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

(continued)



Issue	Status	Corrective Action Needed
Are discharge points and receiving waters free of sediment deposits and turbidity?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are storm drain inlets properly protected?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is there evidence of sediment being tracked into streets?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is trash/litter from the construction site collected and placed in dumpsters?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are vehicle/equipment fueling and maintenance areas free of spills and leaks?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are potential stormwater contaminants protected inside or under cover?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is dewatering from site properly controlled?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are portable restroom facilities properly sited and maintained?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are all hazardous materials and wastes stored in accordance with local regulations?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

Non-Compliance Actions

The municipality shall provide the site operator with a copy of this report, and notice of the corrective action(s) to be taken. The site operator shall have thirty days from the receipt of the notice to commence curative action of the violation.





GREEN INFRASTRUCTURE GUIDELINES FOR DEVENS PROJECTS

The redevelopment of the Devens Regional Enterprise Zone (Devens) is guided by the principles of sustainable development – recognizing the long-range consequences of current actions. This approach to redevelopment also recognizes the economic, social and environmental impacts of redevelopment and the interconnectedness of these triple-bottom line aspects of sustainable development. The Devens Enterprise Commission (DEC) Rules and Regulations governing the redevelopment of Devens contain a number of sustainable design standards that promote the conservation and integration of the natural environment with the built environment. In Devens, where and how you build is just as important as what you build. Connectivity of infrastructure services (roads, sewers, utilities, etc...) is important from a development perspective but so is connectivity of the natural environment to support biodiversity and help ensure preservation of important ecosystem services such as wildlife habitat, natural stormwater management and filtration, carbon capture and sequestration. Devens has been redeveloped with sufficient hard infrastructure to support the energy, water, sewer and transportation needs of the built environment, while also connecting to and preserving important components of the natural environment. This approach results in high quality, attractive and functional development patterns that have proven to be more cost effective than traditional development techniques – further enhancing the sustainable redevelopment goals of Devens. This document is intended to provide applicants with a better understanding of what Green Infrastructure is, the local incentives to promote Green Infrastructure, and guidance on how to strategically locate and incorporate Green Infrastructure into projects to meet multiple regulatory requirements within the DEC Rules and Regulations.

What is Green Infrastructure?

Green Infrastructure refers to natural, constructed, or restored landscape features that support fish, aquatic and terrestrial wildlife habitat and provide natural (and free!) ecosystem services such as water filtration and recharge; temperature moderation; erosion control; carbon capture and pollutant control; nutrient management, and food production. Green Infrastructure features may be natural such as forests, trail systems, floodplains, wetlands and buffer areas, or built/engineered features such as street trees, rain gardens, green roofs, bioretention areas and constructed wetlands (low-impact development or LID) that mimic or restore natural ecological processes. Green Infrastructure elements also help reduce wildlife habitat fragmentation and provide the ability for developments to better adapt to changing weather patterns through more direct and natural methods of stormwater management and infiltration which decrease flooding threats— resulting in less impacts from hazards (improved resiliency). Green Infrastructure in Devens also includes energy efficiency and renewable energy measures that help create a more sustainable network of built and natural systems. Incorporating Green Infrastructure elements into development projects can help meet your corporate sustainability objectives and the DEC regulations, all while saving money and enhancing the natural and built environment within Devens.

The [Devens Open Space and Recreation Plan](#), [Devens Main Post Trails Plan](#), [Water Resources Protection Report](#) and [Stormwater Pollution Prevention Plan](#) were all drafted as part of the planning and redevelopment for Devens. These plans and reports identify important natural areas and systems within Devens and the surrounding region and recommend certain levels of conservation and protection. Well planned developments can strategically identify these resource areas (i.e., wetlands, watercourses, steep slopes) and preserve and incorporate these elements and associated buffers as green infrastructure components and meet development screening, landscaping, water quality and viewshed protection requirements, while preserving the ecological structure and function of these natural areas at the same time.



Traditional parking lot design(curb, gutter and catch basin)



Low-Impact Development parking lot design (biofiltration)

Green Infrastructure elements are incorporated throughout the current DEC Rules and Regulations. A single Green Infrastructure element such as street trees or parking lot landscaping can be utilized to meet multiple regulatory requirements and sustainability objectives within the DEC Rules and Regulations:



Source: "Triple Bottom-Line Benefits of Street Trees in Devens", by Neil Angus, Environmental Planner, Devens Enterprise Commission, February 2012. http://www.devensec.com/news/Benefits_of_Street_Trees.pdf

As the above graphic shows, street tree plantings can replicate many natural ecosystem services and can act as corridors or connections to larger, unfragmented ecological habitats as well as provide many added benefits for people and properties nearby (triple-bottom line attributes of sustainable development). All of these benefits also apply to the vegetative screening that Devens requires for parking lots. A listing of Green Infrastructure elements and the corresponding DEC regulations that these elements address are listed in Appendix A. Graphic examples of commercial and residential Green Infrastructure applications can also be found in Appendix B.

Green Infrastructure Incentives in Devens:

The DEC offers a number of regulatory and financial incentives for projects that incorporate certain sustainable and green infrastructure elements:

Expedited Permitting: To Applicants, time is money. It is often said, the greenest of green buildings is often the adaptive reuse of existing buildings. The DEC recognizes these points and has committed to a maximum 21-day permitting timeframe for projects utilizing existing buildings (where no exterior site improvements are required). This helps reduce the environmental footprint of new development and expands on the DEC's already expedited Unified Permitting Process which commits to Level 2 Unified Permitting of projects within 75 days.

Stormwater Management Credit for Green Roofs: For projects that incorporate vegetated roofs, the area of roof covered by vegetation may be considered pervious and subtracted from the total proposed impervious area [974 CMR 4.08(5)]. This reduces the overall quantity of stormwater that is required to be managed on-site and can reduce the size of associated stormwater management systems, thereby saving land and money.

Relaxed Frontage Requirements for more Energy & Water Efficient Development: Applicants that agree to construct residential projects to a Home Energy Rating System (HERS) of 60 or less and incorporate EPA Water Sense labeled plumbing fixtures in all buildings are eligible for reduced lot frontage requirements. This allows for more

clustered approaches to development which reduces the development footprint and associated infrastructure costs [974 CMR 5.02(2)].

Additional Street Types: The DEC recently revised its Regulations to include additional street types which allow for reduced pavement widths and /infrastructure costs (refer to 974 CMR 2.07).

Renewable Energy Building and Electrical Permit Fee Reductions: to incentivize the integration of Renewable Energy Facilities at Devens and further promote clean energy, greenhouse gas reduction and improved air quality; the DEC has adopted a reduced Unified, Building and Electrical Permit fee schedule for renewable energy installations for both ground-mounted and building mounted/integrated systems.

Financial incentives for LEED projects: The US Green Building Council’s Leadership in Energy and Environmental Design (LEED) green building certification program requires a number of green infrastructure components be designed and constructed into a project that is pursuing certification (landscaping, energy efficiency, low-impact stormwater management, reduced development footprint management, etc...). As this program embodies the same sustainable development principles as Devens, completed projects that achieve LEED certification can be reimbursed up to 15% of their unified permit fee (maximum \$10,000).

Green Infrastructure in Devens – Low-Impact Development/Bio-Filtration Landscape Island Case Study:

One Jackson Place (27 Jackson Road, Devens, MA)



Total Traditional Project Cost:	\$1,004,000
LID Reduced site paving	-\$32,000
LID Reduced curbing	-\$50,000
LID Reduced stormwater piping	-\$14,000
LID Reduced stormwater structures	-\$68,000
LID Increased landscaping	+\$12,000
LID Increased site preparation	+\$10,000
LID Increased soil mix	+\$18,000
Total Estimated LID Savings:	-\$124,000 (12%)



Depressed landscape islands with specialized plantings and soil mix to naturally filter and infiltrate stormwater runoff while providing wildlife habitat connections through the site to adjacent larger forested areas.

For additional information or questions, please contact Devens Enterprise Commission staff neilangus@devensec.com or 978.772.8831.

Resources:

1. UNH Stormwater Center: <http://www.unh.edu/unhsc/>– Case Studies on economics of LID techniques: http://www.unh.edu/unhsc/sites/unh.edu.unhsc/files/docs/FTL_Resource%20Manual_LR.pdf
2. Devens LID Case Study: www.devensec.com/sustain.htm
3. MA Smart Growth/Smart Energy Toolkit: http://www.mass.gov/envir/smart_growth_toolkit/pages/mod-lid.html
4. MA DEP Stormwater Management Standards Structural Specifications for BMP’s: <http://www.mass.gov/eea/docs/dep/water/laws/i-thru-z/v2c2.pdf>
5. BioMap 2: Conserving the Biodiversity of Massachusetts in a Changing World: <http://maps.massgis.state.ma.us/dfg/biomap2.htm>

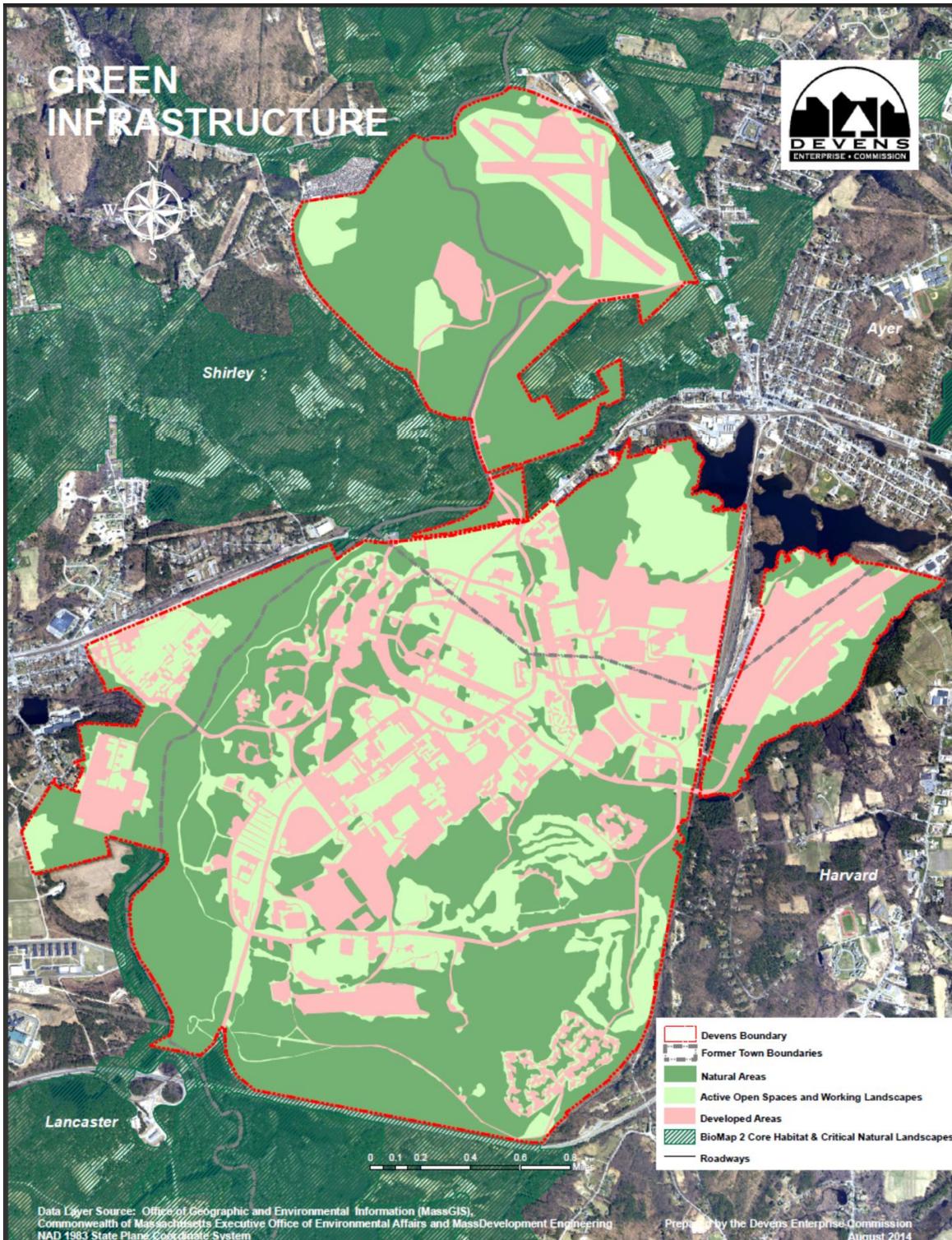


Green Infrastructure Guidelines:

1. **Green Infrastructure Objectives.** All development projects within Devens should be designed to incorporate Green Infrastructure elements that meet one or more of the following objectives:
 - a. **Protect and use existing vegetation.** Minimize disruption to existing habitats by incorporating site design that protects existing healthy and native vegetation and minimizes the development footprint (tight construction disturbance zone limits).
 - b. **Facilitate connections.** Incorporate landscape design elements into all proposed projects to facilitate green infrastructure connections/linkages to surrounding natural landscapes to the maximum extent feasible. 974 CMR 3.04(8)(d)5. requires areas of previously cleared woodlands that are not utilized on project sites to be re-planted with native woodland species. Edges of previously cleared woodlands on-site are also required to be planted with mix of vegetation types.
 - c. **Vegetation types.** Support biodiversity, reduced pesticide use, and water conservation by using native plants species that have adapted to site conditions and local climate zones (see 974 CMR 3.06 Appendix A for a list of native plants). Also prohibit planting of invasive species (a full and updated list is available from the Invasive Plant Atlas of New England – IPANE).
 - d. **Energy/Micro-climate.** Reduce building energy consumption by maximizing solar orientation of buildings and incorporating passive energy design features to maximize energy efficiency to the maximum extent practicable. Projects are encouraged to consider the placement of appropriate vegetation or vegetated structures in strategic locations adjacent to buildings. Projects may also be designed to offset additional building energy demands to the maximum extent practicable through added efficiencies such as district energy systems and/or renewable energy systems. Where feasible, projects may also incorporate urban heat island reduction elements such as shade trees, green roofs, or vegetated structures to cover non-vegetated surfaces such as walls, walkways and parking lots.
 - e. **LID/Stormwater Management.** Use low-impact development stormwater management techniques to facilitate green infrastructure connections throughout proposed developments.
 - f. **Landscape Management.** Develop long-term invasive species monitoring, control and removal program as part of the Long Term Operations and Maintenance Plan for the site. Refer to Appendix B for examples of Commercial/Industrial and Residential Applications.
2. **The Devens Green Infrastructure and Landscape Matrix Map** divide Devens into three (3) landscape areas/classifications. Projects located within one or more of these areas are encouraged to incorporate green infrastructure components that are functional and facilitate connections to or enhance larger contiguous landscape patches. See **Appendix A** for a list of Green Infrastructure technologies and **Appendix B** for graphic examples of Commercial/Industrial and Residential Applications.

DEVENS GREEN INFRASTRUCTURE AND LANDSCAPE MATRIX

- Dark Green:** **Natural Lands.** All proposed projects within these areas may preserve and incorporate green infrastructure linkages and connections within these areas in accordance with DEC Landscaping requirements 974 CMR 3.04(8).
- Light Green:** **Active Open Spaces, Working Landscapes and Existing LID.** All proposed projects within these areas may incorporate landscape designs that connect to/expand existing Natural lands within the immediate vicinity in accordance with 974 CMR 3.04(8)(d)5. and 974 CMR 3.04(8) in general.
- Red:** **Developed Areas.** All proposed projects within these areas may incorporate landscape designs in accordance with 974 CMR 3.04(8) that, where feasible, facilitate connections to surrounding Natural Lands, Active Open Spaces, Working Landscapes and Existing LID as per 974 CMR 3.04(8)(d)5.



**Core Habitat and Critical Natural Landscapes from the BioMap 2 are shown in green hash marks outside of Devens boundaries. These areas are generally contiguous with "Natural Lands" within Devens, further emphasizing the importance of maintaining and facilitating green infrastructure connections to and from these areas.*

APPENDIX A – Devens Green Infrastructure Elements:

Below is a list of green infrastructure elements and technologies that should be considered by all Applicants, along with links to the applicable DEC regulations that such components can satisfy. As this table demonstrates, many individual green infrastructure components can satisfy multiple regulatory requirements. Please note, the DEC supports innovation and recognizes this is not a complete list of Green Infrastructure elements and technologies. New or alternative Green Infrastructure elements and technologies not listed below may be acceptable, provided the Applicant demonstrates to the DEC the appropriateness of such measures in meeting the applicable provisions of the [DEC Rules and Regulations](#).

GREEN INFRASTRUCTURE ELEMENTS	EXAMPLES OF DEC REGULATIONS ADDRESSED
General Landscape Design Elements:	
Preservation of tracts/corridors of existing native vegetation, topography and native wildlife habitat.	Stormwater Management - 974 CMR 3.04(4) Topographic Alterations – 974 CMR 3.04(5) Site Improvements - sidewalks/trails 974 CMR 3.04(6)(d) Preservation of existing vegetation - 974 CMR 3.04(8)(d) Restoration of vegetation - 974 CMR 3.04(8)(d)5. Use of native plants - 974 CMR 3.04(8)(c) Minimize lawn areas 974 CMR 3.04(8)(f) Viewshed Overlay Districts - 974 CMR 3.04(8)(i) Steep Slope Protection – 974 CMR 3.06 Industrial performance standards for light and noise - 974 CMR 4.04 &5 Wetland Protection 974 CMR 4.06 Water Resource Protection – 974 CMR 4.09 Greenhouse Gas Mitigation – 974 CMR 4.11 Innovative Residential Development – 974 CMR 5.02(1)(k)
Restoration of habitat	Preservation of existing vegetation - 974 CMR 3.04(8)(d) Topographic Alterations – 974 CMR 3.04(5) Screening - 974 CMR 3.04(8)(g) Wetland Protection 974 CMR 4.06 Water Resource Protection – 974 CMR 4.09 Greenhouse Gas Mitigation – 974 CMR 4.11
Trails and greenway connections	Site Improvements - sidewalks/trails 974 CMR 3.04(6)(d) Stormwater Management - 974 CMR 3.04(4) Greenhouse Gas Mitigation – 974 CMR 4.11 Innovative Residential Development – 974 CMR 5.02(1) and (2)
Landscaping Plantings	Use of native plants - 974 CMR 3.04(8)(c) Screening - 974 CMR 3.04(8)(g) Minimize lawn areas 974 CMR 3.04(8)(f) Parking Landscaping requirements - 974 CMR 3.04(8)(h) Industrial performance standards for light and noise - 974 CMR 4.04 &5 Greenhouse Gas Mitigation – 974 CMR 4.11
Control and management of invasive species	Use of native plants - 974 CMR 3.04(8)(c) Maintenance requirements:- 974 CMR 3.04(8)(n) Wetland Protection 974 CMR 4.06
Impervious surface reductions (urban heat island)	Parking Landscaping requirements - 974 CMR 3.04(8)(h) Industrial performance standards for light and noise - 974 CMR 4.04 &5 Parking maximums - Devens Bylaws Article C Stormwater Management - 974 CMR 3.04(4) Innovative Residential Development – 974 CMR 5.02(1) and (2) Vegetated roofs and walls - 974 CMR 3.04(8)(g)(i)(5)
Reduce/eliminate potable water use for irrigation	Xeriscaping and greywater reuse 974 CMR 3.04(8)(c) Use of native plants - 974 CMR 3.04(8)(c) Minimize lawn areas - 974 CMR 3.04(8)(f) Maintenance requirements - 974 CMR 3.04(8)(n) Stormwater Management - 974 CMR 3.04(4) Water Resource Protection – 974 CMR 4.09 Controls on in-ground irrigation systems - 974 CMR 8.09(11)
Created Wetlands	Screening - 974 CMR 3.04(8)(g) Use of native plants - 974 CMR 3.04(8)(c) Stormwater Management - 974 CMR 3.04(4) Stormwater Management Design Standards – 974 CMR 4.08 Water Resource Protection – 974 CMR 4.09
Preservation of Steep Slopes	Screening - 974 CMR 3.04(8)(g) Slope Resource Areas - 974 CMR 3.06 Innovative Residential Development – 974 CMR 5.02(1) and (2)
Vegetative screening	Screening - 974 CMR 3.04(8)(g) Use of native plants - 974 CMR 3.04(8)(c) Building façade screening requirements:- 974 CMR 3.04(8)(l) Industrial performance standards for light and noise - 974 CMR 4.04 &5 Parking Landscaping requirements - 974 CMR 3.04(8)(h) Viewshed Overlay Districts - 974 CMR 3.04(8)(i) Greenhouse Gas Mitigation – 974 CMR 4.11

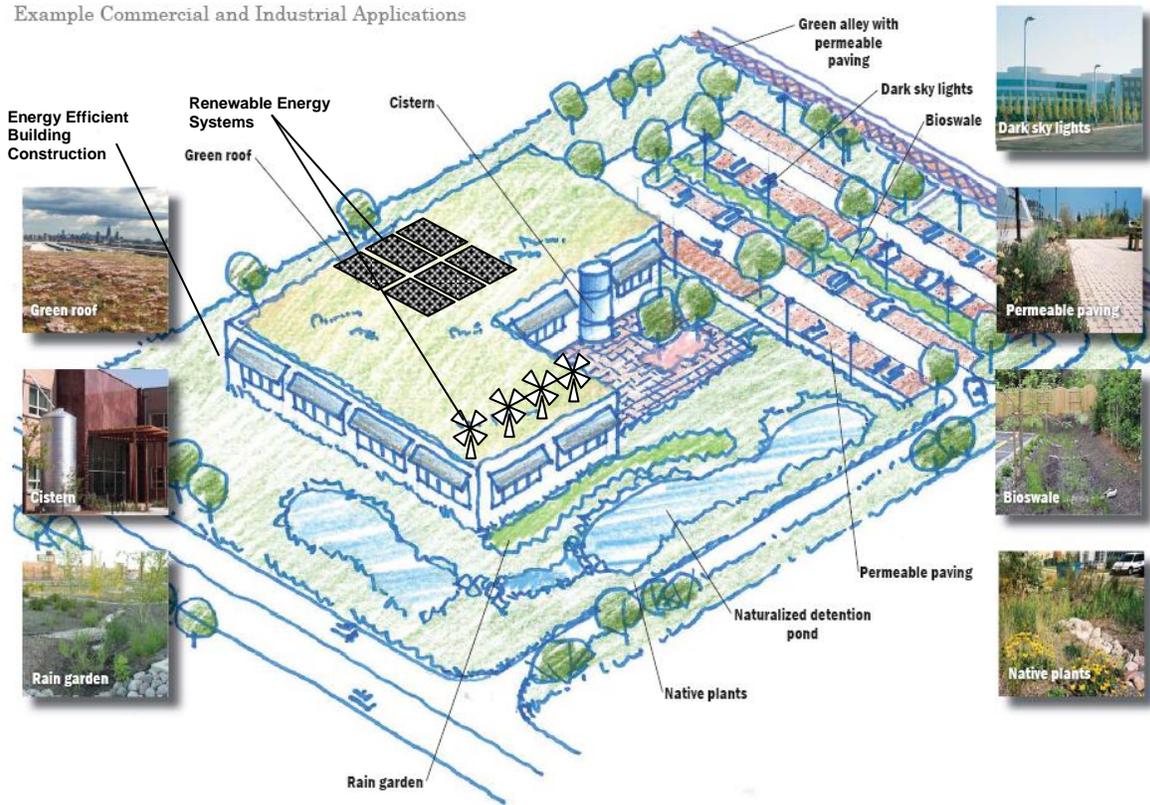
GREEN INFRASTRUCTURE ELEMENTS	EXAMPLES OF DEC REGULATIONS ADDRESSED
General Landscape Design Elements cont...	
Edible landscapes	Plants lists – 974 CMR 3.07(5) Innovative Residential Development – 974 CMR 5.02(1) and (2) Vegetated roofs and walls - 974 CMR 3.04(8)(g)(i)(5)
Building and Site Design Elements:	
Low-Impact Development Stormwater Mgm't - on-site stormwater management requirements	Stormwater Management - 974 CMR 3.04(4) Stormwater Management Design Standards – 974 CMR 4.08 Parking Landscaping requirements - 974 CMR 3.04(8)(h) Water Resource Protection – 974 CMR 4.09 Innovative Residential Development – 974 CMR 5.02(1) and (2) Vegetated roofs and walls - 974 CMR 3.04(8)(g)(i)(5)
Minimizing building heating and cooling requirements with landscaping	Screening - 974 CMR 3.04(8)(g) Building façade screening requirements:- 974 CMR 3.04(8)(l) Vegetated roofs and walls - 974 CMR 3.04(8)(g)(i)(5) Industrial performance standards for light and noise - 974 CMR 4.04 & 5 Greenhouse Gas Mitigation – 974 CMR 4.11
Manage, improve, recharge and reuse stormwater on-site to the maximum extent feasible	Screening - 974 CMR 3.04(8)(g) Stormwater Management - 974 CMR 3.04(4) Vegetated roofs and walls - 974 CMR 3.04(8)(g)(i)(5) Stormwater Management Design Standards – 974 CMR 4.08 Water Resource Protection – 974 CMR 4.09 Controls on in-ground irrigation systems - 974 CMR 8.09(11)
Rain gardens	Use of native plants - 974 CMR 3.04(8)(c) Stormwater Management - 974 CMR 3.04(4) Stormwater Management Design Standards – 974 CMR 4.08 Water Resource Protection – 974 CMR 4.09
Decentralized infiltration systems	Use of native plants - 974 CMR 3.04(8)(c) Stormwater Management - 974 CMR 3.04(4) Vegetated roofs and walls - 974 CMR 3.04(8)(g)(i)(5) Stormwater Management Design Standards – 974 CMR 4.08 Water Resource Protection – 974 CMR 4.09
Rain barrels/cisterns	Stormwater Management - 974 CMR 3.04(4) Maintenance requirements:- 974 CMR 3.04(8)(n) Water Resource Protection – 974 CMR 4.09 Controls on in-ground irrigation systems - 974 CMR 8.09(11)
Green roofs/green walls (refer to DEC Vegetated Roof Policy)	Screening - 974 CMR 3.04(8)(g) Vegetated roofs and walls - 974 CMR 3.04(8)(g)(i)(5) Water Resource Protection – 974 CMR 4.09 Use of native plants - 974 CMR 3.04(8)(c) Building façade screening requirements:- 974 CMR 3.04(8)(l) Stormwater Management - 974 CMR 3.04(4) Stormwater Management Design Standards – 974 CMR 4.08 Greenhouse Gas Mitigation – 974 CMR 4.11
Minimizing cut and fill and development footprint	Topographic Alterations – 974 CMR 3.04(5) Preservation of existing vegetation - 974 CMR 3.04(8)(d) Minimize lawn areas 974 CMR 3.04(8)(f) Industrial performance standards for light and noise - 974 CMR 4.04 & 5 Water Resource Protection – 974 CMR 4.09 Innovative Residential Development – 974 CMR 5.02(1) and (2) Greenhouse Gas Mitigation – 974 CMR 4.11
Naturalized Erosion and Sediment Controls	Plan requirements - 974 CMR 3.02(3)(e) Stormwater Management - 974 CMR 3.04(4) Stormwater Management Design Standards – 974 CMR 4.08 Water Resource Protection – 974 CMR 4.09
Infrastructure Elements*:	
Street types/widths, stormwater mgm't and landscape treatments within Road Rights-Of-Ways (ROW)	Landscaping Requirements within ROW - 974 CMR 2.07(2) and (7) Use of native plants - 974 CMR 3.04(8)(c) Industrial performance standards for light and noise - 974 CMR 4.04 & 5 Stormwater Management for Streets – 974 CMR 2.07(6) Greenhouse Gas Mitigation – 974 CMR 4.11 Innovative Residential Development – 974 CMR 5.02(1)(e)
Traffic calming measures incorporating landscaping/biofiltration	Traffic calming - 974 CMR 2.07(3) Stormwater Management for Streets – 974 CMR 2.07(6) Use of native plants - 974 CMR 3.04(8)(c) Street tree requirements - 974 CMR 3.04(8)(k) Industrial performance standards for light and noise - 974 CMR 4.04 & 5 Greenhouse Gas Mitigation – 974 CMR 4.11 Innovative Residential Development – 974 CMR 5.02(1) and (2)
Permeable and pervious paving systems	Stormwater Management - 974 CMR 3.04(4) Stormwater Management Design Standards – 974 CMR 4.08

GREEN INFRASTRUCTURE ELEMENTS	EXAMPLES OF DEC REGULATIONS ADDRESSED
Infrastructure Elements*cont...:	
Street trees with tighter spacing (30-40' vs. traditional 50')	Street tree requirements - 974 CMR 3.04(8)(k) Industrial performance standards for light and noise - 974 CMR 4.04 & 5 Screening - 974 CMR 3.04(8)(g) Use of native plants - 974 CMR 3.04(8)(c) Greenhouse Gas Mitigation – 974 CMR 4.11 Innovative Residential Development – 974 CMR 5.02(1) and (2)
Biofiltration swales	Use of native plants - 974 CMR 3.04(8)(c) Stormwater Management - 974 CMR 3.04(4) Stormwater Management Design Standards – 974 CMR 4.08
Floodplain, stream, wetland, riparian buffer protection and/or restoration	Wetland Protection 974 CMR 4.06 Stormwater Management - 974 CMR 3.04(4) Stormwater Management Design Standards – 974 CMR 4.08 Greenhouse Gas Mitigation – 974 CMR 4.11
Community parks/permanently protected open space	Greenhouse Gas Mitigation – 974 CMR 4.11 Use of native plants - 974 CMR 3.04(8)(c) Stormwater Management - 974 CMR 3.04(4) Preservation of existing vegetation - 974 CMR 3.04(8)(d) Site Improvements - sidewalks/trails 974 CMR 3.04(6)(d) Restoration of vegetation - 974 CMR 3.04(8)(d)5 Innovative Residential Development – 974 CMR 5.02(1)(k)
Community gardens	Innovative Residential Development – 974 CMR 5.02(1) and (2)
Integrated waste management systems	Greenhouse Gas Mitigation – 974 CMR 4.11
Water Conservation and Efficiency	Use of native plants - 974 CMR 3.04(8)(c) Stormwater Management - 974 CMR 3.04(4) Maintenance requirements:- 974 CMR 3.04(8)(n) Greywater reuse - MA DEP regulatory provisions for greywater systems Innovative Residential Development – 974 CMR 5.02(1) and (2) Controls on in-ground irrigation systems - 974 CMR 8.09(11)
Ground source heat pumps, cogeneration and other energy efficiency infrastructure	Greenhouse Gas Mitigation – 974 CMR 4.11 Innovative Residential Development – 974 CMR 5.02(1) and (2)
District energy systems	Innovative Residential Development – 974 CMR 5.02(1) and (2) Greenhouse Gas Mitigation – 974 CMR 4.11
Renewable energy systems (including solar canopies for renewable energy generation and heat-island reduction)	Renewable Energy Facility Requirements – 974 CMR 4.10 Greenhouse Gas Mitigation – 974 CMR 4.11

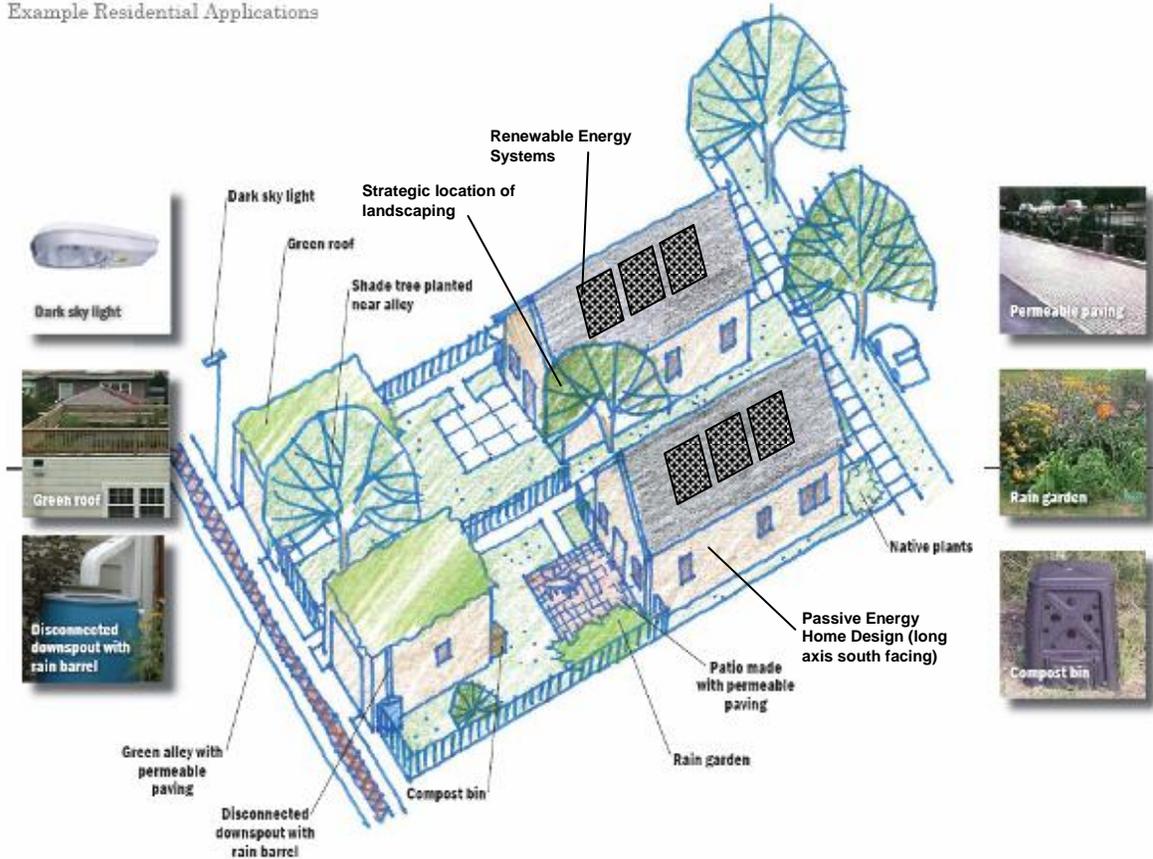
*Transportation demand management programs that reduce single occupancy vehicle trips and promote alternative modes of transportation also contribute to reduced greenhouse gas emissions and improved public health and therefore qualify as green infrastructure components. For details on TDM in Devens, go to: http://www.devensec.com/development/TMI_Overview.pdf

APPENDIX B - Example Commercial, Industrial and Residential Applications:

Example Commercial and Industrial Applications



Example Residential Applications



Base drawings from the Chicago Green Alley Handbook. This information is being provided for informational purposes to assist applicants as part of the Devens Enterprise Commission expedited Unified Permitting process.

APPENDIX H

Standard Operating Procedures

DRAFT OPERATION AND MAINTENANCE PLAN FOR MUNICIPAL ACTIVITIES AND FACILITIES

Massachusetts Development Finance Agency (MDFA)
Devens, Massachusetts

June 2022

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DRAFT

1.0 INTRODUCTION

1.1 Requirement for Standard Operating Procedures

The 2016 Massachusetts Municipal Separate Storm Sewer Systems (MS4) General Permit, which came into effect on July 1, 2018, regulates discharges from small MS4s to waters of the United States. The Permit requires MS4 operators to develop, implement, and enforce a stormwater management program (SWMP). The purpose of the SWMP is to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, to protect water quality, and to satisfy the applicable water quality requirements of the Clean Water Act. MS4 operators implement various Best Management Practices (BMPs) for each of six minimum control measures. These minimum control measures are as follows:

- Public Education and Outreach
- Public Involvement/Participation
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management in New Development and Redevelopment
- Good Housekeeping and Pollution Prevention for Municipal Operations

As part of the minimum control measure for Good Housekeeping and Pollution Prevention for Municipal Operations, Section 2.3.7 of the 2016 MS4 Permit requires regulated communities to develop and implement a written Operations and Maintenance (O&M) program for municipal activities and facilities. The O&M program serves to prevent or reduce pollutant runoff and protect water quality, and is required to include the following components:

1. Written O&M procedures for the following activities/facilities:
 - a. Parks and open space
 - b. Buildings and facilities where pollutants are exposed to stormwater runoff
 - c. Vehicles and equipment
2. An inventory of all permittee-owned facilities
3. A written program outlining the necessary actions the permittee will implement so that the MS4 is properly maintained to reduce the discharge of pollutants from the MS4, including:
 - a. Optimization of routine inspections, cleaning and maintenance of catch basins
 - b. Implementation of procedures for sweeping and/or cleaning streets and municipally owned parking lots
 - c. Proper storage and disposal of catch basin cleanings and street sweepings
 - d. Implementation of procedures for winter road maintenance
 - e. Implementation of inspection and maintenance frequencies and procedures for storm drain systems and stormwater treatment structures
4. Written records for all maintenance activities, inspections and training.

To address these requirements, Standard Operating Procedures (SOPs) associated with these municipal activities and facilities were taken and/or adapted from templates developed by EPA and the Central Massachusetts Regional Stormwater Coalition (CMRSWC). These templates were developed for use by MS4 communities in complying with the permit requirements outlined above. Devens can either implement the SOPs as written or modify the SOPs to reflect current Town practices, as long as they are consistent with the requirements of the MS4 permit.

1.2 Applicability

The operation and maintenance procedures outlined in this document and the accompanying SOPs apply to all the facilities, vehicles, and equipment denoted in the inventory included in Appendix A, as well as any activities associated with each facility, vehicle, or piece of equipment. They shall also apply to all drainage infrastructure owned or operated by Devens. The inventory will be updated annually to reflect any changes in property or equipment ownership.

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2.0 PARKS AND OPEN SPACE

2.1 Overview

The Devens Department of Public Works (DPW) is responsible for the operation and maintenance of parks and open space in Devens. Maintenance typically consists of mowing, irrigation, fertilizer application, and solid waste management. Properly trained DPW personnel apply fertilizer, pesticides, or herbicides in municipal parks or landscaped areas when appropriate—phosphorus-free fertilizer is used in the spring and summer, however a slow-release fertilizer containing phosphorus (type 18-24-12) is used as starter/winterizer in the fall. Stormwater pollutants that can be generated from these activities include nutrients, pesticides, organics, sediment, trash and bacteria.

These Operation and Maintenance Procedures apply to the following MDFA-owned parks and open space areas:

- Red Tail Golf Course
- Athletic Field at 95 Buena Vista Street
- Rogers Field
- Willard Field
- Disc Golf Course
- Mirror Lake Recreation Area

2.2 Operation and Maintenance Activities

The Devens Department of Public Works maintains all parks and mows their own lawns. All lawns are either cut and mulched or bagged and hauled to the compost and yard waste storage area at the DPW facility. Department of Public Works staff are also in charge of weeding, planting/reseeding, pruning, and removing leaf litter from the parks listed above. All fertilizer and pesticide application is performed by properly trained DPW staff.

The Department of Public Works collects trash from the receptacles in each park. Signs regarding the proper disposal of pet waste are also posted at most parks. There is no active waterfowl management or water feature maintenance conducted by the Department of Public Works—repairs and clean-up measures are conducted as needed.

Appendix B provides Standard Operating Procedures that the Town should follow for all operation and maintenance activities in its parks and open space areas, including:

- B.1: Parks and Open Space Management
- B.2: Storage and Use of Pesticides and Fertilizer

3.0 MUNICIPAL BUILDINGS AND FACILITIES

3.1 Overview

Municipal buildings and facilities that are owned and operated by Devens where potential pollutants are exposed to stormwater runoff include:

- Devens Recycling Center
- Devens DPW Facility/Regional Household Hazardous Products Collection Center
- Water/Sewer Pump Stations & Natural Gas Meter Stations (multiple)
- Devens Enterprise Commission Offices
- Devens Fire Department
- Devens Airfield
- Devens Wastewater Treatment Facility

A full inventory of Devens-owned parcels, including their street address and potential stormwater pollutants can be found in the inventory in Appendix A. This extended inventory includes parcels that serve a municipal use as well as those owned by MassDevelopment which are anticipating sale to a private entity for commercial, industrial, or research purposes. These Operation and Maintenance Procedures apply to all buildings and facilities listed above and in Appendix A.

3.2 Use, Storage, and Disposal of Petroleum Products and Other Stormwater Pollutants

Devens has procedures in place regarding the use, storage, and disposal of petroleum products and other stormwater pollutants to prevent the potential for polluted stormwater. All vehicle fluids, including oil, hydraulic fluid, transmission fluid, and others are stored in metal containers on a shelf over a containment structure inside the DPW garage. Waste oil is stored in 55-gallon drums with secondary containment in the DPW Facility.

At the fueling station at the DPW facility, diesel fuel is stored in an aboveground storage tank (AST). The tank and fuel pumps are on a concrete pad, with concrete bollards surrounding the tank and pump. There is no secondary containment for the AST. The fueling station is not covered. All municipal vehicles and equipment requiring diesel are fueled at the DPW Facility; there is no fuel stored at other municipal facilities. Vehicles and equipment requiring gasoline are fueled at nearby gas stations using a gas card.

Appendix C provides Standard Operating Procedures that the Town should follow for the use, storage, and disposal of petroleum or other hazardous products utilized at municipal facilities, including:

- C.1: Fuel and Oil Handling
- C.2: Hazardous Materials Storage and Handling

3.3 Employee Training

Devens has developed an employee training program, which provides information regarding stormwater pollution prevention and good housekeeping practices for municipal operations. Management practices included as part of the training program consist of: (1) minimizing and preventing exposure of vehicles and equipment to stormwater, (2) good housekeeping operations,

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(3) preventative maintenance, (4) spill prevention and response, (5) erosion and sediment control, (6) stormwater runoff management, (7) management of salt and piles containing salt and (8) maintenance of control measures. Training on the proper use, storage, and disposal of petroleum products is also included.

Devens has a Stormwater Pollution Prevention Plan (SWPPP) in place for the DPW Facility. Employees at the DPW facility will complete annual training on the management practices outlined in each SWPPP beginning in Permit Year 5.

3.4 Spill Prevention and Response

Good Housekeeping measures are in place to minimize the risk of spilled pollutants entering nearby surface waters. All transfers to and from fuel, oil, and chemical tanks on site are observed by qualified personnel trained in spill response procedures. Hydraulic equipment is kept in good repair to prevent leaks. Equipment and vehicles are regularly inspected to avoid situations that may result in leaks, spills, and other releases of pollutants that could be conveyed with stormwater to receiving waters. The fueling area at the DPW Facility is also regularly inspected for signs of spills or leaks, which includes inspection of hoses and fittings. Aboveground storage tanks are regularly inspected for signs of deterioration or leaks, and a spill kit is kept near the diesel fueling pump at the DPW facility. Any spills are cleaned up immediately or are properly marked by barricades. Grease and oil spills are treated with an absorbent compound.

Appendix C provides additional Standard Operating Procedures that the Town should follow for spill response at all facilities, including:

- C.3: Spill Response and Cleanup

3.5 Waste Management and Other Applicable Good Housekeeping Practices

The Department of Public Works empties outdoor trash receptacles at municipal buildings and facilities every day, Monday through Friday. Trash receptacles are closed when not in use.

Building maintenance is conducted to minimize the potential for stormwater pollution. This includes practices such as using tarps and drop cloths when painting or sanding, routinely checking buildings for leaks, and sweeping facility parking lots and driveways at least twice per year.

Appendix C also provides Standard Operating Procedures pertaining to waste management and facility housekeeping, including:

- C.4: Operations and Maintenance of Municipal Buildings and Facilities

There are other Standard Operating Procedures that are applicable to municipal buildings and facilities, but they are discussed and referenced exclusively in other sections. These include the following:

- SOPs for lawn maintenance and landscaping activities, which are included under Section 2.0, Parks and Open Space
- SOPs for vehicle and equipment storage, washing, and fueling, which are discussed in Section 4.0, Municipal Vehicles and Equipment

- SOPs for street sweeping, snow disposal, and the storage and application of deicing materials, which are discussed under Section 5.0, Infrastructure Operations and Maintenance.

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4.0 MUNICIPAL VEHICLES AND EQUIPMENT

4.1 Overview

The Devens Department of Public Works is responsible for operating and maintaining a majority of the Town's vehicles and equipment, except those under the responsibility of the Fire Department. An inventory of all vehicles operated and maintained by Devens is included in Appendix A.

4.2 Municipal Vehicle Storage, Maintenance, and Repair

Vehicle maintenance facilities have the potential for spills that could contaminate stormwater. Potential pollutants associated with municipal vehicle storage, maintenance, and repair activities include oil and grease, petroleum products, metals, organics and chlorides.

In Devens, vehicle maintenance is performed within the DPW garage. This maintenance includes all changing of fluids. Employees use spigots/funnels to minimize drips/leaks, use drip pans when changing fluids, and have absorbing compounds available for use in the event of a spill. The maintenance garage is equipped with floor drains, which discharge to the sanitary sewer via an oil-water separator. Spill prevention practices are still encouraged to reduce the amount of oil entering the oil-water separator or the sanitary sewer.

There is a large portion of the DPW garage that is dedicated to vehicle and equipment storage. Municipal vehicles and equipment are stored indoors to the maximum extent feasible.

4.3 Municipal Vehicle and Equipment Fueling

All municipal vehicles that take diesel are fueled at the fueling station at the DPW facility. This station is uncovered and serviced by one 1,800-gallon AST. Potential stormwater pollutants associated with municipal vehicle and equipment fueling include oil and grease, petroleum products, trash, metals and organics. The fueling area is inspected regularly for signs of spills or leaks, and there are concrete bollards around the tank and fuel pump to protect the area from being struck by a passing vehicle. Spill response procedures are in place and spill kits are maintained onsite in accordance with Section 3.2 of these procedures.

4.4 Municipal Vehicle Washing

Potential stormwater pollutants associated with municipal vehicle washing include sediment, nutrients, chlorides, trash, metals, oil & grease, petroleum products and organics.

All vehicles operated primarily by the Department of Public Works are washed in the wash bay at the DPW facility. Employees are aware that no vehicle washing should take place outside or in any area where the wash water might drain to nearby surface waters. The wash bay is a contained system, with washwater getting treated and recycled between washes. Normal soaps are used for vehicle washing, however the recycling system prevents them from coming into contact with stormwater.

The Fire Department wash their vehicles at the Fire Station or at a local car wash.

4.5 Other Applicable Good Housekeeping/ Pollution Prevention Practices

Appendix D provides Standard Operating Procedures related to vehicle and equipment operation and maintenance, including:

- D.1: Operations and Maintenance of Municipal Vehicles and Equipment

There are other Standard Operating Procedures that are applicable to Municipal Vehicles and Equipment but are discussed and referenced exclusively in other sections. These include the following:

- SOPs for the use, storage, and disposal of petroleum products; SOPs for spill prevention and response, and SOPs for waste management, which are included under Section 3.0, Municipal Buildings and Facilities.
- SOPs for street sweeping, which are discussed under Section 5.0, Infrastructure Operations and Maintenance.

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5.0 DRAINAGE INFRASTRUCTURE OPERATIONS AND MAINTENANCE

5.1 Drainage System Overview

Devens has developed a map of its drainage system in GIS, which includes mapping of outfalls, culverts, drain manholes, catch basins, drainage pipes, swales, stormwater treatment structures, etc. throughout the Devens Regional Enterprise Zone. The map distinguishes between infrastructure owned by Devens, owned by the army, and owned by private entities, and is updated frequently to account for changes in ownership. The most recent version of Devens' drainage mapping is included in the Stormwater Management Plan.

There are formal stormwater collection facilities on most streets in the enterprise zone. Devens has several outfalls that discharge directly to surface waters, and few that discharge to infiltration or leaching basins which infiltrate stormwater directly into the ground. Several structural BMPs have been installed throughout Devens, including detention basins, grassed swales, infiltration/leaching basins, oil/water separators and stormceptors. An inventory of structural BMPs owned and maintained by Devens is included in Appendix A of this plan.

5.2 Catch Basin Cleaning

Devens currently cleans approximately 50% of its 1,212 catch basins per year using in-house equipment and staff. **Catch basins at the DPW facility are cleaned annually.**

To meet MS4 Permit requirements, Devens will need to optimize catch basin inspection, cleaning and maintenance such that the following conditions are met:

- Prioritization of the inspection and maintenance of catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or development). Catch basins in such areas must be cleaned more frequently if inspection and maintenance activities indicate excessive sediment or debris loading.
- Establishment of a schedule such that the frequency of routine cleaning ensures that no catch basin at any time will be more than 50 percent full. A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.
- If a catch basin sump is more than 50 percent full during two consecutive routine inspections/cleaning events, Devens will document the finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources.
- Devens will maintain documentation, including metrics and other information, used to determine that the established plan for cleaning and maintenance is optimal and meets the requirements of the MS4 permit, including a log of catch basins cleaned and inspected.
- Devens will track and report the following information to EPA annually:
 - Total number of catch basins town-wide
 - Number of catch basins inspected
 - Number of catch basins cleaned
 - Total volume or mass of material removed from all catch basins

During recent cleaning seasons, data was collected including the depth from the catch basin rim to the top of sediment, to the bottom of the basin, and to the invert of the outlet pipe. This data will be

used to identify those catch basins that are filling up more quickly, and will therefore need to be cleaned more than once annually to ensure that the catch basin sump is never more than 50% full.

All catch basin cleanings are temporarily stockpiled in the northern portion of the DPW Facility, which is self-contained and erosion-free. The stockpiles are hauled to a nearby landfill as needed.

Appendix E provides Standard Operating Procedures that the DPW should follow, including:

- E.1: Catch Basin Inspection and Cleaning

5.3 Street Sweeping

Devens currently sweeps all streets once per year in the Spring, and then every four weeks as needed. Municipal parking lots are swept with the same frequency. Areas surrounding municipal facilities are kept clean to reduce the runoff of pollutants. The DPW Facility is swept at least twice per year.

The Town will continue to sweep all public roads and municipally-owned parking lots more than once per year, exceeding the minimum permit requirement and satisfying additional requirements for impaired receiving waters. The Town will report the number of miles of roadway swept and/or the volume or mass of material removed to EPA annually.

All street sweepings are temporarily stockpiled in the northern portion of the DPW Facility. Devens hires an outside contractor to haul the spoils offsite and dispose of them properly.

Appendix F provides Standard Operating Procedures that the DPW should follow, including:

- F.1: Street Sweeping

5.4 Inspection and Maintenance of Stormwater Treatment Structures

Devens conducts annual inspections of its existing stormwater treatment structures, which include detention basins, grassed swales, infiltration/leaching basins, oil/water separators and stormceptors. Maintenance of these structures is performed biannually or as-needed. When properly maintained, these structures reduce stormwater pollution and reduce stormwater facility maintenance costs. A complete inventory of existing stormwater treatment structures is included in Appendix A.

Appendix G provides Standard Operating Procedures for stormwater treatment structures, including:

- G.1: Inspection and Maintenance of Structural Stormwater Best Management Practices (BMPs)
- G.2: Stormwater Management Operation and Maintenance Plan

Many stormwater treatment structures are proprietary systems for which the manufacturer provides operation and maintenance procedures. In the event that there are conflicting operation and maintenance procedures for a stormwater treatment structure, any procedure provided by the manufacturer shall take precedent.

5.5 Winter Road Maintenance

Potential stormwater pollutants associated with winter road maintenance include chloride, sediment and various deicing materials. Pollution potential is reduced by properly storing salt and sand, minimizing the use of sodium chloride and other salts, evaluating opportunities for use of alternative materials, and ensuring that snow disposal activities do not result in disposal of snow into waters of the United States.

The Department of Public Works stores salt in the salt barn, a 5,450 square foot structure located in the southern portion of the site near Antietam Street. Salt/sand mixture is also stored in the barn for use on roads in reduced salt areas. A natural, molasses-based roadway pretreatment product is stored in two 1,000-gallon tanks outside of the salt shed. The tanks are contained with jersey barriers, and a pumping system is in place to transfer the pretreatment product from the tanks to the salt trucks.

Appendix H provides Standard Operating Procedures for winter road maintenance, including:

- H.1: Salt Use Optimization/ Winter Road Maintenance

There are other Standard Operating Procedures that are applicable to Winter Road Maintenance, which are discussed and referenced exclusively in other sections. These include the following:

- SOPs for the operation and maintenance of vehicles and equipment, which are discussed exclusively under Section 4.0, Municipal Vehicles and Equipment

APPENDIX A

Parks and Open Space Inventory

Municipal Buildings and Facilities Inventory

Municipal Vehicles and Equipment Inventory

Inventory of Town-Owned Stormwater Treatment Structures

Appendix A- Inventory of Parks and Open Space

<u>Park/ Open Space Parcel</u>	<u>Property Use</u>	<u>Parcel</u>	<u>Type of Development</u>	<u>Existing Building</u>	<u>Total Acres</u>	<u>Additional Notes from JMA</u>
15	Bulge Road	Golf Course - Club House	15-8-100		13,688	
28	Bulge Road	Golf Course - Maint BLDG	15-18-100		8,650	
95	Buena Vista Street	Athletic Field	26-99-1700	Open Space & Recreation		7.2 4+/- Acres playing fields
110	Sherman Avenue	Athletic Field - Rogers	25-2-700	Open Space & Recreation		30.2 26+/- Acres playing fields
21	Antietam Street	Athletic Field - Willard	31-99-1000	Open Space & Recreation		26.7 18+/- Acres playing fields
28	Bulge Road	Golf Course - Red Tail	15-18-100	Open Space & Recreation		99.6
2	Marne Road	Golf Course - Red Tail	11-19-100	Special Use I		55.7
3	Marne Road	Golf Course - Red Tail	11-19-200	Special Use I		40.1
79	Antietam Street	Recreation - Disc Golf	32-99-400	Open Space & Recreation		62.6 Shepley's Hill Conservation area
98	Patton Road	Recreation - Mirror Lake	6-99-201	Open Space & Recreation		154.4 4+/- Acres Recreation (beach) remainder Conservation

Appendix A - Inventory of Devens-Owned Buildings and Facilities

Appendix A - Inventory of Devens-Owned Buildings and Facilities					
Commercial/Industrial Properties & Buildings	Property Use	Parcel	Type of Development	Additional Notes from JMA	Potential Stormwater Pollution Sources
47	Balls Bluff	Natural Gas Meter Station	31-6-300		easement only Trash containers, oil/grease in parking lot
49	Barnum Road	Water Pump Station	33-7-700		out of service Trash containers, oil/grease in parking lot
143	Barnum Road	Sewer Lift Station	21-16-501		Potential Sanitary Sewer Overflows, trash containers, oil/grease in parking lots
240	Barnum Road	Post Office	20-99-102		Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
249	Barnum Road	BLDG 1477	20-13-2300		includes 249, 251 & 253 Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
251	Barnum Road	BLDG 1476	20-13-2300		includes 249, 251 & 253 Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
253	Barnum Road	BLDG 1478	20-13-2300		includes 249, 251 & 253 Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
270	Barnum Road	PS & Dispatch BLDG	20-3-500		Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
43	Buena Vista Street	Vicksburg Square - Revere Hall	25-2-1600	Office/R&D/light Manufacturing	3 story + basement Trash containers, fertilizers, oil/grease in parking areas, building washing/painting

Appendix A - Inventory of Devens-Owned Buildings and Facilities

Commercial/Industrial Properties & Buildings	Property Use	Parcel	Type of Development	Additional Notes from JMA	Potential Stormwater Pollution Sources
45	Buena Vista Street	Vicksburg Square - Allen Hall	25-2-1600	3 story + basement	Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
51	Buena Vista Street	Vicksburg Square - Hale Hall	25-2-1600	3 story + basement	Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
53	Buena Vista Street	Vicksburg Square - Kennel	25-2-1600		Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
55	Buena Vista Street	Vicksburg Square - Battan Corregidor Theater	25-2-1600	Office/R&D/light Manufacturing (RapsCALLION Brewing)	Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
59	Buena Vista Street	Vicksburg Square - Police Barracks	25-2-1600		Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
122	Sherman Avenue	Vicksburg Square - Knox Hall	25-2-1600	3 story + basement	Trash containers, fertilizers, oil/grease in parking areas, building washing/painting
95	Buena Vista Street	BLDG 227	26-99-1700		Trash containers, fertilizers, oil/grease in parking areas, building washing/painting

Appendix A - Inventory of Devens-Owned Buildings and Facilities

Commercial/Industrial Properties & Buildings	Property Use	Parcel	Type of Development	Additional Notes from JMA	Potential Stormwater Pollution Sources
99	Buena Vista Street	DPW	26-13-1500	includes 9 Cook St and HHW	Trash containers, fertilizers, oil/grease in parking areas, building washing/painting, vehicle & equipment washing, fuel storage & handling
9	Cook Street		26-13-1500	included in DPW parcel	Trash containers, fertilizers, oil/grease in parking areas, building washing/painting, vehicle & equipment washing, fuel storage & handling
109	Hospital Road	Electric SubStation	18-7-100		Trash containers, oil/grease in parking areas
111	Hospital Road	(CFS) - UNDER AGRMNT	18-7-200	Office/R&D/Manufacturing/Bio	Oil/grease in parking areas, trash containers
88	Jackson Road	BLDG 649	19-4-1500		Oil/grease in parking areas, trash containers
94	Jackson Road	BLDG 655	19-4-1500		Oil/grease in parking areas, trash containers
100	Jackson Road	BLDG 650	19-4-1500		Oil/grease in parking areas, trash containers
182	Jackson Road	Fire House	20-99-1200		Trash containers, oil/grease in parking areas, vehicle/equipment maintenance and washing
37	Lake George Street	Electric SubStation	13-21-701		Trash containers, oil/grease in parking areas
31	MacArthur Avenue		19-4-1601	Office/R&D/Manufacturing/Bio	Trash containers, oil/grease in parking areas
44	MacPherson Road	Municipal Well	35-00-700	new structures under construction	Erosion and sedimentation

Appendix A - Inventory of Devens-Owned Buildings and Facilities

	Commercial/Industrial Properties & Buildings	Property Use	Parcel	Type of Development	Additional Notes from JMA	Potential Stormwater Pollution Sources
131	MacPherson Road	Sewer Lift Station	40-99-2100			Potential Sanitary Sewer Overflows, trash containers, oil/grease in parking areas
165	MacPherson Road	Army property at Airfield	46-15-100			Oil/grease in parking areas and on airstrip
177	MacPherson Road	Army property at Airfield	46-15-201			Oil/grease in parking areas and on airstrip
168	Patton Road	Municipal Well	11-99-204		new structures under construction	Trash containers, oil/grease in parking areas, erosion and sedimentation
254	Patton Road	Natural Gas Take Station	16-99-105.1			Trash containers, oil/grease in parking areas
263	Patton Road	Sewer Lift Station			included in ROW of Patton	Potential Sanitary Sewer Overflows, trash containers, oil/grease in parking areas
81	Saratoga BLVD	Electric SubStation	26-13-2200			Trash containers, oil/grease in parking areas
88	Sheridan Road	Municipal Well	2-99-202		new structures under construction	Trash containers, oil/grease in parking areas
93	Sherman Avenue		25-2-900	Office/R&D/light Manufacturing	This site is subdividable	Trash containers, oil/grease in parking areas, building painting/washing
95	Sherman Avenue		25-2-900	Office/R&D/light Manufacturing	This site is subdividable	Trash containers, oil/grease in parking areas, building painting/washing
97	Sherman Avenue		25-2-900	Office/R&D/light Manufacturing	This site is subdividable	Trash containers, oil/grease in parking areas, building painting/washing
101	Sherman Avenue		25-2-1000	Office/R&D/light Manufacturing	This site is subdividable	Trash containers, oil/grease in parking areas, building painting/washing
293	West Main Street	Electric SubStation	31-99-401			Trash containers, oil/grease in parking areas

Appendix A - Inventory of Devens-Owned Buildings and Facilities

Appendix A - Inventory of Devens-Owned Buildings and Facilities					
Commercial/Industrial Properties & Buildings	Property Use	Parcel	Type of Development	Additional Notes from JMA	Potential Stormwater Pollution Sources
	Devens Regional Wastewater Treatment Facility				Potential Sanitary Sewer Overflows, trash containers, oil/grease in parking lots
11	Grant Road (CFS Option Parcel)	19-8-400	Office/R&D/Manufacturing/Bio	13.2 Ac. if include former "buffer strip"	Currently open space - monitor for construction or change in use
151	Barnum Road (GFI)	21-16-500	Office/R&D/light Manufacturing		Currently open space - monitor for construction or change in use
16	Bulge Road (Project Eagle)	16-18-200	Office/R&D/light Manufacturing		Currently open space - monitor for construction or change in use
145	MacPherson Road Airfield	44-15-200	Manufacturing/R&D	Total commercial area=229 acres - subject to NHESP restriction	Currently open space - monitor for construction or change in use
205	Jackson Road Chapel Site	25-9-100	Office/R&D/light Manufacturing		Currently open space - monitor for construction or change in use
40	Salerno Circle Salerno Housing Area	3-19-300	Office/R&D/Bio	25 acres adjacent if needed but outside of commercial zone.	Currently open space - monitor for construction or change in use
8	Balls Bluff	31-2-1400			Currently open space - monitor for construction or change in use
0	Buena Vista Street	25-2-1102		a lot of wetlands	Currently open space - monitor for construction or change in use
15	Buena Vista Street	31-2-1300	Office/R&D/light Manufacturing	Up to 11.2 Acres if lots are pushed all the way to Antietam St.	Currently open space - monitor for construction or change in use
4	Grant Road	19-8-600		significant topo issues	Currently open space - monitor for construction or change in use
59	Grant Road	24-8-100		Limited by housing cap and policy to not to compete with Emerson Green	Currently open space - monitor for construction or change in use
140	Grant Road	24-6-200		Limited by housing cap and policy to not to compete with Emerson Green	Currently open space - monitor for construction or change in use

Appendix A - Inventory of Devens-Owned Buildings and Facilities

	<u>Commercial/Industrial Properties & Buildings</u>	<u>Property Use</u>	<u>Parcel</u>	<u>Type of Development</u>	<u>Additional Notes from JMA</u>	<u>Potential Stormwater Pollution Sources</u>
160	Grant Road (partial)		31-6-300		Limited by housing cap and policy to not to compete with Emerson Green	Currently open space - monitor for construction or change in use
63	Hospital Road		23-23-400	Retail/Office/Medical/Sr. Housing		Currently open space - monitor for construction or change in use
63	Hospital Road		23-23-400		Limited to 62 units of senior housing, site/acres not specified. Showing 0 acres because already included in commercial/industrial properties.	Currently open space - monitor for construction or change in use
105	Hospital Road		18-7-300	Office/R&D/Manufacturing/Bio		Currently open space - monitor for construction or change in use
33	Lake George Street		8-21-401	Office/R&D/light Manufacturing		Currently open space - monitor for construction or change in use
15	Pine Road		25-8-700		topo issues	Currently open space - monitor for construction or change in use
105	Sherman Avenue		25-2-1100	Office/R&D/light Manufacturing		Currently open space - monitor for construction or change in use
125	Sherman Avenue		31-2-1500			Currently open space - monitor for construction or change in use

Appendix A - Inventory of Vehicles and Equipment

Name	Description	Dept.	Location
VEH01A	2011 Ford Explorer FMHK8D84BGA39546	DPW	Devens
VEH002	19 Ford F350 1FTRF3BTXKEE17128	DPW	Devens
VEH005	07 INTER 4000 1HTMMAAR57H34750	DPW	Devens
VEH006	21 FRIEIGHTLINER M2 3ALACWD23MDMH3379	DPW	Devens
VEH009	2019 Ford Transit 250 1FTYR1CM8KKA23871	DPW	Devens
VEH016	19 Freightliner 108SD 1FVAG5D28KHKE6713	DPW	Devens
VEH019	09 INTER 7000 1HTWAAARX9J154851	DPW	Devens
VEH020	06 FORD F SER 1FTWF31P96EC80356	DPW	Devens
VEH021	05 FORD F SER 1FDWW37P35EA65878	DPW	Devens
VEH022	97 FORD F SER 1FDKF38F3VEC75661	DPW	Devens
VEH023	10 FORD F SER 1FTWX3BR8AEA89730	DPW	Devens
VEH024	10 FORD F SER 1FTWF3BR6AEA89731	DPW	Devens
VEH025	11 FORD F SER 1FDWF37R59EA61080	DPW	Devens
VEH029	05 FORD F SER 1FDSF34595EA40436	DPW	Devens
VEH035	06 NEW H TN85D HJE05650	DPW	Devens
VEH038	80 FORD 6610 C69651	DPW	Devens
VEH042	97 NEW H 31006008	DPW	Devens
VEH047	86 BROWE SUCKE BV85155	DPW	Devens
VEH056	06 MMC M BOARD 0606M306	DPW	Devens
VEH050	10 VOLVO 62663 LOADER	DPW	Devens
VEH025	09 FORD F SER 1FDWF37R59EA61080	DPW	Devens
VEH055	11 BOBCA MY12 AJNU11803	DPW	Devens
VEH026	09 FORD F SER 1FDWF37R99EA61079	DPW	Devens
VEH018	03 FORD F SER 3FDPF75H83MB07086	DPW	Devens
VEH032	12 KUBOT TRACT M7040F121385	DPW	Devens
VEH049	68 JOHNS TRAIL 698468	DPW	Devens
VEH017	14 INTER 7000 1HTWAAAR7EH022275	DPW	Devens
VEH034	14 KUBOT M7040 30304	DPW	Devens
VEH014	17 FORD 1FDUF5HY5HDA02124	DPW	Devens
VEH031	16 NEW HOLLAND ZGAH51893	DPW	Devens
VEH007	17 FORD TRANSIT 250 1FTYR1CM0HKKB30602	DPW	Devens
VEH041	17 VOLVO L70H VCE0L70HL0S622715 LOADER	DPW	Devens
VEH004	18 FORD F350 PICK UP 1FT8W3B60JEC28010	DPW	Devens
VEH012	2018 Elgin Wirwind Sweeper	DPW	Devens
Bobcat S130	Bobcat S130 and H71 - 529219075	DPW	Devens
Bobcat 770	Bobcat T770 Track - AT6324107	DPW	Devens
Bobcat E42	Bobcat E42 - B4GM11386	DPW	Devens
Holder C70	Holder C70 - WHO222PGZHMP0129	DPW	Devens
Olymp Generator	02 OLYMP GENERATOR 0NNS00488	DPW	Devens
Ladder 1	Ladder -Rescue	Fire	Station
Engine 3	Pumper	Fire	9 Cook Street
Engine 4	Pumper	Fire	Station
Engine 6	Fast Attack Brush	Fire	Station (Spring - Late Fall)

Appendix A - Inventory of Vehicles and Equipment

Name	Description	Dept.	Location
Tanker 1	Brush Tanker	Fire	Outside at Station summer
Forestry 1	AWD Brush Truck	Fire	OOS - Behind station
Rescue 1	Rescue truck	Fire	9 Cook Street
Ambulance 1	Ambulance	Fire	Station
Car 1	Chief's Car	Fire	Station - Outside
Car 2	Deputy's Car	Fire	Station - Outside
Car 3	Fire Prevention Car	Fire	Station - Outside
Service 1	Utility vehicle	Fire	Station - Outside
Rescue Boat		Fire	In Station on Trailer
Argo		Fire	In trailer behind station
Golf Cart	EMS Golf Cart	Fire	9 Cook Street when not needed
Flame House	Trailer	Fire	9 Cook Street
Rope trailer	Trailer	Fire	9 Cook Street
Foam Trailer	Trailer	Fire	9 Cook Street
First Aid Shelter	Trailer	Fire	Behind Station
Fire Alarm	Trailer	Fire	9 Cook Street
Argo trailer	Trailer	Fire	Behind Station
Trench	Trailer	Fire	Behind Station
MDU	Trailer	Fire	9 Cook street
HAZMAT	Trailer	Fire	Behind Station
Boat	Trailer	Fire	In Station

Devens, MA		
Inventory of Municipally-Owned Stormwater Treatment BMPs		
ID	BMP Type	Location
DET-1	Detention Pond	112 Barnum Road
DET-2	Detention Pond	Jackson Road & Patton Road
DET-3	Detention Pond	Barnum Rd & Saratoga Blvd
DET-4	Detention Pond	112 Barnum Road
DET-5	Detention Pond	JR1 - 53 Jackson Road
DET-6	Detention Pond	2 Buena Vista Street
DET-7	Detention Pond	Hospital Rd-Givry St
DET-8	Detention Pond	2 Buena Vista Street
DET-9	Detention Pond	56 Barnum Rd
DET-10	Detention Pond	Jackson Rd - Across from Job Corps
DET-11	Detention Pond	Barnum Road near Willow Branch
DET-12	Detention Pond	Barnum Road near Willow Branch
DET-13	Detention Pond	14 Robbins Pond Road
DET-14	Detention Pond	Grant Road Housing - Phase I
DET-15	Detention Pond	Antietam Street near DPW
DET-16	Detention Pond	51 Independence Drive
DET-17	Detention Pond	51 Independence Drive
DET-18	Detention Pond	Patton Road & Marne Street
DET-19	Detention Pond	Jackson Road & Antietam Street
DET-20	Detention Pond	Jackson Road & Antietam Street
DET-21	Detention Pond	Jackson Road & Antietam Street
DET-22	Detention Pond	Jackson Road & Antietam Street
DET-23	Detention Pond	Jackson Road & Cavite Street
DET-24	Detention Pond	Jackson Road & Cavite Street
DET-25	Detention Pond	Buena Vista Street & Cooke Street
OWS-1	Oil-Water Separator	Barnum Rd & Adams Cir
OWS-2	Oil-Water Separator	Barnum Rd & Adams Cir
OWS-3	Oil-Water Separator	Barnum Rd & Adams Cir
OWS-4	Oil-Water Separator	Across from 270 Jackson Road
SW-1	Swale	Behind 1 Jackson Place
SW-2	Swale	Hospital Road & Givry St

APPENDIX B

Standard Operating Procedure – Parks and Open Space

B.1: Parks and Open Space Management

B.2: Storage and Use of Pesticides and Fertilizer

Standard Operating Procedures

Devens, MA

Department of Public Works

Issue Date:

JUN 2022

B.1: Parks and Open Space Management

Approved by:

Public Works Director (or similar)

MA Small MS4 General Permit Requirement Summary:

Part 2.3.7.a.i.

Within two (2) years from the effective date of the permit, the permittee shall develop, if not already developed, written (hardcopy or electronic) operations and maintenance procedures for [Parks and open space]. These written procedures shall be included as part of the SWMP.

Part 2.3.7.a.ii.1.

Establish procedures to address the proper use, storage, and disposal of pesticides, herbicides, and fertilizers including minimizing the use of these products and using only in accordance manufacturer's instruction. Evaluate lawn maintenance and landscaping activities to ensure practices are protective of water quality. Protective practices include reduced mowing frequencies, proper disposal of lawn clippings, and use of alternative landscaping materials (e.g., drought resistant planting). Establish pet waste handling collection and disposal locations at all parks and open space where pets are permitted, including the placing of proper signage concerning the proper collection and disposal of pet waste. Establish procedures to address waterfowl congregation areas where appropriate to reduce waterfowl droppings from entering the MS4. Establish procedures for management of trash containers at parks and open space (scheduled cleanings; sufficient number). Establish procedures to address erosion or poor vegetative cover when the permittee becomes aware of it; especially if the erosion is within 50 feet of a surface water.

Municipal Parks and Open Space Inventory

The following is a list of properties covered by these procedures. This inventory shall be updated annually during SWMP review.

Park/Open Space Area	Address/Location	Lawn Mowing	Landscaping	Fertilizing	Pesticide/Herbicide	Trash mgmt.	Pet waste mgmt.	Waterfowl mgmt.	Other maintenance:
Red Tail Golf Course	28 Bulge Road; 2-3 Marne Road	X	X	X	X	X	X		
Athletic Field	95 Buena Vista Street	X	X	X	X	X	X		
Rogers Field	110 Sherman Ave	X	X	X	X	X	X		
Willard Field	21 Antietam Street	X	X	X	X	X	X		
Disc Golf Course	79 Antietam Street					X	X		
Mirror Lake Recreation Area	98 Patton Road					X	X	X	

Standard Operating Procedures

Devens, MA

Department of Public Works

Issue Date:

JUN 2022

B.1: Parks and Open Space Management

Personnel

The following personnel are responsible for municipal parks and open space management. Employees performing the procedures in this SOP shall attend annual stormwater pollution prevention training.

Name	Responsibility
Shane Melone	Oversees the implementation of this SOP
Andrew Pelletier	Assists in the implementation of this SOP

Lawn Mowing

Occurs at the following parks:

Red Tail Golf Course, Athletic Field, Rogers Field, Willard Field Complex

On the following schedule:

In the spring/summer months, the lawn is mowed weekly. Lawns are not mowed during the fall and winter months.

Responsible Personnel:

Shane Melone, Andrew Pelletier

Standard Operating Procedures:

- Lawns shall be mowed to a height of 2.5".
- Mowing pattern shall vary to prevent ruts and promote even growth.
- Grass clippings shall be mulched using a mulching mower OR disposed of at the Transfer Station so as to avoid entering the storm drain system.

Pesticide, Herbicide, and Fertilizer Use

Occurs at the following parks:

Red Tail Golf Course, Athletic Field, Rogers Field, Willard Field

On the following schedule:

Fertilizer is applied as needed on the fields indicated above. Phosphorus-free fertilizer is used in the spring and summer months. Fertilizer containing phosphorus is used in the fall as a starter/winterizer.

Responsible Personnel:

Shane Melone, Andrew Pelletier

Standard Operating Procedures:

- Fertilizer shall be applied as needed by properly trained personnel.
- Fertilizer application shall follow manufacturer instructions and guidance.

Standard Operating Procedures

Devens, MA

Department of Public Works

Issue Date:

JUN 2022

B.1: Parks and Open Space Management

Other Landscaping

Involves the following:

- Weeding
- Planting/reseeding
- Pruning
- Leaf litter removal

Occurs at the following parks:

All parks listed above.

On the following schedule:

Landscape areas are planted/reseeded once annually in the spring. During the summer months, they are pruned/weeded as needed but not less than once per month. Leaf litter is removed from parks once annually in the fall.

Responsible Personnel:

Shane Melone, Andrew Pelletier

Standard Operating Procedures:

- Landscaping waste shall be disposed of at the DPW Facility so as to avoid entering the storm drain system.
- Weeding shall be done manually where possible to reduce herbicide use.
- Leaf litter shall be disposed of at the Transfer Station so as to avoid entering the storm drain system.

Trash Management

Trash cans and/or dumpsters are located in the following parks:

All parks mentioned above.

Emptying and replacing bags/inspecting for leaks shall take place on the following schedule:

Trash receptacles are emptied as needed by the Department of Public Works.

Responsible Personnel:

Shane Melone

Additional trash cans or other necessary equipment shall be ordered by the Department of Public Works' Facilities Manager based on the results of park inspections.

Parks shall be inspected and cleaned for litter once per year.

Pet waste signage is located at all parks.

Standard Operating Procedures

Devens, MA

Department of Public Works

Issue Date:

JUN 2022

B.1: Parks and Open Space Management

Additional pet waste receptacles, signage, bags, etc. shall be ordered by the Department of Public Works based on the results of park inspections.

Other Park Management

Procedures for addressing waterfowl congregation and waste at specific parks:

The DPW cleans up waste from waterfowl as needed at parks with water features. The DPW will also install and maintain “Don’t Feed the Geese” signage as needed to manage waterfowl congregation.

Procedures for addressing the emptying and cleaning of water features:

- Allow 2 hours for dechlorination
- Store disinfection chemicals indoors in secondary containment
- Train staff on spill response procedures at least annually

Procedures for washing or cleaning park impervious surfaces:

- Parking lots in parks shall be swept at the frequency specified for municipally-owned parking lots in SOP F.1
- Impervious surfaces such as paths and walkways which are salted or treated in the winter shall be swept once per year following the conclusion of winter deicing operations

Procedures for correcting areas experiencing erosion:

- Areas shall be temporarily stabilized with seeding
- Sediment and erosion shall be controlled with filter fabric or compost filter sock
- Grass or native plants shall be re-established as quickly as possible

B2: Storage and Use of Pesticides and Fertilizer

Introduction

The use and improper storage of pesticides, herbicides, and fertilizers can contribute to the discharge of nutrients and toxic compounds to the municipal storm drainage system and surface waters. The goal of this Standard Operating Procedure (SOP) is to provide guidance on municipal employees on proper handling and storage of pesticides, herbicides, and fertilizers to prevent the discharge of pollutants from the MS4.

The Devens Department of Public Works stores all pesticides, herbicides, and fertilizers indoors in a confined area of the DPW facility. Application of pesticides and fertilizers is performed by properly trained DPW staff. Phosphorus-free fertilizers are used in the spring and summer, but a slow-release fertilizer containing phosphorus is used as a starter/winterizer in the fall.

Procedures

Below are procedures for the storage and use of fertilizers, pesticides, and herbicides by municipal employees. In this section, the term “pesticide” include products used as herbicides. Refer to SOP 4: Spill Response and Cleanup and SOP 17: Hazardous Materials Storage and Handling for information on and handling spills and hazardous materials.

Storage

- Store pesticides and fertilizers in high, dry locations in accordance with the manufacturer’s specifications.
- Store in cool, well-ventilated, and insulated areas to protect against temperature extremes.
- Store in areas that have been constructed in accordance with local fire codes for storing flammable or combustible materials.
 - Flammable products should be stored separately from non-flammable products, preferably in a fire-proof cabinet.
 - Small quantities (less than 500 lbs. or 220 gallons) of pesticides can be stored in cabinets constructed of double-walled 18-gauge sheet metal.
 - Large quantities (greater than 500 lbs. or 220 gallons) of pesticides can be stored in a prefabricated Hazardous Material Storage building or in a purpose-built storage facility. It is not anticipated that many municipal facilities will store quantities in excess of 500 lbs. or 220 gallons of pesticides.
 - Building walls should have a two-hour fire rating and be impervious to the stored materials.
 - Floors should be watertight, impervious, and provide spill containment.
- Store materials in an enclosed area or in covered, impervious containment, such as a locked cabinet. The cabinet should be located in a first story room or one that has direct access to the outdoors. Storage areas should be equipped with easily accessible spill cleanup materials and portable firefighting equipment. Regularly inspect storage areas for leaks and spills. Emergency eyewash stations and emergency drench showers should be located near the storage area.
- For pesticides, storage cabinets should be kept locked and the door to the storage area should contain a weather proof sign that warns of the existence and danger of the pesticides inside. The

door should be kept locked. The sign should be visible at a distance of 25 feet and should read as follows:

DANGER
PESTICIDE STORAGE AREA
ALL UNAUTHORIZED PERSONS KEEP OUT
KEEP DOORS LOCKED WHEN NOT IN USE

The sign should be posted in both English and any other language used by maintenance workers.

- Pesticides should not be stored in the same place as ammonium nitrate fertilizer.
- Separate pesticides and fertilizers from other chemical storage and other flammable materials.
- Label all containers with date of purchase. Clearly label all secondary containers. Use older materials first.
- Order for delivery as close to the time of use as possible to reduce the amount of chemicals stored at the facility.
- Order only the amount of materials needed in order to minimize excess or obsolete materials, which require storage and disposal.
- Never leave unlabeled or unstable pesticides and fertilizers in uncontrolled locations.
- Maintain a current written inventory of all pesticides and fertilizers at the storage site.
- Ensure that contaminated waste materials are kept in designated containers and stored in labeled, designated, covered, and contained areas.
- Dispose of excess or obsolete pesticides/fertilizers and associated waste materials in accordance with the manufacturer's specification and all applicable regulations.

Use and Application of Fertilizers

- All fertilizer products manufactured or distributed in the State of Massachusetts must be registered with the Department of Agricultural Resources.
- Perform soil testing before choosing a fertilizer. The quantity of available nutrients already present in the soil will determine the type and amount of fertilizer that is recommended. The soil test will also determine the soil pH, humic matter, texture, and exchangeable acidity, which will indicate whether pH adjustment is required for fertilizer to work efficiently. A soil test should be completed at each facility, as soil type can vary widely within a single community.
 - Soil tests are recommended every 3-4 years for turf and plantings (more frequently for problem or newly planted areas) and every year for soil where phosphorus-containing fertilizers are used. Soil pH tests should be conducted every year for all sites.
 - When collecting soil samples, take multiple samples for each target area at a four-inch depth; mix the samples together in a container and properly label the sample with property information and site use type. Separately sample areas that have discoloration, abnormal plant growth, or other problems. Take the sample at approximately the same time every year. If the area has been fertilized, wait eight weeks after fertilizing to test the soil to ensure nutrients have been absorbed.
- When selecting the optimal type of fertilizer to use on an area, consider the soil test results, type of turf, and type of turf use. Slow-use fertilizer should be used for turf grass.
- Calibrate application equipment regularly to ensure proper application and loading rates.

- Mix fertilizers using clean application equipment under cover in an area where accidental spills will not enter surface water or groundwater and will not contaminate the soil.
- Fertilizers should only be applied by properly trained personnel.
- Never apply fertilizers in quantities exceeding the manufacturer's instructions. Instead, apply small amounts throughout the growing season.
- Time fertilizer application methods for maximum plant uptake, usually in the fall and spring (e.g., between April 15 and October 15). When applying at the beginning and end of planting season, take into consideration the slower uptake rate of fertilizer by plants and adjust the fertilizer application accordingly.
- Never apply fertilizer during a drought, when the soil is dry or frozen, when it is raining, or immediately before expected rain.
- Fertilizer should be applied when the ground temperature is above 55° F.
- Apply fertilizers in amounts appropriate for the type of vegetation to minimize losses to surface water and groundwater. Use the results of the soil test to determine optimal fertilizer timing and application rates.
- Where applicable, till fertilizers into the soil rather than dumping or broadcasting (proper application techniques will depend on the type of soil and vegetation).
- Do not hose down paved areas after fertilizer application if drainage will enter into an engineered storm drain system or drainage ditch.
- Limit irrigation after fertilizer application to prevent runoff (approximately ½ inch of water per application for a week following application).
- Turn off irrigation systems during periods of adequate rainfall.
- Do not over-apply fertilizer in late fall to “use it up” before winter. The effectiveness of fertilizer does not reduce when stored.
- If phosphorus fertilizer is used when re-seeding, mix the phosphorus into the root zone. Do not apply directly to the soil surface.
- Avoid combined products such as “weed and feed,” which do not target specific problems at the appropriate time.

Use and Application of Pesticides and Herbicides

The State of Massachusetts has a stringent program for registration of pesticides and certification of those authorized to apply them. Once a pesticide has been approved for use by the USEPA, it must be registered by the Massachusetts Pesticide Board Subcommittee prior to being distributed, purchased, or used in Massachusetts. Pesticide classification in Massachusetts is based on the potential adverse effects the pesticide may have on humans or the environment. “Restricted Use” pesticides can only be sold by Licensed Dealers to Certified Applicators, while “State Limited Use” pesticides may be restricted to use by certain individuals or require written permission from the Department of Agricultural Resources prior to use. Legal application of pesticides must be performed by an individual licensed or certified by the Massachusetts Department of Agricultural Resources. A Commercial Applicator License is required for applying general use pesticides, and a Commercial Applicator Certification is required for applying restricted and state limited use products.

Use and Application of Pesticides

- Pesticides should only be applied by licensed or certified applicators.

- Calibrate application equipment regularly to ensure proper application and loading rates.
- Ensure that pesticide application equipment is capable of immediate shutoff in case of emergency.
- Conduct spray applications according to specific label directions and applicable local regulations.
- Never apply pesticides in quantities exceeding the manufacturer's instructions.
- Apply pesticides at the life stage when the pest is most vulnerable.
- Never apply pesticides if it is raining or immediately before expected rain.
- Establish setback distances from pavement, storm drains, and waterbodies, which act as buffers from pesticide application, with disease-resistant plants and minimal mowing.
- Do not apply pesticides within 100 feet of open waters or of drainage channels.
- Spot treat infected areas instead of the entire location.
- Mix pesticides and clean application equipment under cover in an area where accidental spills will not enter surface water or groundwater and will not contaminate soil.
- Do not hose down paved areas after pesticide application to a storm drain or drainage ditch.
- Recycle rinsate from equipment cleaning back into product.
- Choose the least toxic pesticide that is still capable of reducing the infestation to acceptable levels.
- Use alternatives to pesticides, such as manual weed control, biological controls, and Integrated Pest Management strategies (learn more at: <https://www.mass.gov/files/documents/2016/08/wk/ipm-kit-for-bldg-mgrs.pdf>).
- For the use of herbicides, reduce seed release of weeds by timing cutting and pesticide application at seed set. Select vegetation and landscaping that is low-maintenance in order to tolerate low levels of weeds without interfering with aesthetics.

Employee Training

- Employees who handle pesticides, fertilizers, and herbicides are trained once per year on proper handling and storage procedures.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Related Standard Operating Procedures

- SOP 4: Spill Response and Cleanup
- SOP 17: Hazardous Materials Storage and Handling

APPENDIX C

Standard Operating Procedures – Municipal Buildings and Facilities

C.1 Fuel and Oil Handling

C.2 Hazardous Materials Storage and Handling

C.3 Spill Response

C.4 Operation and Maintenance of Buildings and Facilities

C.1: Fuel and Oil Handling

Introduction

Spills, leaks, and overfilling can occur during handling of fuels and petroleum-based materials, representing a potential source of stormwater pollution, even in small volumes. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees on a variety of ways by which fuels and petroleum-based materials can be delivered, as well as steps to be taken when petroleum products (such as waste oil) are loaded onto vehicles for offsite disposal or recycling. Delivery, unloading, and loading of waste oils are hereafter referred to as “handling.” Attached is a fuel delivery form checklist.

Devens undertakes various procedures and precautions in handling fuel and oil, as described in Section 3.0 of the Town’s Operation and Maintenance Plan.

Procedures

Devens will implement the following fuel and oil handling procedures to help reduce the discharge of pollutants from the MS4:

General Guidelines

For all manners of fuel and oil handling described below, a member of the facility’s Pollution Prevention Team (if the facility has a SWPPP) or another knowledgeable person familiar with the facility should be present during handling procedures. This person should ensure that the following are observed:

- There is no smoking while fuel handling is in process or underway.
- Sources of flame are kept away while fuel handling is being completed. This includes smoking, lighting matches, carrying any flame, or carrying a lighted cigar, pipe, or cigarette.
- The delivery vehicle’s hand brake is set and wheels are chocked while the activity is being completed.
- Catch basins and drain manholes are adequately protected.
- No tools are to be used that could damage fuel or oil containers or the delivery vehicle.
- No flammable liquid should be unloaded from any motor vehicle while the engine is operating, unless the engine of the motor vehicle is required to be used for the operation of a pump.
- Ensure that local traffic does not interfere with fuel transfer operations. If it does, make appropriate accommodations.
- The attending persons should watch for any leaks or spills:
 - Any small leaks or spills should be immediately stopped, and spilled materials absorbed and disposed of properly. Follow the procedures in SOP C.3: Spill Response and Cleanup.
 - In the event of a large spill or one that discharges to surface waters or an engineered storm drain system, the facility representative should activate the facility’s Stormwater Pollution Prevention Plan (SWPPP) and report the incident as specified in the document.

Delivery by Bulk (Tanker) Truck

Procedures for the delivery of bulk fuel should include the following:

- The truck driver should check in with the facility upon arrival.

- The facility representative should ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible. Refer to SOP C.3: Spill Response and Cleanup for examples of spill cleanup and response materials.
- The facility representative should check to ensure that the amount of delivery does not exceed the available capacity of the tank.
 - A level gauge can be used to verify the level in the tank.
 - If a level gauge is not functioning or is not present on the tank, the tank should be stick tested prior to filling.
- The truck driver and the facility representative should both remain with the vehicle during the delivery process.
- The truck driver and the facility representative should inspect all visible lines, connections, and valves for leaks.
- When delivery is complete and the hoses are removed, buckets should be placed underneath connection points to catch drippings.
- The delivery vehicle should be inspected prior to departure to ensure that the hose is disconnected from the tank.
- The facility representative should inspect the fuel tank to verify that no leaks have occurred, or that any leaked or spilled material has been cleaned and disposed of properly.
- The facility representative should gauge tank levels to ensure that the proper amount of fuel is delivered, and collect a receipt from the truck driver.

Delivery of Drummed Materials

Drummed materials may include motor oil, hydraulic fluid, transmission fluid, or waste oil from another facility (as approved). Procedures for the delivery of drummed materials should include the following:

- The truck driver should check in with the facility upon arrival.
- The facility representative should ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible. Refer to SOP C.3: Spill Response and Cleanup for examples of spill cleanup and response materials. The facility representative should closely examine the shipment for damaged drums.
 - If damaged drums are found, they should be closely inspected for leaks or punctures.
 - Breached drums should be removed to a dry, well-ventilated area and the contents transferred to other suitable containers.
 - Drums should be disposed of in accordance with all applicable regulations.
- Drummed materials should not be unloaded outdoors during wet weather events.
- The truck driver and the facility representative should both remain with the vehicle during the delivery process.
- Drums should be handled and unloaded carefully to prevent damage.
- Upon completion of unloading, the facility representative should inspect the unloading point and the drums to verify that no leaks have occurred, that any leaked or spilled material has been cleaned up and disposed of properly, and that the unloaded drums are not leaking.
- The facility representative should check to ensure that the proper amount of fuel or other material is delivered, and collect a receipt from the truck driver.

Removal of Waste Oil from the Facility

When waste oil or similar oil products need to be removed from the premises, only haulers certified to transport waste oil should be utilized. Procedures should include the following:

- The disposal truck driver should check in with the facility upon arrival.
- The facility representative should ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible. Refer to SOP C.3: Spill Response and Cleanup for examples of spill cleanup and response materials. The truck driver and the facility representative should both remain with the vehicle during the tank draining process.
- When draining is complete and the hoses are removed, buckets should be placed underneath connection points to catch drippings.
- The facility representative should inspect the loading point and the tank to verify that no leaks have occurred, or that any leaked or spilled material has been cleaned up and disposed of properly.
- The facility representative should collect a receipt from the truck driver.
- When draining bulk oil tanks:
 - The facility representative should verify that the volume of waste oil in the tank does not exceed the available capacity of the disposal hauler's vehicle.
 - The disposal hauler vehicle should be inspected prior to departure to ensure that the hose is disconnected from the tank.

Employee Training

- Employees who handle or deliver fuel and/or oil are trained once per year on proper procedures.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Attachments

1. Fuel Delivery Checklist

Related Standard Operating Procedures

- C.3: Spill Response and Cleanup

FUEL DELIVERY FORM
DEVENS, MA

Date: _____
Time of Arrival: _____
Time of Departure: _____
Truck Number: _____
Name of Truck Driver: _____
Name of Town Employee: _____

BEFORE UNLOADING:

Is all spill response equipment and personal protective equipment in place?

Yes No

In the case of bulk fuel delivery, does tank capacity exceed the amount of delivery?

Yes No N/A

In the case of drum fuel delivery, are all drums free of leaks and punctures?

Yes No N/A

COMMENCE UNLOADING. REMAIN WITH VEHICLE AT ALL TIMES.

AFTER UNLOADING IS COMPLETE:

Have all fuel containers, including the vehicle, been inspected for leaks?

Yes No

Has the ground at the unloading point been inspected for evidence of leaks?

Yes No

If there are any leaks or spills, has the material been properly cleaned?

Yes No

Has the correct amount of fuel been delivered?

Yes No

Has a receipt been collected?

Yes No

DELIVERY IS COMPLETE.

C.2: Hazardous Materials Storage and Handling

Introduction

A hazardous material is any biological, chemical, or physical material with properties that make it dangerous or potentially harmful to human health or the environment. Hazardous materials can be released to the environment in a variety of ways. When hazardous materials come into contact with rain or snow, the pollutants are washed into the storm sewer system and to surface waterbodies and/or groundwater. Hazardous materials associated with municipal facilities and their operations include, but are not limited to, oil, gasoline, antifreeze, fertilizers, pesticides, and de-icing agents and additives.

Municipally owned or managed facilities where hazardous materials are commonly stored and handled include:

- Equipment storage and maintenance yards
- Hazardous waste disposal facilities
- Hazardous waste handling and transfer facilities
- Composting facilities
- Materials storage yards
- Municipal buildings and facilities (e.g., schools, libraries, police and fire departments, town offices, municipal pools, and parking garages)
- Public works yards
- Solid waste handling and transfer facilities
- Vehicle storage and maintenance yards
- Water and wastewater facilities

Minimizing or eliminating contact of hazardous materials with stormwater can significantly reduce pollution of receiving waters. Proper hazardous material handling and storage also contributes to employee health, an organized workplace, and efficient operations. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees to help prevent stormwater pollution resulting from the handling and storage of hazardous materials. If services are contracted, this SOP should be provided to the contractor. The contract should also specify that the contractor is responsible for compliance with all applicable laws.

Devens undertakes various activities in regards to handling and storing hazardous materials. These activities are outlined in Section 3.2 of the Operation and Maintenance Plan.

Procedures

Devens will implement the following procedures for handling and storing hazardous materials to reduce the discharge of pollutants to the MS4:

Handling, Loading, and Unloading

- Avoid loading/unloading materials in the rain and/or provide cover.
- Retrace areas where materials have been transferred to identify spills. If spills are found, immediately

clean them up. Follow procedures in SOP C.3: Spill Response and Cleanup.

- Time delivery and handling of materials during favorable weather conditions whenever possible (e.g., avoid receiving loads of sand during windy weather).
- Inspect containers for material compatibility and structural integrity prior to loading/unloading any raw or waste materials.
- Use dry cleanup methods (e.g., squeegee and dust pan, sweeping, and absorbents as last step) rather than hosing down surfaces.

Material Storage

- Confine material storage indoors whenever possible. Plug or disconnect floor drains that lead to the stormwater system.
- Confine outdoor material storage to designated areas that are covered, on impervious surfaces, away from high traffic areas, and outside of drainage pathways.
- Store containers on pallets or equivalent structures to facilitate leak inspection and to prevent contact with wet floors that can cause corrosion. This technique also reduces incidences of container damage by insects and rodents.
- Store materials and waste in materially compatible containment units.
- Keep hazardous materials in their original containers.
- If materials are not in their original containers, clearly label all storage containers with the name of the chemical, the expiration date, and handling instructions.
- Maintain an inventory of all raw and waste materials to identify leakage. Order new materials only when needed.
- Provide secondary containment for storage tanks and drums with sufficient volume to store 110 percent of the volume of the material.
- Provide sufficient aisle space to allow for routine inspections and access for spill cleanup.
- Inspect storage areas for spills or leaks and containment units for corrosion or other failures.

Waste Treatment, Disposal, and Cleanup

- Adopt a regular schedule for the pick-up and disposal of waste materials.
- Recycle leftover materials whenever possible.
- Substitute nonhazardous or less-hazardous materials for hazardous materials whenever possible.
- Protect empty containers from exposure to stormwater and dispose of them regularly to avoid contamination from container residues.

Employee Training

- Employees who handle and use hazardous materials are trained once per year on these procedures.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

C.3: Spill Response and Cleanup

Introduction

Municipalities are responsible for any contaminant spill or release that occurs on property that they own or operate. Particular areas of concern include any facilities that use or store chemicals, fuel oil, or hazardous waste, including schools, garages, and landfills. Implementation of proper spill response and cleanup procedures can help to mitigate the effects of a contaminant release. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees to help reduce the discharge of pollutants from the MS4 as a result of spills or releases.

Devens undertakes various precautions with spill response and cleanup procedures, which are described in Section 3.4 of the Operation and Maintenance Plan.

Procedures

Devens will implement the following spill response and cleanup procedures to reduce the discharge of pollutants from the MS4:

Responding to a Spill

Employees should be trained in proper spill response specific to the materials used at their site and appropriate personal protective equipment (PPE). In the event of a spill, follow these spill response and cleanup procedures:

- If the facility has a Stormwater Pollution Prevention Plan (SWPPP), notify a member of the facility's Pollution Prevention Team, the facility supervisor, and/or the facility safety officer (fill out the attached spill response contact list). If not, continue to follow the procedures outlined below.
- Assess the contaminant release site for potential safety issues and for direction of flow.
- Complete the following:
 - Stop the contaminant release.
 - Contain the contaminant release through the use of spill containment berms or absorbents.
 - Protect all drains and/or catch basins with the use of absorbents, booms, berms or drain covers.
 - Clean up the spill.
 - Dispose of all contaminated products in accordance with applicable federal, state and local regulations.
 - i. Soil contaminated with petroleum should be handled and disposed of as described in MassDEP policy WCS-94-400, Interim Remediation Waste Management Policy for Petroleum Contaminated Soils (<https://www.mass.gov/files/documents/2016/08/mq/94-400.pdf>).
 - ii. Products saturated with petroleum products or other hazardous chemicals require special handling and disposal by licensed transporters. Licensed transporters will pick up spill contaminated materials for recycling or disposal. Save the shipping records for at least three years.
 - iii. Waste oil contaminated industrial wipes and sorptive minerals:
 - 1. Perform the "one drop" test to ensure absorbents do not contain enough

- oil to be considered hazardous, as described in the MassDEP Waste Oil Management Guide (<https://www.mass.gov/files/documents/2018/12/18/oilwiper.pdf>).
2. Wring absorbents through a paint filter. If doing so does not generate one drop of oil, the materials are not hazardous.
 3. If absorbents pass the “one drop” test they may be discarded in the trash unless contaminated with another hazardous waste.
 - a. It is acceptable to mix the following fluids and handle them as waste oil:
 - i. Waste motor oil
 - ii. Hydraulic fluid
 - iii. Power steering fluid
 - iv. Transmission fluid
 - v. Brake fluid
 - vi. Gear oil
 - b. **Do not mix** the following materials with waste oil. Store each separately:
 - i. Gasoline
 - ii. Antifreeze
 - iii. Brake and carburetor cleaners
 - iv. Cleaning solvents
 - v. Other hazardous wastes
 4. If absorbents do not pass the “one drop” test they should be placed in separate metal containers with tight fitting lids, labeled “Oily Waste Absorbents Only.”
- If you need assistance containing and/or cleaning up the spill, or preventing it from discharging to a surface water (or an engineered storm drain system), contact your local fire department using the number listed below. **In the case of an emergency call 911.**
 - ##MUNICIPAL FIRE DEPARTMENT: ##PHONE NUMBER
 - Contact the MassDEP 24-hour spill reporting notification line, toll-free at **(888)-304-1133**;
 - The following scenarios **are exempt** from MassDEP reporting requirements (see the MassDEP factsheet on oil and hazardous materials handling for more information: <https://www.mass.gov/files/documents/2016/08/xm/spillmgm.pdf>).
 - i. Spills that are less than 10 gallons of petroleum and do not impact a water body
 - ii. Spills that are less than one pound of hazardous chemicals and do not present an imminent health or safety hazard
 - iii. Fuel spills from passenger vehicle accidents
 - iv. Spills within a vault or building with a watertight floor and walls that completely contain all released chemicals

Reporting a Spill

When contacting emergency response personnel or a regulatory agency, or when reporting the contaminant release, be prepared to provide the following information:

1. Your name and the phone number you are calling from.
2. The exact address and location of the contaminant release.

3. Specifics of release, including:
 - a. What was released;
 - b. How much was released, which may include:
 - i. Pounds
 - ii. Gallons
 - iii. Number of containers
4. Where was the release sent/what was contaminated, addressing:
 - a. Pavement
 - b. Soil
 - c. Drains
 - d. Catch basins
 - e. Water bodies
 - f. Public streets
 - g. Public sidewalks
5. The concentration of the released contaminant.
6. What/who caused the release.
7. Is the release being contained and/or cleaned up or is the response complete.
8. Type and amount of petroleum stored on site, if any.
9. Characteristics of contaminant container, including:
 - a. Tanks
 - b. Pipes
 - c. Valves

Maintenance and Prevention Guidance

Prevention of spills is preferable to even the best response and cleanup. To mitigate the effects of a contaminant release, provide proper maintenance and inspection at each facility. To protect against contaminant release adhere to the following guidance:

- Ensure all employees are properly trained to respond in the case of a spill, understand the nature and properties of the contaminant, and understand the spill control materials and personnel safety equipment. Maintain training records of current personnel on site and retain training records of former personnel for at least three years from the date last worked at the facility.
- Provide yearly maintenance and inspection at all municipal facilities, paying particular attention to underground storage tanks. Maintain maintenance and inspection records on site.
- Implement good management practices where chemicals and hazardous wastes are stored:
 - a. Ensure storage in closed containers inside a building and on an impervious surface wherever possible.
 - b. If storage cannot be provided inside, ensure secondary containment for 110 percent of the maximum volume of the storage container.
 - c. Locate storage areas near maintenance areas to decrease the distance required for transfer.
 - d. Provide accurate labels, Material Safety Data Sheets (MSDS) information, and warnings for all stored materials.
 - e. Regularly inspect storage areas for leaks.
 - f. Ensure secure storage locations, preventing access by untrained or unauthorized persons.
 - g. Maintain accurate records of stored materials.

- Replace traditional hazardous materials such as pesticides and cleansers with non-hazardous products such as bio-lubricants which can reduce response costs in the case of a spill.

Maintain appropriately stocked spill response kits at each facilities and locations where oil, chemicals, or other hazardous materials are handled and stored.

Employee Training

- Employees who perform work with potential stormwater pollutants are trained once per year on proper spill procedures.
- Employees are also trained on stormwater pollution prevention and illicit discharge detection and elimination (IDDE) procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Attachments

1. Spill Response and Cleanup Contact List

Spill Response and Cleanup Contact List

Contact	Phone Number	Date and Time Contacted
Safety Officer: _____		
Facility Supervisor: Shane Melone, DPW Director	(978)-413-1259	
Fire Department: Timothy Kelly, Fire Chief	(978)-772-4600	
MassDEP 24-Hour Spill Reporting	(888)-304-1133	
MassDEP Regional Offices:		
Northeast Regional Office	(978) 694-3200	
Southeast Regional Office	(508) 946-2700	
Central Regional Office	(508) 792-7650	
Western Regional Office	(413) 784-1100	
Hazardous Waste Compliance Assistance Line	(617) 292-5898	
Household Hazardous Products Hotline	(800) 343-3420	
Massachusetts Department of Fire Services	(978) 567-3100 or (413) 587-3181	
Licensed Site Professionals Association (Wakefield, MA)	(781) 876-8915 (617) 556-1091	
Licensed Site Professionals Board		

C.4: Operations and Maintenance of Municipal Buildings and Facilities

Introduction

Municipal buildings and facilities (schools, municipal offices, police and fire stations, municipal pools, parking garages, etc.) often house various chemicals, such as petroleum products and hazardous materials. As a result, these buildings and facilities are potential sources of pollutant discharges to the storm drainage system. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees on the use, storage, and disposal of chemicals and other stormwater pollutants to reduce the discharge of pollutants from the MS4. If services are contracted, this SOP should be provided to the contractor. The contract should specify that the contractor is responsible for compliance with all applicable laws.

Devens performs a variety of operations and maintenance activities at its municipally owned and operated buildings, as mentioned in the Operation and Maintenance Plan. An inventory of all municipal buildings and facilities is included in Appendix A of that Plan, and will be updated annually.

Procedures

Devens will implement the following procedures for municipally owned or operated buildings and facilities to reduce the discharge of pollutants from the MS4:

Handling, Storage, Transfer, and Disposal of Trash and Recyclables

All liquid and solid waste must be disposed of properly. Some of the most common sources of pollution at municipal facilities are a result of littering, improper collection of debris, and improper disposal of solid or liquid waste.

- All waste and recycling receptacles must be leak-tight with tight-fitting lids or covers.
- Keep lids on dumpsters and containers closed at all times unless adding or removing material. If using an open-top roll-off dumpster, cover it and tie it down with a tarp unless adding materials.
- Place waste or recycling receptacles indoors or under a roof or overhang whenever possible.
- Locate dumpsters on a flat, paved surface and install berms or curbs around the storage area to prevent run-on and run-off.
- Do not locate dumpsters over or adjacent to catch basins.
- Prior to transporting waste, trash, or recycling, ensure that containers are not leaking (double bag if needed) and properly secure containers to the vehicle.
- Clean and sweep up around outdoor waste containers regularly.

- Clean up any liquid leaks or spills with dry cleanup methods.
- Arrange for waste or recycling to be picked up regularly and disposed of at approved disposal facilities.
- Never place hazardous materials, liquids, or liquid-containing wastes in a dumpster or recycling or trash container (see SOP C.2: Hazardous Materials Storage and Handling).
- Do not wash trash or recycling containers outdoors or in parking lots.
- Conduct periodic inspections of solid and liquid waste storage areas to check for leaks and spills.
- Conduct periodic inspections of work areas to ensure that all wastes are being disposed of properly.
- In dumpster areas, regularly pick up surrounding trash and debris and regularly sweep the area.
- In compactor areas, regularly check the hydraulic fluid hoses and reservoir to ensure that there are no cracks or leaks. Regularly sweep the area.

Building Maintenance

- When power washing buildings and facilities, ensure that the washwater does not flow into the storm system. Containment or filtering systems should be provided.
- Paint and other chemicals should not be applied on the outside of buildings when it is raining or prior to expected rain.
- When sanding, painting, power washing, etc., ensure that sites are properly prepared (e.g., use tarps) and cleaned (e.g., use dry cleaning methods) especially if they are near storm drains. Protect catch basins when maintenance work is conducted upgradient of them.
- When painting, use a drop cloth and clean up any spills immediately.
- Do not leave open containers on the ground where they may accidentally tip over.
- Buildings should be routinely inspected for areas of potential leaks.
- Do not discharge chlorinated pool water into the stormwater system. Water must be properly dechlorinated and tested before it is discharged.
- Streets and parking lots surrounding municipal buildings and facilities should be swept and kept clean to reduce runoff of pollutants and debris to the stormwater system.
- Streets and parking lots around buildings and facilities will be swept in accordance with the procedures in SOP F.1: Streets and Parking Lots.

Storage of Petroleum Products and Potential Pollutants

- Floor drains in storage areas should be disconnected from the stormwater system.
- Routinely inspect buildings and facilities for areas of potential leaks.
- For storage and handling procedures of petroleum products and potential pollutants, refer to SOP C.2: Hazardous Materials Storage and Handling and SOP C.1: Fuel and Oil Handling Procedures.
- All municipal buildings and facilities should be periodically inspected to address potential pollutant sources (e.g., leaks).

Spill Prevention Plan

- Spill prevention plans such as Spill Prevention Control and Countermeasure (SPCC) Plans should be in place where applicable, based on inventories of material storage and potential pollutants. Coordinate with the local fire department if necessary.
- Spill SOPs are outlined in SOP C.3: Spill Response and Cleanup.

Employee Training

- Employees who perform maintenance or other applicable work at municipal buildings and facilities are trained once per year on these procedures and the proper operation of related equipment.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Related Standard Operating Procedures

1. B.2: Storage and Use of Pesticides & Fertilizer
2. C.1: Fuel and Oil Handling
3. C.2: Hazardous Material Storage and Handling
4. C.3: Spill Response and Cleanup
5. F.1: Street Sweeping

APPENDIX D

Standard Operating Procedures – Municipal Vehicles and Equipment

D.1: Operation and Maintenance of Municipal Vehicles and Equipment

D.1: Operations and Maintenance of Municipal Vehicles and Equipment

Introduction

Regular maintenance of both municipal and contracted vehicles and heavy equipment not only prolongs the life of municipal assets but also helps reduce the potential for leaking of fluids associated with normal wear and tear. Potential pollutants include fuels, oil, antifreeze, brake fluid, solvents, and battery acid. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees to help reduce the discharge of pollutants from the MS4 as a result of leaks from vehicles and equipment. If services are contracted with respect to vehicles and equipment, this SOP should be provided to the contractor. The contract should also specify that the contractor is responsible for compliance with all applicable laws.

Devens undertakes various procedures in regards to its municipal vehicles and equipment, which are explained in detail in Section 4.0 of the Operation and Maintenance Plan. An inventory of all municipal vehicles and equipment is included in Appendix A of that Plan and updated annually.

Procedures

Devens will implement the following procedures for municipally owned and operated vehicles and equipment to reduce the discharge of pollutants from the MS4:

Vehicle and Equipment Maintenance

Vehicle Storage

- Monitor vehicles and equipment for leaks and use drip pans as needed until repairs can be performed.
- When drip pans are used, avoid overtopping.
- Drain fluids from leaking or wrecked vehicles and parts as soon as possible. Dispose of fluids properly.
- Store and park vehicles on impervious surfaces and/or under cover or indoors whenever possible.

Vehicle Maintenance

- Conduct routine inspections of heavy equipment and vehicles to proactively identify maintenance needs or potential leaks.
- Perform routine preventive maintenance to ensure heavy equipment and vehicles are operating optimally.
- Recycle or dispose of waste properly and promptly.
- Sweep and pick up trash and debris as needed.

- Do not dump any liquids or other materials outside, especially near or in storm drains or ditches.

Body Repair and Painting

- Conduct all body repair and painting work indoors.
- Minimize waste from paints and thinners. Calculate paint needs based on surface area.
- Use dry cleanup methods (vacuum, sweep) to clean up metal filings and dust and paint chips from grinding, shaving and sanding. Sweep debris from wet sanding after allowing it to dry overnight on the shop floor. Dispose of waste properly; never dump waste into storm or sanitary sewers.
- Use sanding tools equipped with vacuum capability to pick up debris and dust.

Fueling

- Fueling areas owned or operated by the municipality should be covered.
- Fueling areas should be evaluated to ensure that pollutants (e.g., gasoline or oil) do not enter the MS4. Follow the procedures in SOP C.1: Fuel and Oil Handling.

Material Management

- Store materials and waste in labeled containers under cover and in secondary containment.
- Chemicals should not be combined in containers.
- Hazardous waste must be labeled and stored according to hazardous waste regulations. Follow the procedures in SOP C.2: Hazardous Materials Storage and Handling.
- Carefully transfer collected fluids from containers into designated storage areas as soon as possible.
- Store new and used batteries securely to avoid breakage. Store indoors or in secondary containment to contain potential acid leaks. Recycle used batteries.
- Conduct periodic inspections of storage areas to detect possible leaks.
- Do not wash or hose down storage areas unless there is prior approval to collect and discharge the water into the sanitary sewer. Use dry cleanup methods whenever possible.
- Keep lids on containers. Store them indoors or under cover to reduce exposure to rain.
- Inspect and maintain all pretreatment equipment, including interceptors, according to the manufacturer's maintenance schedule and at least once per year.
- Proper spill protocol should be followed to prevent chemicals from entering the stormwater system. Follow the procedures in SOP C.3: Spill Response and Cleanup.

Parts Cleaning

- Use designated areas for engine, parts, or radiator cleaning. Do not wash or rinse parts outdoors. If parts cleaning equipment is not available then capture parts cleaning fluids.
- Recycle cleaning solution. Never discharge waste to the sanitary sewer or storm sewer.
- Use steam cleaning or pressure washing of parts instead of solvent cleaning. Cleaning equipment must be connected to an oil/water interceptor prior entering the sanitary sewer.
- When using solvents for cleaning, drain parts over the solvent tank to avoid drips to the floor. Catch excess solutions and divert them back to tank. Allow parts to dry over the hot tank.

Vehicle and Equipment Washing

Vehicle washing can result in the discharge of nutrients, sediment, petroleum products, and other contaminants to a surface water body or to a stormwater system. The MS4 Permit does not authorize the discharge of municipal vehicle washing byproducts into the MS4.

Outdoor Vehicle Washing Procedures

Outdoor washing of municipal vehicles should be avoided unless wash water is contained in a tight tank or similar structure. Where no alternative wash system is available, and full containment of wash water cannot be achieved, adhere to the following procedures:

- Avoid discharge of any wash water directly to the storm drainage system or surface water (e.g., stream, pond, or drainage swale)
- Minimize the use of water to the extent practicable.
- Where the use of detergent cannot be avoided, use products that do not contain regulated contaminants. The use of a biodegradable, phosphate-free detergent is preferred.
- Do not use solvents except in dedicated solvent parts washer systems or in areas not connected to a sanitary sewer.
- Do not power wash, steam clean, or perform engine or undercarriage cleaning.
- Grassy and pervious (porous) surfaces may be used to promote direct infiltration of wash water, providing treatment before recharging groundwater and minimizing runoff to an adjacent stormwater system. Pervious surfaces or other infiltration-based systems should not be used within wellhead protection areas or within other protected resources.
- Impervious surfaces discharging to the storm drainage system should not discharge directly to a surface water unless treatment is provided. The treatment device should be positioned such that all drainage must flow through the device, preventing bypassing or short-circuiting.
- Periodic sweeping and/or cleaning should be completed to prevent accumulation from forming on the washing area.
- Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities. Follow the procedures in SOP C.3: Spill Response and Cleanup.
- Heavily soiled vehicles or vehicles dirtied from salting or snow removal efforts should follow the SOPs in the “Heavy Equipment Washing Procedures” below.

Indoor Vehicle Washing Procedures

- Vehicles and equipment should be washed inside whenever possible to reduce runoff to the stormwater system.
- Where the use of detergent cannot be avoided, use products that do not contain regulated contaminants. The use of biodegradable, phosphate-free detergent is preferred.
- Detergents should not be used in areas where oil/water separators provide pre-treatment of drainage.
- Floor drains should be connected to a sanitary sewer or tight tank. Floor drains discharging to adjacent surface water bodies or engineered storm drain systems should be permanently plugged or otherwise abandoned before any vehicle wash activities are completed.
- Designate separate areas for routine maintenance and vehicle cleaning. This helps prevent

contamination of wash water by motor oils, hydraulic lubricants, greases, or other chemicals.

- Dry cleanup methods are recommended within garage facilities. Do not wash down floors and work areas with water.
- Bring smaller vehicles to commercial washing stations.
- Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities. Follow the procedures in SOP C.3: Spill Response and Cleanup.

Heavy Equipment Washing Procedures

- Mud and heavy debris removal should occur on impervious surfaces or within a retention area.
- Maintain these areas with frequent mechanical removal and proper disposal of waste.
- Impervious surfaces with engineered storm drain systems should not discharge directly to a surface water.
- Floor drains should be connected to a sanitary sewer or tight tank. Floor drains discharging to adjacent surface waterbodies or engineered storm drain systems should be permanently plugged or otherwise abandoned before any vehicle wash activities are completed.
- Where the use of detergent cannot be avoided, use products that do not contain regulated contaminants. The use of biodegradable, phosphate-free detergent is preferred.
- Detergents should not be used in areas where oil/water separators provide pre-treatment of drainage.
- Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities. Follow the procedures in SOP C.3: Spill Response and Cleanup.

Engine and Steam Washing Procedures

- Do not wash parts outdoors.
- Maintain drip pans and smaller containers to contain motor oils, hydraulic lubricants, greases, etc. and to capture and collect spills or noticeable leaks observed during washing activities, to the extent practicable. Follow the procedures in SOP C.3: Spill Response and Cleanup.
- Where use of detergent cannot be avoided, use products that do not contain regulated contaminants. The use of a biodegradable, phosphate-free detergent is preferred.
- Avoid cleaning with solvents except in dedicated solvent parts washer systems. Make use of pressure washing and steam cleaning.
- Recycle clean solutions and rinse water to the extent practicable.
- Wash water should discharge to a tight tank or a sanitary sewer via an oil/water separator. Detergents should not be used in areas where oil/water separators provide pre-treatment of drainage.

Employee Training

- Employees who perform work on/with municipal vehicles or equipment are trained once per year on these procedures and the proper operation of related equipment.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

APPENDIX E

Standard Operating Procedures – Catch Basin Inspection and Cleaning

E.1: Catch Basin Inspection and Cleaning

E.1: Catch Basin Inspection and Cleaning

Introduction

Catch basins help minimize flooding and protect water quality by removing trash, sediment, decaying debris, and other solids from stormwater runoff. These materials are retained in a sump below the invert of the outlet pipe (older catch basins may not have a sump). Catch basin cleaning reduces foul odors, prevents clogs in the storm drain system, and reduces the loading of trash, suspended solids, nutrients, bacteria, and other pollutants to receiving waters. The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees on catch basin inspection and cleaning to reduce the discharge of pollutants from the MS4. If services are contracted, this SOP should be provided to the contractor. The contract should specify that the contractor is responsible for compliance with all applicable laws.

This SOP can also be used for inspection of catch basins or manholes for the purpose of conducting catchment investigations as part of the municipality's Illicit Discharge Detection and Elimination program.

Devens' Department of Public Works performs routine inspections, cleaning, and maintenance of the approximately 1,350 catch basins that are located within the MS4 regulated area. Devens will include an optimization plan for catch basin cleaning and inspection in its annual report. A description of current practices for catch basin cleaning and inspection is included in Section 5.2 of the Operation and Maintenance Plan.

Devens will implement the following catch basin inspection and cleaning procedures to reduce the discharge of pollutants from the MS4:

Procedures

Inspection and Cleaning Frequency

- Each catch basin should be cleaned and inspected at least annually.
- Catch basins near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment) or high-use areas should be inspected and cleaned more frequently if inspection finds excessive sediments or debris loadings.
- Catch basins should be cleaned to ensure that they are no more than 50 percent full¹ at any time. Establish inspection and maintenance frequencies needed to meet this "50 percent" goal. If a catch basin sump is more than 50 percent full during two consecutive inspections, document the findings, investigate the contributing drainage area for sources of excessive sediment loading, and, if possible, address the contributing sources. If no contributing sources are found, increase the inspection and cleaning frequencies of the sump.
- Street sweeping performed on an appropriate schedule will reduce the amount of sediment, debris, and organic matter entering the catch basins, which will in turn reduce the frequency with which they need to be cleaned. Reference SOP 16: Streets and Parking Lots for information on appropriate

¹ . A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin

street sweeping frequencies. Street sweeping schedules should also be adjusted based on catch basin inspection findings, with more frequent sweepings for areas with higher catch basin loads.

Inspection and Cleaning Procedures

Catch basin inspection and cleaning procedures should address both the grate opening and the catch basin structure, including the sump and any inlet and outlet pipes. Document any and all observations about the condition of the catch basin structure and water quality (an inspection form and log of catch basins cleaned or inspected are included in the attachments). Collect data on the condition of the physical basin structure, its frame, and the grate, as well as on the quality of stormwater conveyed by the structure. Observations like those below can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

Both oil and bacteria can create a sheen on the water's surface. The source of a sheen can be differentiating by disturbing it (e.g., with a pole). A sheen caused by oil will remain intact and move in a swirl pattern, while a sheen caused by bacteria will separate and appear "blocky." The bacteria that cause this sheen are naturally occurring iron bacteria – they are not considered a pollutant but should be noted. Other types of bacteria, such as fecal bacteria, are considered pollutants and their discovery should be recorded

Observations like those below can indicate a potential connection of a sanitary sewer to the storm drain system, which is an illicit discharge:

- Indications of sanitary sewage, including fecal matter or sewage odors
- Foaming, such as from detergent
- Optical enhancers, fluorescent dye added to laundry detergent

In general, adhere to the following procedures when inspecting and cleaning catch basins. Record the findings in the log in the attachments:

1. Implement appropriate traffic safety procedures (e.g., traffic cones) prior to and during the catch basin inspection and cleaning process.
2. Work upstream to downstream in a given drainage network.
3. Clean sediment and trash off of the grate.
4. Visually inspect the outside of the grate.
5. Remove the grate and visually inspect the inside of the catch basin to determine cleaning needs.
6. Inspect the catch basin for structural integrity.
7. Determine the most appropriate equipment and method for cleaning the basin:
 - a. Manually use a shovel to remove accumulated sediments.
 - b. Use a bucket loader to remove accumulated sediments.
 - c. Use a high pressure washer to clean any remaining material out of the catch basin while capturing the slurry with a vacuum.
 - d. If necessary, after the catch basin is cleaned, use the rodder of the vacuum truck to clean the downstream pipe and pull back sediment that might have entered it.
8. If contamination is suspected, chemical analysis will be required to determine if the materials comply with the Massachusetts Department of Environmental Protection (MassDEP) Hazardous Waste Regulations, 310 CMR 30.000

(https://www.mass.gov/files/documents/2016/08/x1/310cmr30_7883_54357.pdf). The chemical analysis required will depend on suspected contaminants. Note the identification number of the catch basin on the sample label and note sample collection on the Catch Basin Inspection Form.

Handling and Disposal of Catch Basin Cleanings

- Properly dispose of collected sediments and catch basin cleanings (solid material, such as leaves, sand, and twigs removed from stormwater collection systems during cleaning operations).
- Cleanings from stormwater-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP does not routinely require stormwater-only catch basin cleanings to be tested before disposal, unless there is evidence that they have been contaminated by a spill or some other means.
- Screenings may need to be placed in a drying bed to allow water to evaporate before proper disposal. In this case, ensure that the screenings are managed properly to prevent pollution.
- Catch basin cleanings must be handled and disposed in accordance with compliance with the applicable MassDEP regulations, policies, and guidance (<https://www.mass.gov/files/documents/2018/03/09/catch-basins.pdf>).

Documentation and Reporting

The following information should be documented and included in the municipality's annual report – use the catch basin inspection log provided in the attachments to document the information to include in the report (alternatively, obtain records of volume of debris removed to include in the report):

- Metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for the MS4 (include in the SWMP and first annual report)
- Any action taken in response to excessive sediment or debris loadings
- Total number of catch basins
- Number of catch basins inspected
- Number of catch basins cleaned
- Total volume or mass of material removed from catch basins.

Employee Training

- Employees who perform catch basin cleaning and inspection are trained once per year on these procedures and the proper operation of related equipment.
- Employees are also trained on stormwater pollution prevention, illicit discharge detection and elimination (IDDE) procedures, and spill and response procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Attachments

1. Catch Basin Inspection Form and Log
2. Catch Basin Inventory

Related Standard Operating Procedures

1. SOP F.1: Street Sweeping

Job No.: _____ Town: _____
 Inspector: _____ Date: _____



CATCH BASIN INSPECTION FORM

Catch Basin I.D.		Final Discharge from Structure? Yes <input type="checkbox"/> No <input type="checkbox"/> If Yes, Discharge to Outfall No: _____	
Catch Basin Label:	Stencil <input type="checkbox"/> Ground Inset <input type="checkbox"/> Sign <input type="checkbox"/> None <input type="checkbox"/> Other _____		
Basin Material:	Concrete <input type="checkbox"/> Corrugated metal <input type="checkbox"/> Stone <input type="checkbox"/> Brick <input type="checkbox"/> Other: _____ <input type="checkbox"/>	Catch Basin Condition:	Good <input type="checkbox"/> Poor <input type="checkbox"/> Fair <input type="checkbox"/> Crumbling <input type="checkbox"/>
Pipe Material:	Concrete <input type="checkbox"/> HDPE <input type="checkbox"/> PVC <input type="checkbox"/> Clay Tile <input type="checkbox"/> Other: _____ <input type="checkbox"/>	Pipe Measurements:	Inlet Dia. (in): d= _____ Outlet Dia. (in): D= _____

Required Maintenance/ Problems (check all that apply):	
<input type="checkbox"/> Tree Work Required <input type="checkbox"/> New Grate is Required <input type="checkbox"/> Pipe is Blocked <input type="checkbox"/> Frame Maintenance is Required <input type="checkbox"/> Remove Accumulated Sediment <input type="checkbox"/> Pipe Maintenance is Required <input type="checkbox"/> Basin Undermined or Bypassed	<input type="checkbox"/> Cannot Remove Cover <input type="checkbox"/> Ditch Work <input type="checkbox"/> Corrosion at Structure <input type="checkbox"/> Erosion Around Structure <input type="checkbox"/> Remove Trash & Debris <input type="checkbox"/> Need Cement Around Grate Other: _____

Catch Basin Grate Type :	Sediment Buildup Depth :	Description of Flow:	Street Name/ Structure Location:
Bar: <input type="checkbox"/> Cascade: <input type="checkbox"/> Other: _____ Properly Aligned: Yes <input type="checkbox"/> No <input type="checkbox"/>	0-6 (in): _____ 6-12(in): _____ 12-18 (in): _____ 18-24 (in): _____ 24 + (in): _____	Heavy <input type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Trickling <input type="checkbox"/>	

*If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in): _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
---	------------------------------	-----------------------------

<input type="checkbox"/> Flow <input type="checkbox"/> Standing Water (check one or both)	Observations: Color: _____ Odor: _____	Circle those present:
---	---	------------------------------

Weather Conditions :	Dry > 24 hours <input type="checkbox"/>	Wet <input type="checkbox"/>
-----------------------------	---	------------------------------

Sample of Screenings Collected for Analysis? Yes <input type="checkbox"/> No <input type="checkbox"/>
--

Comments:	Sanitary Waste Orange Staining Excessive sediment Other: _____	Oil Sheen Bacterial Sheen Floatables Pet Waste Optical Enhancers
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APPENDIX F

Standard Operating Procedures – Street Sweeping

F.1: Street Sweeping

Standard Operating Procedures

Devens, MA

Department of Public Works (or similar)

F.1: Sweeping Streets and Parking Lots

Issue Date:

June 2022

Approved by:

Public Works Director (or similar)

Purpose of SOPs:

Procedures for the operation and maintenance of street sweepers, frequency of sweeping, disposal of debris, and recordkeeping to prevent pollution from entering the stormwater sewer systems.

MA Small MS4 General Permit Requirement Summary:

Part 2.3.7.a.iii.3.

The permittee shall establish and implement procedures for sweeping and/or cleaning streets, and permittee-owned parking lots. All streets with the exception of rural uncurbed roads with no catch basins or high speed limited access highways shall be swept and/or cleaned a minimum of once per year in the spring (following winter activities such as sanding). The procedures shall also include more frequent sweeping of targeted areas determined by the permittee on the basis of pollutant load reduction potential, based on inspections, pollutant loads, catch basin cleaning or inspection results, land use, water quality limited or TMDL waters or other relevant factors as determined by the permittee. The permittee shall report in each annual report the number of miles cleaned or the volume or mass of material removed. For rural uncurbed roadways with no catch basins and limited access highways, the permittee shall either meet the minimum frequencies above, or develop and implement an inspection, documentation and targeted sweeping plan with two (2) years of the effective date of the permit, and submit such plan with its year one annual report.

Part 2.3.a.iii.4.

The permittee shall ensure proper storage of catch basin cleanings and street sweepings prior to disposal or reuse such that they do not discharge to receiving waters.

Equipment Inventory:

The following is a list of street sweeping equipment:

Equipment Number	Make	Description	Sweeper Speed (or other notes)
VEH012	2018 Elgin Whirlwind Sweeper	Vacuum Sweeper	< 20 mph

Standard Operating Procedures

Devens, MA

Department of Public Works (or similar)

F.1: Sweeping Streets and Parking Lots

Issue Date:

June 2022

Operations

1. Operate all sweepers and equipment according to the manufacturer's recommended settings, standards, and procedures.
2. While sweeping, drive below the optimal sweeping speed limit, as recorded in the equipment list above.
3. Sweeping will not take place during moderate to heavy rainfall or during periods of extreme cold (temperatures lower than 15 degrees Fahrenheit).
4. If spills occur or illegal discharges are seen, report to Mike Wise, Operations Manager.

Maintenance

1. Sweepers will be checked for leaks after each use. Immediately contain and properly clean up any spills.
2. Regular preventative maintenance to prolong equipment use (such as greasing moving parts and minor adjustments) occur once per month.
3. Parts are replaced as needed. Brushes shall be replaced in accordance with manufacturer specifications.
4. Equipment is washed at the DPW facility located at 15 Lake Street to trap grease, oils and sediment.
5. The left-over debris is scraped out from the hopper after 25 debris dumps.

Schedule

1. Street sweeping will primarily take place between the months of March and October.
2. All streets with curbing and/or catch basins shall be swept a minimum of once per year in the spring (following winter activities such as sanding) and once in the fall. The Downtown area is swept weekly. Streets are swept according to the street list and schedule located at the DPW Facility. A map of all streets the Town is responsible for is attached to this SOP as Figure 1.
3. Priority roads and parking lots are identified on the basis of pollutant load reduction potential, based on inspections, pollutant loads, catch basin cleaning or inspection results, land use, impaired or TMDL waters or other relevant factors. The list of priority roads and parking lots will be reassessed once annually.
4. The sweeping schedule is assessed once per year and updated as necessary.
5. A map of town roads and parking lots is attached to this SOP as Figure 1.
6. Events/activities that require special sweeping are any Town events, including but not limited to concerts, farmers markets, or Town construction projects.

Standard Operating Procedures

Devens, MA

Department of Public Works (or similar)

F.1: Sweeping Streets and Parking Lots

Issue Date:

June 2022

Storage and Disposal

1. Temporary storage of solid sweeping debris is on an impervious surface or in a truck/dumpster that is protected from runoff. The debris is temporarily stored at the DPW Facility at 15 Lake Street.
2. Solid sweeping debris are hauled offsite by an outside contractor and properly disposed of at their discretion.
3. Weighing process: The amount of solid sweeping debris will be weighed by the outside contractor prior to disposal at the receiving facility. This amount is recorded by the Town and included in the yearly MS4 Annual Report to EPA.

Training

1. Employees are trained once per year on this procedure and the proper operation of equipment. Employees are also trained on stormwater pollution prevention, spill and response, and illicit discharge detection and elimination procedures.

Record Keeping

1. Records are kept at the DPW facility at 15 Lake Street.
2. The number of miles swept are recorded after each sweeping. The amount of debris collected per round of sweeping is received from the outside contractor after debris are hauled to a disposal facility.
3. The number of curb miles swept per year is calculated annually and included in the Town's Annual Report to EPA.
4. A list of employees implementing the SOPs and the completion of their training(s) is included below.

Revising the SOPs

1. These procedures are reviewed once per year and updated as needed.

APPENDIX G

Standard Operating Procedures – Inspection and Maintenance of Stormwater Treatment Structures

G.1: Inspection and Maintenance of Structural Stormwater Best Management Practices (BMPs)

G.2: Stormwater Operation and Maintenance Plan

G.1: Inspection and Maintenance of Structural Stormwater Best Management Practices (BMPs)

Introduction

Best Management Practices (BMPs) are policies, procedures and structures designed to reduce stormwater pollution, prevent contaminant discharges to natural water bodies, and reduce stormwater facility maintenance costs. Structural BMPs are permanent site features designed to treat stormwater before infiltrating it to the subsurface or discharging it to a surface water body. Regular inspection and maintenance of structural stormwater BMPs is critical for these engineered systems to function as designed (e.g., provide benefits to water quality, groundwater recharge, and peak flow attenuation).

This Standard Operating Procedure (SOP) provides general inspection and maintenance frequencies and procedures for eight common structural stormwater BMPs, including:

1. Bioretention Areas and Rain Gardens
2. Constructed Stormwater Wetlands
3. Extended Dry Detention Basins
4. Proprietary Media Filters
5. Sand and Organic Filters
6. Wet Basins
7. Dry Wells
8. Infiltration Basins

This SOP is based on the Massachusetts Stormwater Handbook and is not intended to replace the stormwater BMP Operation and Maintenance guidance contained in the Handbook. This SOP is also not intended to replace the Stormwater BMP Operation and Maintenance (O&M) Plan required by the Massachusetts Wetlands Protection Act, Order of Conditions.

The Devens Department of Public Works is responsible for inspection and maintenance of municipally owned structural stormwater BMPs. A list of existing structural stormwater BMPs is included in the attachments, along with inspection and maintenance checklists for each type of BMP.

Structural stormwater BMPs will be inspected annually at a minimum. Inspection checklists for each type of structural BMP are provided in the attachments.

Procedures

Bioretention Areas and Rain Gardens

Bioretention areas and rain gardens are shallow depressions filled with sandy soil, topped with a thick layer of mulch, and planted with dense native vegetation. There are two types of bioretention cells:

1. Filtering bioretention area: Areas that are designed solely as an organic filter.
2. Exfiltration bioretention area: Areas that are configured to recharge groundwater in addition to acting as a filter.

Inspection and Maintenance

Regular inspection and maintenance are important to prevent against premature failure of bioretention areas or rain gardens. Regular inspection and maintenance of pretreatment devices and bioretention cells for sediment buildup, structural damage and standing water can extend the life of the soil media.

Maintenance Schedule: Bioretention Areas and Rain Gardens

Activity	Time of Year	Frequency
Inspect for soil erosion and repair	Year round	Monthly
Inspect for invasive species and remove if present	Year round	Monthly
Remove trash	Year round	Monthly
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and spring	Bi-annually
Replace dead vegetation	Spring	Annually
Prune	Spring or fall	Annually
Replace all media and vegetation	Late spring/early summer	As needed

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation, and mulch the surface.

Never store snow within a bioretention area or rain garden. This would prevent the recharge and water quality treatment of ground water.

Constructed Stormwater Wetlands

Constructed stormwater wetlands maximize pollutant removal from stormwater through the use of wetland vegetation uptake, retention, and settling. Constructed storm water wetlands must be used in conjunction with other BMPs, such as sediment forebays.

Devens does not currently own or maintain any constructed stormwater wetlands. In the event that Devens installs a constructed stormwater wetland, the operation and maintenance procedures outlined in this section shall apply.

Inspection and Maintenance

Regular inspection and maintenance are important for the health of constructed stormwater wetlands. They help identify the need for replacement of vegetation and media, detect potentially harmful invasive species, and ensure the overall health of the wetland.

Maintenance Schedule, Constructed Stormwater Wetlands: Years 0-3

Activity	Time of Year	Frequency
Inspect for invasive species and remove if present	Year round	Monthly
Record and Map:	Year round	Annually
Types and distribution of dominant wetland plants	Year round	Bi-annually
Presence and distribution of planted wetland species	Spring	Annually
Presence and distribution of invasive species	Fall and spring	Bi-annually

Indications other species are replacing planted wetland species	Spring	Annually
Percent of standing water that is not vegetated	Spring or fall	Annually
Replace all media and vegetation	Late spring/early summer	As needed
Stability of original depth zones and micro-topographic features		
Accumulation of sediment in the forebay and micropool and survival rate of plants		

Maintenance Schedule, Constructed Stormwater Wetlands: Years 4-Lifetime

Activity	Time of Year	Frequency
Inspect for invasive species and remove if present	Year round	Monthly
Clean forebays	Year round	Annually
Clean sediment in basin/wetland system	Year round	Once every 10 years
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and spring	Bi-annually
Replace dead vegetation	Spring	Annually
Prune	Spring or fall	Annually
Replace all media and vegetation	Late spring/early Summer	As needed

Never store snow within a constructed stormwater wetland. This would prevent required water quality treatment and the recharge of groundwater.

Extended Dry Detention Basins

Extended dry detention basins are designed to control both stormwater quantity and quality. These BMPs are designed to hold stormwater for at least 24 hours, allowing solids to settle and reducing local and downstream flooding. Pretreatment is required to reduce the potential for overflow clogging. The outflow may be designed as either fixed or adjustable. Additional nutrient removal may be achieved by a micropool or shallow marsh.

A list of Extended Dry Detention Basins owned and/or operated by Devens is included in Appendix A of the Operation and Maintenance Plan. This inventory is updated annually.

Inspection and Maintenance

Annual inspection of extended dry detention basins is required to ensure that the basins are operating properly. Potential problems include: erosion within the basin and banks, tree growth on the embankment, damage to the emergency spillway, and sediment accumulation around the outlet. Should any of these problems be encountered, necessary repairs should be made immediately.

Maintenance Schedule: Extended Dry Detention Basins

Activity	Time of Year	Frequency
Inspect basins	Spring and fall	Bi-annually and during and after major storms
Examine outlet structure for clogging or high outflow release velocities	Spring and fall	Bi-annually
Mow upper stage, side slopes, embankment and emergency spillway	Spring through fall	Bi-annually
Remove trash and debris	Spring	Bi-annually
Remove sediment from basin	Year round	At least once every 5 years

Proprietary Media Filters

Media Filters are designed to reduce total suspended solids and other target pollutants, such as organics, heavy metals, or nutrients – these materials are sorbed onto the filter media, which is contained in a concrete structure. The substrate used as filter media depends on the target pollutants, and may consist of leaf compost, pleated fabric, activated charcoal, perlite, amended sand in combination with perlite, and zeolite. Two types of Media Filters are manufactured: Dry media filters, which are designed to dewater within 72 hours, and wet media filters, which maintain a permanent pool of water as part of the treatment system.

Devens does not currently own or maintain any proprietary media filters. In the event that Devens installs a this type of BMP, the operation and maintenance procedures outlined in this section shall apply.

Inspection and Maintenance

Maintenance in accordance with the manufacturer's requirements is necessary to ensure stormwater treatment. Inspection or maintenance of the concrete structure may require OSHA confined space training. Dry media filters are required to dewater in 72 hours, thus preventing mosquito and other insect breeding. Proper maintenance is essential to prevent clogging. Wet media filters require tight fitting seals to keep mosquitoes and other insects from entering and breeding in the permanent pools. Required maintenance includes routine inspection and treatment.

Maintenance Schedule: Proprietary Media Filters

Activity	Time of Year	Frequency
Inspect for standing water, trash, sediment and clogging	Per manufacturer's schedule	Bi-annually (minimum)
Remove trash and debris	N/A	Each inspection
Examine to determine if system drains in 72 hours	Spring, after large storm	Annually
Inspect filtering media for clogging	Per manufacturer's schedule	Per manufacturer's schedule

Sand and Organic Filters

Sand and organic filters, also known as filtration basins, are intended for stormwater quality control rather than quantity control. These filters improve water quality by removing pollutants through a filtering media and settling pollutants on top of the sand bed and/or in a pretreatment basin. Pretreatment is required to prevent filter media from clogging. Runoff from the filters is typically discharged to another BMP for additional

treatment.

Devens does not currently own or maintain any sand or organic media filters. In the event that Devens installs this type of BMP, the operation and maintenance procedures outlined in this section shall apply.

Inspection and Maintenance

If properly maintained, sand and organic filters have a long life. Maintenance requirements of the filters include raking the sand and removing sediment, trash, and debris from the surface of the BMP. Over time, fine sediments will penetrate deep into the sand requiring replacement of several inches or the entire sand layer. Discolored sand is an indicator of the presence of fine sediments, suggesting that the sand should be replaced.

Maintenance Schedule: Sand and Organic Filters

Activity	Frequency
Inspect filters and remove debris	After every major storm for the first 3 months after construction completion. Every 6 months thereafter.

Wet Basins

Wet basins are intended to treat stormwater quality through the removal of sediments and soluble pollutants. A permanent pool of water allows sediments to settle and removes the soluble pollutants, including some metals and nutrients. Additional dry storage is required to control peak discharges during large storm events. If properly designed and maintained, wet basins can add fire protection, wildlife habitats, and aesthetic values to a property.

A list of Wet Basins owned and/or operated by Devens is included in Appendix A of the Operation and Maintenance Plan. This inventory is updated annually.

Inspection and Maintenance

To ensure proper operation, wet basin outfalls should be inspected for evidence of clogging or excessive outfall releases. Potential problems to investigate include erosion within the basin and banks, damage to the emergency spillway, tree growth on the embankment, sediment accumulation around the outlet, and the emergence of invasive species. Should any of these problems be encountered, perform repairs immediately. An on-site sediment disposal area will reduce sediment removal costs.

Maintenance Schedule: Wet Basins

Activity	Time of Year	Frequency
Inspect wet basins	Spring and/or fall	Annually (Minimum)
Mow upper stage, side slopes, embankment and emergency spillway	Spring through fall	Bi-annually (Minimum)
Remove sediment, trash and debris	Spring through fall	Bi-annually (Minimum)
Remove sediment from basin	Year round	As required, but at least once every 10 years

Dry Wells

Dry wells are used to infiltrate uncontaminated runoff. These BMPs should never be used to infiltrate stormwater or runoff that has the potential to be contaminated with sediment and other pollutants. Dry wells provide groundwater recharge and can reduce the size and cost required of downstream BMPs or storm drains. However, they are only applicable in drainage areas of less than one acre and may experience high failure rates due to clogging.

Devens does not currently own or maintain any dry wells. In the event that Devens installs this type of BMP, the operation and maintenance procedures outlined in this section shall apply.

Inspection and Maintenance

Proper dry well function depends on regular inspection. Clogging has the potential to cause high failure rates. The water depth in the observation well should be measured at 24 and 48 hour intervals after a storm and the clearance rate calculated. The clearance rate is calculated by dividing the drop in water level (inches) by the time elapsed (hours).

Maintenance Schedule: Dry Wells

Activity	Frequency
Inspect dry wells	After every major storm for the first 3 months after construction completion. Annually thereafter.

Infiltration Basins

Infiltration basins are designed to contain stormwater and provide groundwater recharge. Pollution prevention and pretreatment are required to ensure that contaminated stormwater is not infiltrated. Infiltration basins reduce local flooding and preserve the natural water balance of the site. High failure rates, however, often occur due to improper siting, inadequate pretreatment, poor design, and lack of maintenance.

A list of Infiltration Basins owned and/or operated by Devens is included in Appendix A of Devens’ Operation and Maintenance Plan. This inventory is updated annually.

Inspection and Maintenance

Regular maintenance is required to prevent clogging, which results in infiltration basin failure. Clogging may be due to upland sediment erosion, excessive soil compaction, or low spots. Inspections should include signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, riprap condition, sediment accumulation, and turf health.

Maintenance Schedule: Infiltration Basins

Activity	Time of Year	Frequency
Preventative maintenance	Spring and fall	Bi-annually
Inspection	Spring and fall	After every major storm for the first 3 months after construction completion. Bi-annually thereafter and discharges through the high outlet orifice.
Mow/rake buffer area, side slopes and basin bottom	Spring and fall	Bi-annually
Remove trash, debris and organic matter	Spring and fall	Bi-annually

Employee Training

- Employees who perform inspection or maintenance on structural BMPs are trained once per year on proper procedures.
- If services are contracted, the contractor should be given a copy of this and any applicable SOPs to ensure compliance with MS4 regulations.

Attachments

1. Structural BMP Inspection and Maintenance Checklist

G.2: STORMWATER MANAGEMENT OPERATION & MAINTENANCE PLAN

Stormwater Management System Owner:

The Devens Commerce Center

Parties Responsible for Operation and Maintenance:

Devens will be responsible for the operation and maintenance of the SWM system including the storm drainage collection and conveyance system, infiltrating swales, and the infiltration chambers. Devens will sweep the streets on an annual basis and will clean all catch basins, infiltration swales, and infiltration chambers bi-annually as part of its normal maintenance schedule for all its local roads.

Inspection and Maintenance Schedule

The attached table outlines the inspection and maintenance schedule for the various elements of the SWM System.

Routine and Non-Routine Maintenance Tasks

Routine inspection and maintenance tasks to be undertaken are described on inspection and maintenance schedule. These tasks are described in more detail below.

1. Street Sweeping: Street sweeping with mechanized street cleaning equipment on an annual basis
2. Catch Basin Cleaning: Catch basins and Infiltration Chambers shall be cleaned on Devens' rotating basis with the commitment of cleaning an average of 50% of the watershed's catch basins each year.
3. Infiltration Swale Inspection and Maintenance: The infiltration swales have been designed to minimize maintenance requirements. The most important maintenance will take place during the first year after construction, to ensure proper establishment of vegetation. The swale embankments and side slopes must be properly maintained to ensure long term stability. The embankments, side slopes, and swale bottoms must establish a healthy ground cover to avoid erosion and to promote infiltration. The embankments and side slopes should be inspected annually for adequate ground cover and presence of shrubs and saplings. Bare spots should be repaired and planted with suitable ground cover material. Saplings and shrubs should be removed.
4. Pocket Wetland and Detention Basin Inspection and Maintenance: Wet Retention Ponds and Detention Basins shall be inspected annually to insure clear passage of both inlet and outlet. The outlet structures should also be inspected for potential subsidence, erosion, cracking, tree growth, damage to the emergency spillway, sediment accumulation around the outlet, inadequacy of the inlet/outlet erosion control measures, and erosion within the pond and banks.

STORMWATER MANAGEMENT OPERATION & MAINTENANCE PLAN

5. The upper-stage, side-slopes, embankment, and emergency spillway of each Detention Basin should be mowed annually (rough-cut). Any tree saplings should also be removed. Accumulated sediment in both the Wetlands and Splash Pad should be removed as necessary and at least once every 10 years. Disturbance of Pocket Wetlands should be avoided and should be replanted in the event that they are. Materials shall be removed by a licensed contractor, who shall be responsible for removing the material and disposing of the material off-site in a manner consistent with all local, state and federal regulations.

6. Sediment Trap Inspection and Maintenance: The sediment traps should be inspected annually for sediment accumulation. Any sediment accumulations in excess of half the unit's depth shall be removed. Material shall be removed by a licensed contractor, who shall be responsible for removing the material and disposing of the material off-site in a manner consistent with all local, state and federal regulations.

SWM Inspection Maintenance Tasks

SWM System Element	Inspection/Maintenance Task	Frequency
Street Sweeping	Streets to be swept with mechanized street sweeping equipment.	Annually
Catch-basin and Infiltration Chamber Cleaning	Accumulated sediment to be removed from catch basins sumps and infiltration swales and chambers.	50% Annually, as part of standard roadway maintenance schedule.
Infiltration Swales	Inspect embankments, side slopes and swale bottoms for adequate ground cover. Remove tree saplings and shrubs Remove accumulated sediments at entrance to forebays.	Annually
Detention Basins / Pocket Wetlands	Inspect Outlet Structure for accumulated debris or blockage. Remove as necessary	Annually
	Inspect side slopes for adequate ground cover. Remove saplings and shrubs.	Annually
Sediment Traps	Traps to be inspected.	Annually
	Accumulated sediment to be removed.	Whenever sediment has collected to a depth of half the unit's depth.

APPENDIX H

Standard Operating Procedure – Salt Use Optimization/ Winter Road Maintenance

H.1: Salt Use Optimization/ Winter Road Maintenance

STANDARD OPERATING PROCEDURE DEPARTMENT OF PUBLIC WORKS PROGRAM: Snow Removal and De-Icing	SOP NUMBER: 1	ISSUE DATE: June 2021
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APPROVED BY:

Director of Engineering

Department of Public Works Director

MA SMALL MS4 PERMIT REQUIREMENT SUMMARY:

Part 2.3.7.a.iii.5.

The permittee shall establish and implement procedures for winter road maintenance including the use and storage of salt and sand; minimize the use of sodium chloride and other salts, and evaluate opportunities for use of alternative materials; and ensure that snow disposal activities do not result in disposal of snow into waters of the United States. For purposes of this MS4 Permit, salt shall mean any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

Personnel

The following personnel are responsible for snow and ice removal. Employees performing the procedures in this SOP shall attend yearly stormwater pollution prevention training.

TABLE 1

Name	Responsibility
Quentin Burks	Specialist 2 – Mechanic
Roman Ferguson	Field Coordinator
Beau Forgues	Specialist 1
Richard Hawkins	Specialist 1
Brian Kleinknecht	Specialist 2
Jason Lewenczuk	Specialist 1
Shane Melone	DPW/REC Director
Peter Pearson	Specialist 1
Andrew Pelletier	Specialist 2 – Mechanic
James Rogers	Inventory Control & Purchase Agent
Gary Teague	Working Foreman

Equipment

The municipality owns and maintains ice control and snow removal equipment listed in Attachment 1. Equipment maintenance shall be conducted consistent with the Vehicles and Equipment Maintenance SOP, which will be included as a separate appendix to the Operation & Maintenance Plan to be developed in Permit Year 4. The wash bay/area is located at the DPW garage at 99 Buena Vista Street.

STANDARD OPERATING PROCEDURE DEPARTMENT OF PUBLIC WORKS	SOP NUMBER: 1	ISSUE DATE: June 2021
PROGRAM: Snow Removal and De-Icing		

Plowing

When conditions warrant, plows are installed on the **15** designated trucks to move snow from the traveled roadway. Average time to install a plow is approximately **30** minutes.

Salt/Sand Spreaders and Pretreatment

When conditions warrant, salt/sand spreaders are installed on the **6** larger trucks to spread salt or salt/sand mixture on the traveled roadway. Each salt spreader is calibrated in October and again in January. Salt application shall be calibrated to dispense rates of **250** pounds per lane mile. None of the trucks used for winter road maintenance are also equipped with pre-wetting or liquid deicer tanks. Pretreatment is done with straight salt or a combination of salt and Safe Melt, an environmentally friendly pretreatment chemical that is mixed with salt prior to applying it to the road.

Materials

The major materials used in snow and ice control are coarse salt, Safe Melt liquid deicer, and sand. These materials are stockpiled in advance of an event and are immediately available when needed and stocks are replenished between events.

Salt

Salt is used to expedite the melting of snow and ice from the street surface and also to keep the ice from forming a bond to the street surface. Approximately **2,000 – 3,000** tons of **rock salt** are anticipated to be used per year and are ordered from **Eastern Salt Company** prior to each deicing season. Salt is stored in the covered facility located at 99 Buena Vista Street. Loading areas and yards are swept **twice per year** to prevent salt build-up and runoff.

Anti-icing and Pre-Wetting Chemical

Up to 2,000 gallons of Safe Melt liquid deicer is estimated to be needed for pretreatment, which is stored at **99 Buena Vista Street** in **1,000**-gallon storage tanks equipped with appropriate spill control.

Salt Alternatives

Approximately 12 tons of salt-sand mixture is estimated to be needed for de-icing purposes in environmentally sensitive and reduced salt areas. The salt and sand are mixed and stored inside the covered facility located at 99 Buena Vista Street. No other sand is used for de-icing purposes.

Procedures

Salt Application

1. Whenever conditions warrant, salt or salt/Safe Melt mix is applied to the roadway prior to accumulation of snow to prevent compacted snow from bonding to the roadway surface. Shane Melone will instruct staff when salt application is appropriate. Salting will not be done when pavement temperatures are above 32 degrees F or below 10 degrees F.
2. Prior to salt application, equipment will be checked to ensure proper working order and ensure proper calibration of equipment. All fluid levels will be checked and filled to proper levels. All lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.

STANDARD OPERATING PROCEDURE DEPARTMENT OF PUBLIC WORKS	SOP NUMBER:	ISSUE DATE:
PROGRAM: Snow Removal and De-Icing	1	June 2021

3. The standard salt application speed is: **25** mph.
4. Follow the prioritized route or schedule. The prioritization is as follows:
 - a. Orange Route & Lots
 - b. Red Route & Lots
 - c. Green Route & Lots

A map showing the streets in each route is included in Attachment 2.
5. Before parking any truck or equipment after use, all fluid levels will be checked and filled. All minor repairs will be done by the operator. Any repairs the operator cannot perform will be written up on the proper forms and turned in to Quintin Burks or Andrew Pelletier. They will determine importance and will assign the repairs according to schedule. All deicing chemical will be washed from equipment at the wash bay or designated wash area.

Snow Plowing

1. As the storm develops and 2.5 - 3 inches of snow have accumulated, all of the drivers and available equipment will begin to plow their assigned routes.
2. Prior to plowing operations, equipment will be checked to ensure proper working order. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
3. Avoid plowing, pushing, blowing or storing excess snow, deicer, or other debris in or near creeks, watercourses or storm drainage systems.
4. Reduce plowing speed in sensitive areas (near creeks, wetlands or other water courses) to prevent snow and deicing materials from entering waterways.
5. The standard plowing speed is: 25 mph.
6. Follow the prioritized route or schedule. This schedule is as follows:
 - a. Orange Route & Lots
 - b. Red Route & Lots
 - c. Green Route & Lots

A map showing the streets in each route is included in Attachment 2.
7. Before parking any truck or equipment after use, all fluid levels will be checked and filled. Blades or bolts, which need replacing, will be taken care of unless told to do otherwise. Chains that need repairs will be repaired. All minor repairs will be done by the operator. Any repairs the operator cannot perform will be written up on the proper forms and turned in to Quintin Burks or Andrew Pelletier. They will determine importance and will assign the repairs according to schedule.

Salt/Sand Mixture Application

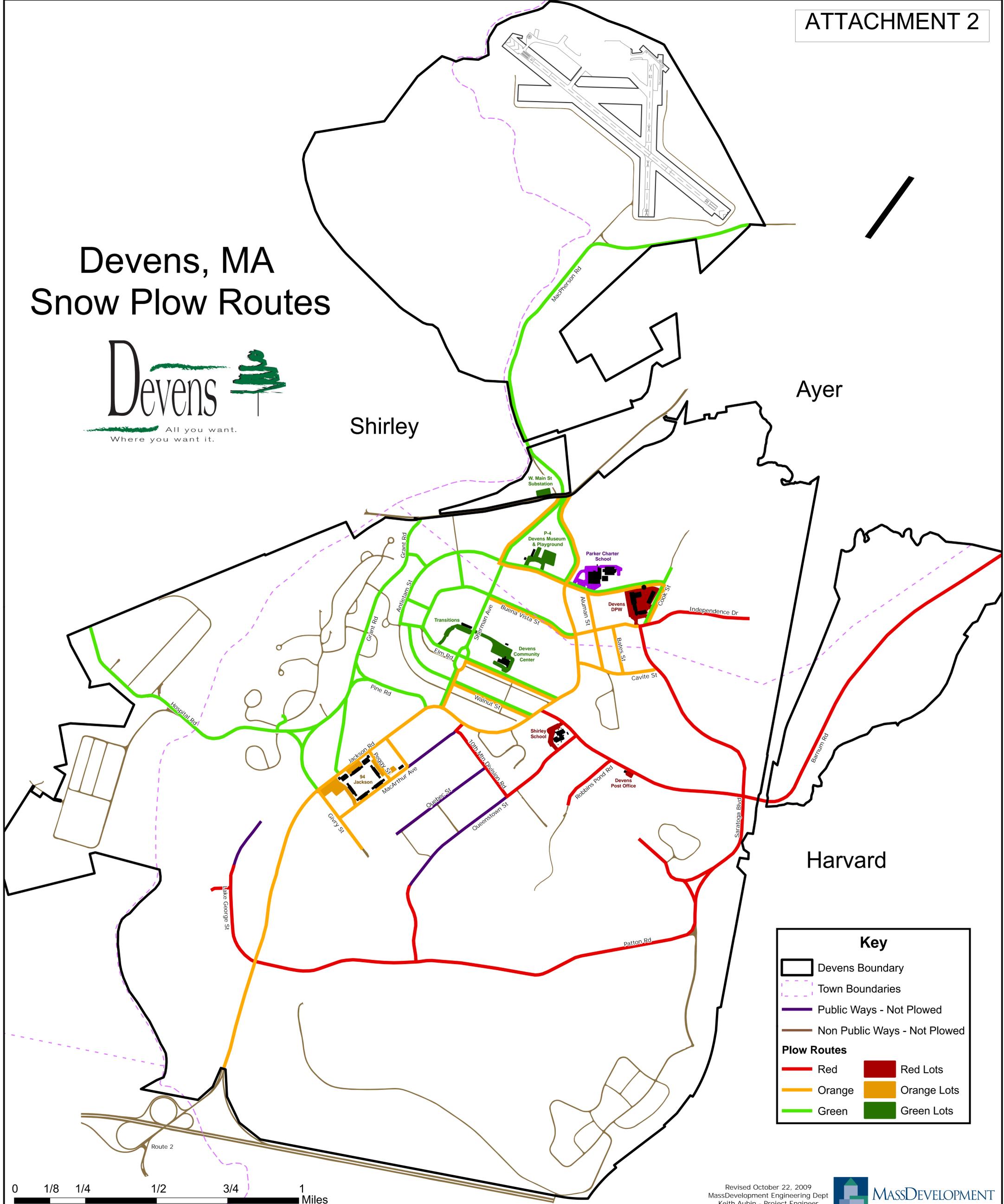
1. Salt/sand mixture is used in environmentally sensitive areas and applied to the roadway prior to accumulation of snow to prevent compacted snow from bonding to the roadway surface. Shane Melone will instruct staff when salt alternative application is appropriate.
2. Prior to application of salt/sand mixture, equipment will be checked to ensure proper working order and ensure proper calibration of equipment. All fluid levels will be checked and filled to proper levels, all lights must be in working order. A visual walk-around inspection of the truck or equipment must be made. Any repairs must be made and reported to a supervisor or mechanic before leaving the yard.
3. Salt alternatives will only be applied to priority routes. The priority routes are as follows:
 1. MacPherson Road

<p>STANDARD OPERATING PROCEDURE DEPARTMENT OF PUBLIC WORKS</p> <p>PROGRAM: Snow Removal and De-Icing</p>	<p>SOP NUMBER:</p> <p>1</p>	<p>ISSUE DATE:</p> <p>June 2021</p>
<ol style="list-style-type: none"> 2. Hospital Road 3. Lovell Road 4. Salt/sand mixture optimal application speed is 25 MPH. 5. Before parking any truck or equipment after use, all fluid levels will be checked and filled. All minor repairs will be done by the operator. Any repairs the operator cannot perform will be written up on the proper forms and turned in to Quintin Burks or Andrew Pelletier. They will determine importance and will assign the repairs according to schedule. All deicing chemical will be washed from equipment at the wash bay or designated wash area. <p>Snow Clearing/Salting on Sidewalks The Devens DPW also clears and salts public sidewalks so that they are accessible for residents after a snowstorm. A bobcat is used to clear snow from sidewalks, and salt is applied when deemed necessary by Shane Melone. The route for clearing sidewalks is included in Attachment 3.</p>		
<p>Record Keeping and Documentation</p> <ol style="list-style-type: none"> 1. Maintain a master schedule of prioritized snow and sanding routes and the miles or roads plowed or sanded at the DPW facility. 2. Keep copies of manufacturer’s recommendations for equipment calibration, plowing speed and salt/sand application rates at the DPW facility. 3. Keep records of the amounts of salt, sand, liquid deicer, and salt alternatives applied per season at the DPW facility. 4. Keep a list of all employees trained in the facility’s Stormwater Pollution Prevention Plan binder or computer file. 		

Winter Road Maintenance Vehicles Devens, MA

Name	Asset #	Year	Make	Plow	Sander	Description
VEH002 M4402A	DA2609	2019	Ford	Yes	NA	2019 Ford F350 Single Cab Truck
VEH006 M3222A	DA2623	2021	Freightliner	Yes	Yes	2021 Freightliner M2
VEH005 M79329	DA2387	2007	International	Yes	Yes	2007 International 4300 SBA 4x2 Dump truck with plow, DT466 engine
Veh016 M3264A	DA2585	2019	Freightliner	Yes	Yes	2019 Freightliner 108SD Truck GVWR 44000
Veh017 M89-233	DA2539	2014	International	Yes	Yes	2014 International 7300 SFA 4x2
VEH019 M78-363	DA2260	2009	International	Yes	Yes	2009 International 7300 DT 255 HP 4x2 w/XT-3 Dump/spreader
Veh020 M75563	DA2223	2006	Ford	Yes	NA	2006 Ford F350
Veh021 M72-722	DA2071	2004	Ford	Yes	NA	2004 Ford F350
Veh026 M88-400	DA2322	2009	Ford	Yes	NA	2009 Ford F350 DRW,4x4, 6.4L deisel, 3 cu yd dump body
VEH014 M97-505	DA2536	2017	Ford	Yes	Yes	2017 F550 Cab Chassis 6.8L V10 engine, Auto trans, 4X4
VEH004 M20-20A	DA2050	2018	Ford	Yes	NA	2018 F350 4x4, V-8 6.2L engine, crew cab, 6 3/4' bed
Veh024 M83-088	DA1379	2010	Ford	Yes	NA	2010 Ford F350,4x4, 6.4L deisel engine; utility body
Veh025 M88-423	DA2321	2011	Ford	Yes	NA	2011 Ford F350
VEH041 M61-827	DA2544	2017	Volvo	Yes	NA	2017 Volvo L70H Wheel Loader with 3 yd bucket Mich X Snow plus tires.
Veh050 M54-922	DA2303	2010	Volvo	Yes	NA	2010 Volvo L70F Wheel Loader with bucket.

Devens, MA Snow Plow Routes

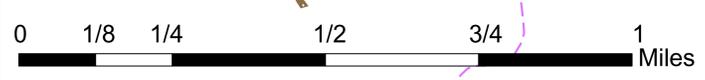


Key

- Devens Boundary
- Town Boundaries
- Public Ways - Not Plowed
- Non Public Ways - Not Plowed

Plow Routes

		Red Lots
		Orange Lots
		Green Lots



ATTACHMENT 3 – SIDEWALK ROUTES FOR RESIDENTS

1. Antietam to Jackson (Turn Left)
2. Jackson to Buena Vista (Turn Left)
3. Buena Vista to Auman (Turn Around)
4. Buena Vista to Jackson (Turn Left)
5. Jackson to Cavite (Turn Left)
6. Cavite to Bates (Turn Left)
7. Bates to Buena Vista (Turn Right)
8. DPW to Auman (Turn Around)
9. Buena Vista to Bates (Turn Right)
10. Bates to Cavite (Turn Right)
11. Cavite to Auman (Turn Right)
12. Auman to Antietam (Cross Over to Other Side)
13. Auman to Cavite (Turn Right)
14. Cavite to Jackson (Turn Left)
15. Jackson to Fire Station (Cross Over to Other Side)
16. Jackson to (Foot Path) Sherman (Turn Left)
17. Sherman to Jackson (Turn Around)
18. Saratoga
19. Independence Drive
20. Barnum Road
21. Patton Road
22. Chance Street
23. Grant Road
24. Hospital Road

25. Sherman to Elm (Turn Left)
26. Elm to Chance (Turn Around)
27. Chance to Buena Vista (Turn Left)
28. Buena Vista to Jackson (Turn Around)
29. Buena Vista to Sherman (Turn Left)
30. Sherman to Elm (Turn Left)
31. Elm to Montana (Turn Right)
32. Montana to Walnut (Turn Left)
33. Walnut to Jackson (Turn Left)
34. Jackson to Elm (Turn Left)
35. Route to March to Buena Vista (Turn Around)
36. Route to March to Elm (Turn Right)
37. Elm to Sherman (Turn Right)
38. Sherman to Jackson to Job Corp (Cross Over)
39. Job Corp to Jackson to Verbeck (Turn Around)
40. Verbeck to Job Corp (Cross Over)
41. Jackson to Antietam Foot Path (Turn Right)
42. Foot Path to P5 (Turn Around)
43. Return to DPW, top off, and Clean Bobcat

APPENDIX I

2016 MS4 Annual Reports

Year 1 Annual Report
Massachusetts Small MS4 General Permit
New Permittees
Reporting Period: May 1, 2018-June 30, 2019

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.

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:

Fax 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 and an explanation of why it is not posted on the web:

Part II: Self Assessment

*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 1 Requirements

- Develop and begin public education and outreach program

Annual Requirements

- Annual opportunity for public participation in review and implementation of SWMP
- Comply with State Public Notice requirements
- 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

Use the box below to input additional details on any unchecked boxes above or 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:

Part IV: Minimum Control Measures

Part IV includes some of the metrics that will be required in upcoming annual reports. For this annual report, these metrics are optional for new permittees; please fill out any of the metrics below that you have started. Then, proceed to Part V.

MCM1: Public Education

Number of educational messages completed during the reporting period:

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

BMP:Brochures/Pamphlets

Message Description and Distribution Method:

General stormwater educational flyers, as well as topic-specific pamphlets addressing lawn care, pet waste management, composting, and proper disposal of household chemicals, were distributed to residents via email. These flyers were also posted to both the Mass Development and Devens Enterprise Commission websites.

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

Five (5) different pamphlets were distributed to each resident included on the Devens residential e-mail distribution list during the reporting period. The e-mail distribution list includes 141 out of 142 total residences.

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:

BMP:Brochures/Pamphlets

Message Description and Distribution Method:

General stormwater educational flyers, as well as topic specific pamphlets addressing grounds maintenance, and the proper use of road salt and de-icing material, were distributed to businesses, institutions, and commercial facilities via email. In addition, flyers addressing composting and proper disposal of hazardous waste were distributed to small businesses. The flyers were also posted on both the MassDevelopment and Devens Enterprise Commission websites.

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

Two (2) pamphlets were distributed to each business, institution, or commercial facility included on the Devens e-mail distribution list. Two (2) additional pamphlets were also distributed to small businesses. There are 108 businesses included on the distribution list, which is believed to be all active businesses in Devens.

Message Date(s): FY2019

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:

BMP:Brochures/Pamphlets

Message Description and Distribution Method:

The Devens Enterprise Commission provided approximately 60 material packets to individual developers/contractors and development teams. The packets include general guidelines for developing at Devens, as well as specific pamphlets on green infrastructure and recycling initiatives.

Targeted Audience: Developers/Contractors (construction)

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment (Engineering)

Measurable Goal(s):

These packets were handed out to all parties that approached the Devens Enterprise Commission and MassDevelopment about potential development at Devens.

Message Date(s): FY2019

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:

BMP:Brochures/Pamphlets

Message Description and Distribution Method:

Flyers were distributed via email to industrial facilities, providing general information on stormwater management and summary information on Devens Rules and Regulations. The flyers were also posted on the MassDevelopment and Devens Enterprise Commission websites.

Targeted Audience: Industrial Facilities

Responsible Department/Parties: Devens Enterprise Commission, MassDevelopment

Measurable Goal(s):

This brochure was distributed to industrial facilities on the Devens e-mail distribution list.

Message Date(s): FY2019

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:

BMP: Web Page

Message Description and Distribution Method:

The Devens website was updated to provide public access to stormwater-related materials, documentation and procedures. The information is included under the "Living Green: Resources for Devens Residents and Businesses" section of the following web page: <http://www.devensec.com/residents.html>

Targeted Audience: Residents

Responsible Department/Parties: MassDevelopment (Operations/Engineering)

Measurable Goal(s):

The website reaches both current Devens residents and those interested in moving to the community, therefore raising awareness of stormwater pollution prevention behaviors among a wide audience.

Message Date(s): FY2019

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:

BMP: Web Page

Message Description and Distribution Method:

The Devens website was updated to provide public access to stormwater-related materials, documentation, regulations and procedures. The stormwater information is included under the "Living Green: Resources for Devens Residents and Businesses" section of the following web page: <http://www.devensec.com/residents.html>

The rules and regulations are included on the "DEC Business" web page: <http://www.devensec.com/meetings.html>

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

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:

BMP: Web Page

Message Description and Distribution Method:

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

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:

BMP: Web Page

Message Description and Distribution Method:

Devens page: <http://www.devensec.com/sustain.html>

Targeted Audience: Industrial facilities

Responsible Department/Parties: MassDevelopment (Operations/Engineering)/Devens Enterprise Commission

Measurable Goal(s):

By making this information available on its website, Devens informs industrial facility owners and operators of the environmental standards associated with operating in the Devens Enterprise Zone, raising awareness of the need for stormwater pollution prevention.

Message Date(s): FY2019

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:

BMP: Web Page

Message Description and Distribution Method:

The permittee continued to provide information on the MassDevelopment "Devens Community" website and the DEC website on "Living Green", including how to reduce water use and reduce waste generated.
"Living Green" Resources: <http://www.devensec.com/residents.html>
"Devens Community" Website: <http://www.devenscommunity.com/about-devens>

Targeted Audience: Residents

Responsible Department/Parties: MassDevelopment, Devens Enterprise Commission

Measurable Goal(s):

The link to these web pages was sent to all residents on the Devens e-mail distribution list.

Message Date(s): FY2019

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:

BMP: Web Page

Message Description and Distribution Method:

The permittee continued to provide informations on the MassDevelopment "Devens Community" website and the DEC website on "Living Green", including how to reduce water use and reduce waste generated.

"Living Green" Resources: <http://www.devensec.com/residents.html>

"Devens Community" Website: <http://www.devenscommunity.com/about-devens>

Targeted Audience: Businesses, institutions and commercial facilities

Responsible Department/Parties: MassDevelopment, Devens Enterprise Commission

Measurable Goal(s):

The link to these web pages was sent to all commercial entities on the Devens e-mail distribution list.

Message Date(s): FY2019

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:

BMP: Brochures/Pamphlets

Message Description and Distribution Method:

Devens continued to make their green infrastructure guidelines for construction projects available to potential developers and contractors. The information is available on the DEC website at http://www.devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf. Green infrastructure guidelines are also included in Level 2 Unified Permit Application packages given to all applicants applying for a Level 2 Unified Permit. Approximately 60 packets were distributed during the reporting period. The Devens Enterprise Commission also reviews this and all related stormwater management requirements (LID, on-site treatment and recharge, etc.) with applicants as part of the required pre-application review process.

Targeted Audience: Developers (construction)

Responsible Department/Parties: MassDevelopment, Devens Enterprise Commission

Measurable Goal(s):

This information is posted in the same location as building and disturbance permit requirements and application information. All developers considering a project in Devens will see this information when researching the application process.

Message Date(s): FY2019

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:

BMP: Web Page

Message Description and Distribution Method:

Devens continued to make information on Best Management Practices for stormwater pollution prevention available to operators of industrial facilities. This information is available on the MassDevelopment "Devens Community" website and the Devens Enterprise Commission website.

Targeted Audience: Industrial Facilities

Responsible Department/Parties: MassDevelopment, Devens Enterprise Commission

Measurable Goal(s):

The link to these web pages was sent to all industrial entities on the Devens e-mail distribution list.

Message Date(s): FY2019

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 the reporting period:

The SWMP is posted to the Devens Enterprise Commission website and is available for public review. Once submitted, this Annual Report will be appended to the SWMP and the on-line copy will be updated. The SWMP is a living document, and comments on the SWMP are welcome by the public. The SWMP will be modified annually to document initiatives undertaken to comply with the permit, and address any comments received from the public.

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

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

Devens provided multiple opportunities for public involvement and participation during this reporting period. Existing access to the recycling drop-off and hazardous waste collection center was continued, encouraging residents and business owners to properly handle all waste leaving their property. Yard waste was collected on a weekly basis from April 1st until November 30th during the reporting period. Devens also continued to participate in the Eco-Efficiency Center, providing programs to assist local businesses in reducing the amount of waste they generate and the associated disposal costs.

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

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:

Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified since 2013.

Total number of SSOs identified:

Total number of SSOs removed:

MS4 System Mapping

Describe the status of your MS4 map, including any progress made during the reporting period (phase I map due in year 5):

Prior to the start of the permit term, Devens' drainage map was fairly comprehensive. Most outfalls, pipes, manholes, catch basins, and municipally owned stormwater treatment structures have already been mapped, and impaired water bodies are included on the existing mapping. Devens is in the process of identifying interconnections with other MS4s, and outfalls and interconnections are being analyzed to delineate catchment areas tributary to the identified outfall or interconnection. Devens is also reviewing drainage infrastructure within the Devens Enterprise Zone to verify ownership. For the most part, drainage infrastructure within the Devens Enterprise Zone belonging to another municipality, state, or federal entity has been identified and designated in Devens' drainage GIS. Devens will continue to investigate and update the system map as needed.

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.

- The outfall screening data is attached to the email submission
- The outfall screening data can be found at the following website:

N/A

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

Number of outfalls screened:

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

Percent of total outfalls screened:

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.

- The catchment investigation data is attached to the email submission
- The catchment investigation data can be found at the following website:

N/A

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:

Devens has begun mapping catchment areas and will continue to update the delineations as the system map is updated.

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.

- 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: [UNITS]

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.

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:

Devens inspects all facilities discharging to the MS4 annually for evidence of illicit discharges.

Employee Training

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

Devens will begin to train employees on the detection and elimination of illicit discharges, including implementation of Devens' IDDE Program, after the written IDDE plan is completed in Permit Year 4.

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: 47

Number of inspections completed: 83

Number of enforcement actions taken: 3

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

Describe the status of the post-construction ordinance required to be complete in year 2 of the permit term:

The existing Devens Enterprise Commission (DEC) regulatory requirements for post-construction runoff from new development and re-development as included in 974 CMR 3.02, 3.04, 4.08 and 4.09 support this permit requirement. These requirements will be reviewed and existing regulations will be updated as needed to meet the requirements of the permit by the end of Permit Year 4, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

As-built Drawings

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites required to be complete in year 2 of the permit term:

Devens continues its pre-existing procedure of requiring submissions of as-built plans as a permit condition on all newly developed or redeveloped sites, and before release of a performance guarantee. The DEC requirements for as-built submissions are available to applicants on their website at http://www.devensec.com/development/As-built_Policy.pdf The development of O&M plans for development sites continues to be a part of the permitting process and a condition of occupancy. Property owners must file annual reports regarding system maintenance to the DEC and MassDevelopment. Devens will review existing regulatory requirements to ensure the permit requirements are met by the end of Permit Year 4, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

Devens continues to incorporate LID practices for all public and private stormwater management projects where feasible. The Devens Enterprise Commission has parking maximums, not minimums, in place, as well as a Transportation Demand Management program to reduce parking. Also 974 CMR 2.07, Street Design Standards, includes additional street types to reduce pavement and support LID. Sustainable indicators, such as impervious surface reductions from the incorporation of LID on private development projects, are monitored and tracked. Devens will develop the required street design and parking lots assessment report in Permit Year 4, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

Devens continues to utilize and improve on green infrastructure guidelines to guide, regulate and incentivize green infrastructure on all development and redevelopment projects: http://www.devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf. Impervious surface reductions in Devens are monitored in Sustainable Indicators Reports, and LID practices are required for stormwater management projects where feasible. Devens will develop the required green infrastructure report in Permit Year 4, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

Devens will begin to assemble the retrofit properties inventory in Permit Year 6, as outlined in the SWMP, and as required in the permit for new permittees. Many retrofit projects implemented to date have reduced impervious surfaces including road diets on Pine and Grant, Hospital and Lovell, BMS parking structure, and at the military redevelopment on Barnum Road; porous pavement at CMTC and Tara Vista; and other LID components, etc.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

See Additional Information section below.

If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:

- The catch basin cleaning optimization plan or schedule is attached to the email submission
- The catch basin cleaning optimization plan or schedule can be found at the following website:

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, if known.

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:

N/A

Street Sweeping

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

Devens currently sweeps all public streets and municipal parking lots in the early spring, and then an average of once every 4 weeks, as needed. Written procedures for street sweeping will be included in the standard operation and maintenance procedures for all municipal facilities and activities, to be completed in Permit Year 4.

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

Number of miles cleaned:

Volume of material removed:

Weight of material removed:

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

Rural, uncurbed roadways with no catch basins are also swept. Sweeping of these streets will be documented in the standard operation and maintenance procedures developed for municipal facilities and activities in PermitYear 4.

Winter Road Maintenance

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

The winter road maintenance procedures will be completed within 3 years of the permit effective date.

Inventory of Permittee-Owned Properties

Describe the status of the inventory, due in year 2 of the permit term, of permittee-owned properties, including parks and open spaces, buildings and facilities, and vehicles and equipment, and include any updates:

Devens is working to develop the inventory of municipal facilities and equipment. The inventory will be complete no later than Permit Year 4, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

O&M Procedures for Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment

Describe the status of the operation and maintenance procedures, due in year 2 of the permit term, of permittee-owned properties (parks and open spaces, buildings and facilities, vehicles and equipment) and include maintenance activities associated with each:

Devens is working to develop standard operation and maintenance procedures for its facilities and equipment. These procedures will be completed by Permit Year 4, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

Stormwater Pollution Prevention Plan (SWPPP)

Describe the status of any SWPPP, due in year 2 of the permit term, for permittee-owned or operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater:

Devens is working to identify waste-handling facilities within the Devens Enterprise Zone which are not covered by the Multi-Sector General Permit, and therefore require a SWPPP under the permit. Once the appropriate facilities have been identified, Devens will begin to develop SWPPPs for them. All necessary SWPPPs will be completed within 4 years of the permit effective date, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

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:

O&M Procedures for Stormwater Treatment Structures

Describe the status of the written procedure for stormwater treatment structure maintenance:

Devens has existing procedures for stormwater treatment structure maintenance, which will be reviewed and optimized to ensure compliance with the 2016 Permit. During the reporting period, Devens inspected 43 non-municipal and 18 municipally-owned stormwater detention basins.

Part V: 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:

Devens has initiated a tracking program for catch basin inspections and cleaning. As data continues to be obtained, it will be assessed to identify problem basins. All data collected will be incorporated into the Devens Drainage GIS and used to establish a frequency for cleaning such that no catch basin sump is ever more than 50% full.

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 2 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
- Continue public education and outreach program

Provide any additional details on activities planned for permit year 2 below:

Part VI: Certification of Small MS4 Annual Report 2019

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:	John P. Marc-Aurele	Title:	Director of Engineering
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Signature:	John P. Marc-Aurele <small>Digitally signed by John P. Marc-Aurele DN: cn=John P. Marc-Aurele, o=MassDevelopment, ou=Director of Engineering, email=jmarc-aurele@massdevelopment.com, c=US Date: 2019.09.27 13:07:39 -0400</small>	Date:	
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[Signatory may be a duly authorized representative]

Year 2 Annual Report
Massachusetts Small MS4 General Permit
New Permittees
Reporting Period: July 1, 2019-June 30, 2020

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, 2019 and June 30, 2020 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

*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.*

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
- Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information for your self-assessment, and/or if any of the above year 2 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:

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? Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: <https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state>

- Yes
 No

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

Devens made updates to its list of outfalls during Permit Year 2 as more information regarding outfall ownership and regulated status became available. The most recent list of regulated outfalls and their associated receiving water is included in the SWMP. There have been no changes in the list of impairments applicable to Devens since the NOI was filed.

Part IV: Minimum Control Measures

Part IV includes some of the metrics that will be required in upcoming annual reports. For this annual report, these metrics are optional for new permittees; please fill out any of the metrics below that you have started within this reporting period. Then, proceed to Part V.

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: Web Page

Message Description and Distribution Method:

The Devens Community website has been updated to provide public access to stormwater-related materials, documentation, and procedures. The website now includes general information on stormwater management, the MS4 Permit, direct links to Devens' stormwater regulations, and more specific educational information for each targeted audience. Educational information specific to residents includes a Home Composting Guide, a list of Low-Impact Development Techniques for Stormwater Management, a Stormwater Pollution Prevention Guide, and winter tips for watershed protection. There is also a link to educational information provided by ThinkBlue Massachusetts. The Devens Community website is at the following location: <https://www.devenscommunity.com/stormwater>. Similar information continued to be posted on the Devens Enterprise Commission's webpage, under the "Living Green: Resources for Devens Residents and Businesses" subheading: <http://www.devensec.com/residents.html>

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

The website was maintained during Permit Year 2 and will remain for the duration of the permit term. Devens is working to develop a way to track interactions with the stormwater website.

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:

BMP: Web Page/Newsletter

Message Description and Distribution Method:

Devens uploaded a flyer outlining proper disposal of yard waste, including grass clippings and leaf litter, to

the stormwater website. The flyer is available to the general public year-round at the following location: https://devenscommunity.com/sites/default/files/stormwater/Disposal_of_Yard_Waste_Nov_2018.pdf. A message regarding proper yard waste and leaf litter disposal was also included in the weekly newsletter posted on the Devens Community website in the fall of 2019.

Targeted Audience: Residents

Responsible Department/Parties: MassDevelopment (Operations/Engineering)

Measurable Goal(s):

This message was maintained for the duration of Permit Year 2 and will remain for the duration of the permit term. Devens is working to develop a way to track interactions with the stormwater website.

Message Date(s): FY2020

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:

BMP:Web Page/Newsletter

Message Description and Distribution Method:

Devens posted a flyer entitled "Do You Doody for Clean Water" to the stormwater website to educate both residents and other members of the Devens community on the importance of picking up pet waste. This flyer is posted at the following location: https://devenscommunity.com/sites/default/files/stormwater/pet_waste_flyer.pdf. A message relating to proper pet waste management was also included in the weekly newsletter on the Devens Community website on the week of July 10, 2020: <https://cm.massdevelopment.com/t/d-39A27E967511C9CD2540EF23F30FEDED>

Targeted Audience: Residents

Responsible Department/Parties: MassDevelopment (Operations/Engineering)

Measurable Goal(s):

This flyer was maintained for the duration of Permit Year 2 and will remain for the duration of the permit term. Devens is working to develop a way to track interactions with the stormwater website.

Message Date(s): FY2020

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:

BMP: Web Page/Handout

Message Description and Distribution Method:

The Devens Enterprise Commission continued to maintain stormwater-related materials, documentation, regulations, and procedures on their website during the reporting period. All regulations specific to developers and industrial facilities are easily accessible on the "Development Services" page of the DEC website: <http://www.devensec.com/devserv.html>. Additional information continued to be provided on the "Sustainable Devens" page: <http://www.devensec.com/sustain.html>, and the DEC's Green Infrastructure Guidelines were posted to the website as well as distributed to some prospective developers in person: http://www.devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

By continuing to make this information available on its website, Devens informs potential developers of the environmental requirements associated with construction in the Devens Enterprise Zone, raising awareness of Low-Impact Development and Green Infrastructure practices. The Green Infrastructure Guidelines handout was distributed to 12 prospective developers during the reporting period.

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:

BMP: Flyer

Message Description and Distribution Method:

A flyer regarding proper pet waste management was distributed with dog license issuances and renewals during the reporting period. Pet waste bags were also distributed to encourage residents to pick up after their pets.

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

A flyer and pet waste bag was distributed to each resident who applied for or renewed a dog license during the reporting period. The exact number of flyers and bags distributed is unknown.

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:

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:**

The updated SWMP is posted to the Devens Enterprise Commission website and is available for public review. Once submitted, this Annual Report will be appended to the SWMP and the online copy will be updated. The SWMP is a living document, and comments on the SWMP are welcome by the public. The SWMP will continue to be modified annually to document initiatives undertaken to comply with the permit and address any comments received from the public.

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:**

Devens continued to provide public access to the recycling drop-off at the DPW facility and to provide access to the Regional Household Hazardous Products Collection Center during the reporting period, encouraging residents and business owners to properly handle all hazardous waste leaving their property. Yard waste was again collected on a weekly basis between April 1st and November 30th during the reporting period. Devens also continued to participate in the Eco-Efficiency Center, providing programs to assist local businesses in reducing the amount of waste they generate and the associated disposal costs.

Due to the impacts of COVID-19, the annual Earth Day clean-up event was not held during the reporting period. Organized clean-up events will resume during Permit Year 3 assuming it is safe to do so.

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:

*Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified **since the effective date of the permit (July 1, 2018).***

Total number of SSOs identified: Total number of SSOs removed: **MS4 System Mapping***Below, check all that apply.*

The following elements of the Phase I map have been completed:

- Outfalls and receiving waters
- Open channel conveyances
- Interconnections
- Municipally-owned stormwater treatment structures
- Waterbodies identified by name and indication of all use impairments
- Initial catchment delineations

Describe any additional progress you made on your map during this reporting period or provide additional status information regarding your map:

Devens continued to update the ownership and regulated status of its MS4 infrastructure, clarifying which areas are under the jurisdiction of the Massachusetts Development Finance Agency and therefore regulated under the MS4 Permit, which are under the control of the Army and therefore regulated by their MS4 Permit, and which infrastructure is owned and operated by private entities. All changes to outfall ownership status have been reflected in the SWMP.

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.*

- The outfall screening data is attached to the email submission
- The outfall screening data can be found at the following website:

Devens will complete dry weather outfall screening by June 30, 2022, as required for new permittees under the MS4 Permit.

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

- 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:

Devens has developed a draft catchment prioritization and ranking as well as draft catchment investigation procedures which will be finalized in Permit Year 3 along with the IDDE Plan. After dry-weather outfall screening and sampling has been completed, the catchments will be reprioritized, and catchment investigations will proceed according to permit requirements. Devens is also in the process of finalizing its System Vulnerability Factor analysis for each catchment. This analysis will be completed during Permit Year 3 and included in the Year 3 annual report submission.

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.

- The illicit discharge removal report is attached to the email submission
- The illicit discharge removal report can be found at the following website:

N/A

*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:

Employee Training

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

Devens will begin to conduct training on the IDDE program and Good Housekeeping/Pollution Prevention after the written IDDE plan is finalized in Permit Year 4.

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: 12

Number of inspections completed: 4

Number of enforcement actions taken: 0

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

Ordinance Development

Describe the status of the post-construction ordinance required to be complete by year 3 of the permit term:

While Devens' existing regulatory mechanisms meet the requirements of Section 2.3.6 of the MS4 Permit as it relates to Low-Impact Development, BMP design guidance, the submission of as-built plans, and long-term operation and maintenance of stormwater management systems, the regulations require further updates to meet the Permit requirements for stormwater management standards for new development and redevelopment, and the necessary requirements for phosphorus impaired waters. Updates to 974 CMR 4.08, the applicable regulatory mechanism, were drafted during Permit Year 2 to bring Devens' regulations into compliance with the Permit. The updated language is currently under review and will be enacted by the end of Permit Year 3.

As-built Drawings

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites:

Devens' existing regulations require the submission of as-built drawings at the completion of construction and require long term operation and maintenance plans for on-site stormwater management systems to be submitted prior to project approval. As the existing measures meet permit requirements, they will not be modified during Permit Year 3.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment including any planned or completed changes to local regulations and guidelines:

Devens continues to incorporate LID practices for all public and private stormwater management projects where feasible. The Devens Enterprise Commission has parking maximums, not minimums, in place, as well as a Transportation Demand Management program to reduce parking. Also 974 CMR 2.07, Street Design Standards, includes additional street types to reduce pavement and support LID. Sustainable indicators, such

as impervious surface reductions from the incorporation of LID on private development projects, are monitored and tracked. Devens will develop the required street design and parking lots assessment report in Permit Year 4, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

Green Infrastructure Report

Describe the status of the green infrastructure report, including the findings and progress towards making the practice allowable:

Devens continues to utilize and improve on green infrastructure guidelines to guide, regulate and incentivize green infrastructure on all development and redevelopment projects: http://www.devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf. Impervious surface reductions in Devens are monitored in Sustainable Indicators Reports, and LID practices are required for stormwater management projects where feasible. Devens will develop the required green infrastructure report in Permit Year 4, as allowed by the extended deadlines for new permittees outlined in Section 1.10.3 of the permit.

Retrofit Properties Inventory

Describe the status of the inventory of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

Devens will begin to assemble the retrofit properties inventory in Permit Year 6, as outlined in the SWMP, and as required in the permit for new permittees. Many retrofit projects implemented to date, including road diets on Pine Road, Grant Road, Hospital Road, Lovell Street, the Bristol-Myers Squibb (BMS) parking structure, and at the military redevelopment on Barnum Road; porous pavement at CMTC and Tara Vista; and other LID projects have mitigated impervious area within the Devens Enterprise Zone.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

See "Additional Information" field below.

If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:

- The catch basin cleaning optimization plan or schedule is attached to the email submission
- The catch basin cleaning optimization plan or schedule can be found at the following website:

N/A

*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, if known.

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:

As mentioned in the "Additional Information" section below, Devens is still in the process of collecting the data necessary to complete its catch basin optimization plan. Once complete, this plan will include procedures for actions to be taken if a catch basin sump is more than 50% full during two consecutive routine inspections or cleanings.

Street Sweeping

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

Devens currently sweeps all public streets and municipal parking lots in the early spring, and then an average of once every 4 weeks, as needed. Devens will begin compiling its written Operation and Maintenance (O&M) Plan for municipal properties and activities in September 2020. This overarching O&M Plan will include written procedures for sweeping streets and municipally-owned lots, and will be complete within 4 years of the permit effective date.

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

Number of miles cleaned:

Volume of material removed:

Weight of material removed:

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

Devens also sweeps rural, uncurbed roadways with no catch basins. Sweeping of these streets will be documented in the standard operation and maintenance procedures developed for municipal facilities and activities in Permit Year 4.

O&M Procedures and Inventory of Permittee-Owned Properties

Below, check all that apply.

The following permittee-owned properties have been inventoried:

- Parks and open spaces
- Buildings and facilities
- Vehicles and equipment

The following O&M procedures for permittee-owned properties have been completed:

- Parks and open spaces
- Buildings and facilities
- Vehicles and equipment

Winter Road Maintenance

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

Devens will develop the winter road maintenance procedures within 3 years of the permit effective date.

Stormwater Pollution Prevention Plan (SWPPP)

Describe the status of any SWPPP for permittee-owned or operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater:

Devens is working to develop a SWPPP for the DPW Facility and Devens Regional Household Hazardous Products Collection Center, which are on the same parcel. A preliminary site inspection was scheduled for the spring of 2020, however it was postponed due to the impacts of COVID-19. This SWPPP, as well as any other SWPPPs determined to be necessary, will be complete within 4 years of the permit effective date.

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:

N/A

O&M Procedures for Stormwater Treatment Structures

Describe the status of the written procedure for stormwater treatment structure maintenance:

Devens has existing procedures for stormwater treatment structure maintenance, which will be reviewed and optimized to ensure compliance with the 2016 MS4 Permit as part of the development of the overall written Operation and Maintenance Plan.

Part V: 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:

Devens collected data during the 2019 and 2020 cleaning seasons as part of their optimization plan to ensure that no catch basin is more than 50% full. Data collected includes depth from the catch basin rim to the top of sediment, to the bottom of the basin, and to the invert of the outlet pipe. Devens will continue to collect data as needed until data is available for all catch basins. This data will be integrated into the Devens Drainage GIS and utilized to identify which catch basins are filling up more frequently and will therefore need to be cleaned more than once annually to ensure that the catch basin sump is never more than 50% full.

COVID-19 Impacts

Optional: If any of the above year 2 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 3 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree

- Complete IDDE ordinance
- Complete Construction/ Erosion and Sediment Control (ESC) ordinance
- Develop written procedures for site inspections and enforcement of sediment and erosion control measures
- Develop written procedures for site plan review

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
- Continue public education and outreach program

Provide any additional details on activities planned for permit year 3 below:

Part VI: Certification of Small MS4 Annual Report 2020

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: Title:

Signature: Date:

[Signatory may be a duly authorized representative]

Year 3 Annual Report
Massachusetts Small MS4 General Permit
New Permittees
Reporting Period: July 1, 2020-June 30, 2021

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, 2020 and June 30, 2021 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.

Impairment(s)

Bacteria/Pathogens
 Chloride
 Nitrogen
 Phosphorus
 Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State:
 Assabet River Phosphorus
 Bacteria and Pathogen
 Cape Cod Nitrogen
 Charles River Watershed Phosphorus
 Lake and Pond Phosphorus

Out of State:
 Bacteria/Pathogens
 Metals
 Nitrogen
 Phosphorus

Clear Impairments and TMDLs

*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 3 Requirements

- IDDE ordinance or other regulatory mechanism complete and adopted
- Construction/ Erosion and Sediment Control (ESC) ordinance or other regulatory mechanism complete and adopted
- Post-construction bylaw, ordinance, or other regulatory mechanism complete and adopted
- Developed written procedures for site inspections and enforcement of sediment and erosion control measures
- Developed written procedures for site plan review
- Kept a log of catch basins cleaned and inspected

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above year 3 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:

The Devens Enterprise Commission (DEC) updated their regulations (974 CMR) to meet permit requirements for IDDE authority, erosion and sediment control, and post-construction stormwater management during Permit Year 3. Devens is also in the process of expanding IDDE authority to MassDevelopment, as MassDevelopment assists the DEC in meeting many requirements of the MS4 Permit. Updates to the MassDevelopment regulations (946 CMR) were drafted in Permit Year 3 to grant IDDE authority to MassDevelopment as well as the DEC. These updates will be adopted in Permit Year 4.

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

- 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

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above annual 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:

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) that encourages the proper use and disposal of grass clippings and encourages 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)

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:

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:

Devens does not currently have any impaired water bodies with an approved TMDL for phosphorus. Devens does have direct discharges to water bodies that are impaired for phosphorus or that are tributary to water bodies that are impaired for phosphorus without an approved TMDL. Appendix H requires Devens to track and estimate the amount of phosphorus removed by structural BMPs installed as a result of the retrofit inventory conducted as part of the Phosphorus Source Identification Report, which is due in Permit Year 6. As dictated by the permit, at least one structural BMP must be installed by the end of Permit Year 8. Appendix H does not require permittees to estimate the amount of phosphorus removed by existing structural BMPs -- that is only a requirement for permittees discharging to a waterbody with an existing TMDL for phosphorus and therefore not applicable to Devens. However, once Devens begins installation of structural BMPs as identified as part of their Phosphorus Source Identification Report, they will track and estimate the phosphorus removed by the BMP consistent with Attachment 3 to Appendix F. Over the past year, Devens did finish a road reconstruction project where three existing separate drainage branches from Hospital Road, Elliot Road and Perimeter Road were replaced (deep sump catch basins were added) and were combined into one network, which conveys stormwater into a new infiltration basin and provides required recharge, attenuation of peak flows, and water quality treatment. Two outfalls discharging directly to Catacoonamug Brook, which flows into the Nashua River, which is impaired for phosphorus, were eliminated as part of this effort. Phosphorus reduction associated with the new infiltration basin has been calculated and pertinent information is attached separately to this report.

Under their updated post-construction stormwater management regulations (974 CMR), Devens will be tracking phosphorus removal attributable to structural BMPs on private developments. This effort will ensure that phosphorus reduction requirements are being met for new development and redevelopment, and will be useful should a TMDL be approved for the phosphorus-impaired waterbodies in Devens.

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? Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: <https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state>

- Yes
 No

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

Devens is continuously updating its list of outfalls, interconnections, and receiving waters as new infrastructure is built and existing infrastructure changes ownership. The most recent list of outfalls, interconnections, and receiving waters is included in the SWMP. Devens has not had any impairments added or removed from any of its receiving waters since the effective date of the permit.

Part IV: Minimum Control Measures

Part IV includes some of the metrics that will be required in upcoming annual reports. For this annual report, please report on MCM1 and MCM2 and any other metrics below that have an asterisk (), along with any other metrics that you have started within this reporting period. Other than the metrics with an asterisk, the rest of the metrics are optional for new permittees. Then, proceed to Part V.*

*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: Mailer/Virtual Course

Message Description and Distribution Method:

Devens has developed comprehensive Green Infrastructure Guidelines for businesses and developers. During the reporting period, these guidelines were featured in the Devens Forward Climate Action Plan and in the Business Toolkit that was developed and distributed to all businesses in Devens: <https://kladashboard-clientsourcefiles.s3.amazonaws.com/Devens/Devens+Climate+Action+Toolkit+FINAL.pdf>

The guidelines were also featured in the Apple Country Natural Climate Solutions Project Report, which was developed in conjunction with Harvard and Bolton, MA under an initiative funded by the Municipal Vulnerability Preparedness (MVP) program: <https://climateresilient.wixsite.com/applecountry>

The DEC also produced an on-line course on Green Infrastructure for Green Roofs for the Healthy Cities Living Architecture Academy: <https://livingarchitectureacademy.com/p/street-trees-and-community-wellbeing>
This course features the Devens Green Infrastructure Guidelines and was viewed by people throughout North America

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

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:

BMP: Web Page

Message Description and Distribution Method:

The Devens Enterprise Commission continued to maintain stormwater information on its website. The information is on the "Devens Residents" page under the "Living Green: Resources for Devens Residents and Businesses" subheading: <http://www.devensec.com/residents.html>. Information is also posted on the DEC's "News and Events" page under the subheading "Devens Stormwater Management Education and Awareness Initiative": <https://www.devensec.com/news.html>. Flyers are posted on the News and Events page specifically targeting Devens residents and business owners in the Nashua River watershed.

Targeted Audience: Residents, Businesses, Institutions, and Commercial facilities

Responsible Department/Parties: MassDevelopment (Operations/Engineering)/Devens Enterprise Commission

Measurable Goal(s):

The DEC website was maintained during Permit Year 3. The "Devens Residents" page had 624 visitors during the reporting period with 494 visitors clicking on a linked document; the "News and Events" page had 1,258 visitors during the reporting period, with 843 clicking on a linked document.

Message Date(s): FY2021

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:

BMP: Web Page/Handout

Message Description and Distribution Method:

The Devens Enterprise Commission continued to maintain stormwater-related materials, documentation, regulations, and procedures on their website during the reporting period. All regulations specific to developers and industrial facilities are easily accessible on the "Development Services" page of the DEC website: <http://www.devensec.com/devserv.html>. Additional information continued to be provided on the "Sustainable Devens" page: <http://www.devensec.com/sustain.html>, and the DEC's Green Infrastructure Guidelines were posted to the website as well distributed to some prospective developers in person: http://www.devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf

Targeted Audience: Developers (construction). Industrial facilities

Responsible Department/Parties: MassDevelopment (Operations/Engineering)/Devens Enterprise Commission

Measurable Goal(s):

By continuing to make this information available on its website, Devens informs potential developers of the environmental requirements associated with construction in the Devens Enterprise Zone, raising awareness of Low-Impact Development and Green Infrastructure practices. Hard copies of the Green Infrastructure Guidelines were also distributed to 6 prospective developers during the reporting period.

Message Date(s): FY2021

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:

BMP:Flyer

Message Description and Distribution Method:

A flyer regarding proper pet waste management was distributed with dog license issuances and renewals during the reporting period. Two new pet waste bag dispensaries were also installed in high traffic dog walking areas.

Targeted Audience: Residents

Responsible Department/Parties: MassDevelopment (Operations/Engineering)

Measurable Goal(s):

A flyer was distributed to 51 residents who applied for or renewed a dog license during the reporting period.

Message Date(s): FY2021

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:

BMP: Flyer/Web Page

Message Description and Distribution Method:

Devens developed flyers specifically targeting businesses and residents within the Nashua River watershed during Permit Year 3. The business flyer discusses the Nashua River's phosphorus and bacteria impairments as well as actions like proper parking lot sweeping, material storage, fertilizing, and snow and ice removal that business owners can take to reduce their impact on stormwater pollution. This flyer was posted to the Devens website: <https://www.devenscommunity.com/assets/work/pdfs/DevensStormwaterBusinesses05202021.pdf?cachebuster:34>

The residential flyer discusses actions like pet waste and yard waste management, proper fertilizer use, proper leaf litter disposal, and car maintenance that residents can take to reduce their impact on stormwater pollution.

Both flyers were distributed with the May 2021 newsletter, which reaches all residents and business owners in Devens: <https://cm.massdevelopment.com/t/ViewEmail/d/6B0C08622E665D892540EF23F30FEDED>

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

This flyer was posted during the reporting period and will be maintained throughout the permit term. The exact number of views the flyer had is unknown. While these flyers meet the additional public education requirements for phosphorus impairments, they were all distributed in the spring instead of in the timeframes specified in the permit.

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:

BMP:Web Page

Message Description and Distribution Method:

Devens maintained the Devens Community website during the permit term, which provides educational information to residents, business owners, and prospective developers. The website includes direct links to Devens' Stormwater Management Rules & Regulations, flyers discussing proper pet waste, yard waste, and leaf litter disposal, and a stormwater pollution prevention guide for homeowners. The stormwater webpage is located under the "Engineering" heading at this link: <https://www.devenscommunity.com/work/>

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

The website was maintained and available to the public throughout the permit year. The exact number of website views is not known.

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:

BMP:Social Media

Message Description and Distribution Method:

The Devens Enterprise Commission has active Facebook and Twitter pages, which were used to spread

educational information about stormwater management, climate change, and nature-based solutions during the reporting period. These posts are intended for multiple target audiences, as they range in topic from sustainable housing to the Devens' Complete Streets policy to the Devens Climate Action Toolkit for Businesses. The DEC made 8 posts relating to stormwater management, 19 relating to climate change, and 9 about nature-based solutions on Facebook and 7 posts about stormwater management on Twitter during the reporting period.

Targeted Audience: Residents, Businesses, institutions, and commercial facilities, Developers (construction)

Responsible Department/Parties: DEC

Measurable Goal(s):

The Facebook posts relating to stormwater management had 899 views. The Facebook posts about climate change and nature-based solutions had over 2,000 total views. The Twitter posts about stormwater management had 924 views.

Message Date(s): FY2021

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:**

Devens keeps their SWMP posted on their website for public review year-round. Hard copies of the SWMP are also kept at the MassDevelopment offices, the DEC office, and at the Department of Public Works.

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:**

Devens continued to provide public access to the recycling drop-off at the DPW facility and to provide access to the Regional Household Hazardous Products Collection Center during the reporting period, encouraging residents and business owners to properly handle all hazardous waste leaving their property. Yard waste was again collected on a weekly basis between April 1st and November 30th during the reporting period. Devens also continued to participate in the Eco-Efficiency Center, providing programs to assist local businesses in reducing the amount of waste they generate and the associated disposal costs. Devens is in the planning stages

of developing a stormwater-based curriculum for students in conjunction with the Nashua River Watershed Association. While delayed due to COVID-19, this curriculum will be developed and implemented in future permit years.

A public hearing was held on May 25, 2021 discussing MS4 permit requirements and providing the public with an opportunity to comment on the proposed updates to the DEC regulations. The updated regulations were also posted for public comment as part of the state's approval process.

Due to the impacts of COVID-19, the annual Earth Day clean-up event was once again postponed. This event will resume in Permit Year 4 assuming it is safe to do so. Devens also participated in the Nashua River Watershed Association, attending multiple meetings and participating as a voting member to the Wild and Scenic River Stewardship Council.

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:

Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified **since the effective date of the permit (July 1, 2018)**.

Total number of SSOs identified:

Total number of SSOs removed:

MS4 System Mapping

Below, check all that apply.

The following elements of the Phase I map have been completed:

- Outfalls and receiving waters
- Open channel conveyances
- Interconnections
- Municipally-owned stormwater treatment structures
- Waterbodies identified by name and indication of all use impairments
- Initial catchment delineations

Describe any additional progress you made on your map during this reporting period or provide additional status information regarding your map:

As mentioned in Part III above, Devens is continuously updating its MS4 mapping, specifically the ownership status of its infrastructure. All changes to the MS4 map have been reflected in the SWMP.

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:

Devens will complete dry weather outfall and interconnection screening by June 30, 2024, as required for new permittees under the MS4 Permit.

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:

Devens finalized its IDDE Plan, along with its catchment prioritization and ranking and catchment investigation procedures during Permit Year 3. System Vulnerability Factors for each catchment were also finalized during Year 3. After dry-weather screening and sampling has been completed, the catchments will be reprioritized, and catchment investigations will proceed according to permit requirements.

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:

Employee Training

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

Devens will begin to conduct training on the IDDE program and Good Housekeeping/Pollution Prevention in Permit Year 4. Training is also planned to instruct Devens staff on outfall screening and sampling, and at least one training will be held on the Stormwater Pollution Prevention Plan (SWPPP) that was developed for the DPW facility.

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 inspections completed:

Number of enforcement actions taken:

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

The Devens Enterprise Commission conducted 131 construction site inspections during the reporting period, which included erosion and sediment control inspections and inspections for overall project progress. While multiple inspections resulted in requested repairs, replacement and/or installation of erosion and sedimentation controls, enforcement actions were not necessary due to full compliance with requested corrective actions.

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

As-built Drawings

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites:

Devens' existing regulations, prior to the updates in Year 3, required the submission of as-built drawings at the completion of construction and required long term operation and maintenance plans for on-site stormwater management systems to be submitted prior to project approval. No changes were made to these measures during Permit Year 3. Devens received 17 as-built plans from completed developments during the reporting period.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment including any planned or completed changes to local regulations and guidelines:

Devens requires and incorporates LID practices for all public and private stormwater management projects where feasible. The Devens Enterprise Commission has parking maximums in place, as opposed to the minimums that other communities impose, as well as a Transportation Demand Management Program to reduce parking. 974 CMR 2.07, Street Design Standards, includes additional street types to reduce pavement and support LID. Sustainable indicators, such as impervious surface reductions from the incorporation of LID on private development projects, are monitored and tracked. The required street design and parking lots assessment report will be developed in Permit Year 6.

Green Infrastructure Report

Describe the status of the green infrastructure report including the findings and progress towards making the practice allowable:

Devens continues to use and improve on green infrastructure guidelines to guide, regulate, and incentivize green infrastructure on all development and redevelopment projects: https://devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf

Impervious surface reductions in Devens are monitored in Sustainable Indicators Reports, and LID practices

are required for stormwater management projects where feasible. Devens will develop the required green infrastructure report in Permit Year 6.

Retrofit Properties Inventory

Describe the status of the inventory of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

Devens will begin to assemble the retrofit properties inventory in Permit Year 6, as outlined in the SWMP, and as required in the permit for new permittees. Many retrofit projects implemented to date, including road diets on Pine Road, Grant Road, Hospital Road, Lovell Street, the Bristol-Meyers Squibb (BMS) parking structure, and at the military redevelopment on Barnum Road; porous pavement at CMTC and Tara Vista; and other LID projects have mitigated impervious area within the Devens Enterprise Zone.

As part of the Hospital Road road reconstruction project, three existing separate drainage branches from Hospital Road, Elliot Road and Perimeter Road were replaced (deep sump catch basins were added) and were combined into one network, which conveys stormwater into a new infiltration basin and provides required recharge, attenuation of peak flows, and water quality treatment. Two outfalls discharging directly to Catacoonamug Brook, which flows into the Nashua River, which is impaired for phosphorus, were eliminated as part of this effort.

MCM6: Good Housekeeping

***Catch Basin Cleaning**

Describe the status of the catch basin cleaning optimization plan:

See "Additional Information" field below.

If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:

- The catch basin cleaning optimization plan or schedule is attached to the email submission
- The catch basin cleaning optimization plan or schedule can be found at the following website:

*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, if known.

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:

During Permit Year 3, all 74 catch basins inspected were cleaned, regardless of the amount of material in each basin. As mentioned in the "Additional Information" section below, Devens is still in the process of collecting the data necessary to complete its catch basin optimization plan. Once complete, this plan will include procedures for actions to be taken if a catch basin sump is more than 50% full during two consecutive routine inspections or cleanings.

***Street Sweeping**

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

Devens currently sweeps all public streets and municipal parking lots in the early spring, and then an average of once every 4 weeks, as needed. In Permit Year 3, all streets were swept four times. Devens will continue compiling its written Operation and Maintenance (O&M) Plan for municipal properties in Permit Year 4. The O&M Plan will include written procedures for sweeping streets and municipally-owned lots, and will be complete by June 30, 2022.

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:

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

Devens also sweeps rural, uncurbed roadways with no catch basins. Sweeping of these streets will be documented in the standard operation and maintenance procedures developed for municipal facilities and activities in Permit Year 4.

O&M Procedures and Inventory of Permittee-Owned Properties

Below, check all that apply.

The following permittee-owned properties have been inventoried:

- Parks and open spaces
- Buildings and facilities
- Vehicles and equipment

The following O&M procedures for permittee-owned properties have been completed:

- Parks and open spaces
- Buildings and facilities

Vehicles and equipment

Winter Road Maintenance

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

Devens developed written winter road maintenance procedures during Permit Year 3. These procedures are included in the SWMP.

Stormwater Pollution Prevention Plan (SWPPP)

Describe the status of any SWPPP for permittee-owned or operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater:

Devens developed a draft SWPPP for its DPW Facility and the Devens Regional Household Hazardous Products Collection Center, which are on the same parcel. A preliminary site inspection was conducted on October 13, 2020. SWPPP implementation, including quarterly SWPPP inspections, will be conducted after the document is finalized in Permit Year 4.

*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:

N/A

O&M Procedures for Stormwater Treatment Structures

Describe the status of the written procedure for stormwater treatment structure maintenance:

Devens has existing procedures for stormwater treatment structure maintenance, which will be reviewed and optimized to ensure compliance with the 2016 MS4 Permit as part of the development of the overall written Operation and Maintenance Plan.

Part V: 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:

Devens continued to collect data during the 2021 cleaning season as part of their optimization plan to ensure that no catch basin is more than 50% full. Data collected includes depth from the catch basin rim to the top of sediment, to the bottom of the basin, and to the invert of the outlet pipe. Devens will continue to collect data as needed until data is available for all catch basins. This data will be integrated into the Devens Drainage GIS and utilized to identify which catch basins are filling up more frequently and will therefore need to be cleaned more than once annually to ensure that the catch basin sump is never more than 50%.

COVID-19 Impacts

Optional: If any of the above year 3 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 4 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree

- Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
- Identify each outfall and interconnection discharging from MS4, classify into the relevant category, and priority rank each catchment for investigation
- Develop written IDDE plan including a procedure for screening and sampling outfalls
- Develop written procedures to require the submission of as-built drawings and ensure the long term operation and maintenance of completed construction sites and add these procedures to the SWMP
- Develop written operations and maintenance procedures for parks and open space, buildings and facilities, and vehicles and equipment and added these procedures to the SWMP
- Develop an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment and added this inventory to the SWMP
- Complete a written program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- Develop written SWPPPs, included in the SWMP, for all of the following permittee owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater
- Enclose or cover storage piles of salt or piles containing salt used for deicing or other purposes

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
- Continue public education and outreach program
- Sweep all curbed roadways at least once within the reporting period
- Provide training within the reporting period to employees involved in IDDE program
- Clean catch basins in accordance with catch basin cleaning procedures to ensure that no catch basin is greater than 50% full

Provide any additional details on activities planned for permit year 4 below:

***Part VI: 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: Title:

Signature:
[Signatory may be a duly authorized representative] Date:

Year 4 Annual Report
Massachusetts Small MS4 General Permit
New Permittees
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.

Impairment(s)

Bacteria/Pathogens
 Chloride
 Nitrogen
 Phosphorus
 Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State:
 Assabet River Phosphorus
 Bacteria and Pathogen
 Cape Cod Nitrogen
 Charles River Watershed Phosphorus
 Lake and Pond Phosphorus

Out of State:
 Bacteria/Pathogens
 Metals
 Nitrogen
 Phosphorus

Clear Impairments and TMDLs

*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

- Identified and developed an inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
 - The SSO inventory is attached to the email submission
 - The SSO inventory can be found at the following website:

<https://www.devenscommunity.com/live/>

- Identified each outfall and interconnection discharging from MS4, classified into the relevant category, and priority ranked each catchment for investigation
 - The priority ranking of outfalls/interconnections is attached to the email submission
 - The priority ranking of outfalls/interconnections can be found at the following website:

<https://www.devenscommunity.com/live/>

- Developed written IDDE plan including a procedure for screening and sampling outfalls
- Developed written procedures to require the submission of as-built drawings and ensure the long term operation and maintenance of completed construction sites and added these procedures to the SWMP
- Developed written operations and maintenance procedures for parks and open space, buildings and facilities, and vehicles and equipment and added these procedures to the SWMP
- Developed an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment and added this inventory to the SWMP
- Completed a written program for MS4 infrastructure maintenance to reduce the discharge of pollutants
 - Developed written SWPPPs, included in the SWMP, for all of the following permittee owned or
 - operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater
- Enclosed or covered storage piles of salt or piles containing salt used for deicing or other purposes

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:

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
- 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

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:

Devens finalized the IDDE Plan during Permit Year 4. Annual training to employees involved in the IDDE program is planned to commence within Year 5, along with the implementation of the IDDE plan.

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) that encourages the proper use and disposal of grass clippings and encourages 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)

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:

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:

Devens does not currently have any impaired water bodies with an approved TMDL for phosphorus. Devens does have direct discharges to water bodies that are impaired for phosphorus or that are tributary to water bodies that are impaired for phosphorus without an approved TMDL. Appendix H requires Devens to track and estimate the amount of phosphorus removed by structural BMPs installed as a result of the BMP retrofit analysis to be conducted as part of the Phosphorus Source Identification Report for the Nashua River watershed, which must be completed by the end of Permit Year 6. As required by the permit, at least one structural BMP must be installed by the end of Permit Year 8. Appendix H does not require permittees to estimate the amount of phosphorus removed by existing structural BMPs -- that is only a requirement for permittees discharging to a waterbody with an existing TMDL for phosphorus and therefore not applicable to Devens. However, once Devens begins installation of structural BMPs as identified as part of their Phosphorus Source Identification Report, they will track and estimate the phosphorus removed by the BMP consistent with Attachment 3 to Appendix F.

Under their updated post-construction stormwater management regulations (974 CMR), Devens will be tracking phosphorus removal attributable to structural BMPs on private developments. This effort will ensure that phosphorus reduction requirements are being met for new development and redevelopment, and will be useful should a TMDL be approved for the phosphorus-impaired waterbodies in Devens.

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

The terms of the settlement agreement dated December 28, 2020, between the Conservation Law Foundation, Inc., and the Massachusetts Development Finance Agency, includes implementation deadlines that MassDevelopment met during Permit Year 4. The required regulatory updates included in the settlement

agreement were integrated with updates MassDevelopment and the Devens Enterprise Commission made to their regulations to meet MS4 Permit requirements-- the updated 974 CMR sections were adopted at a public hearing on May 25, 2021, ahead of the February 2022 deadline outlined in the settlement.

In accordance with the settlement, MassDevelopment developed a preliminary ranking of their stormwater catchment areas based on calculated phosphorus loadings to receiving waters. A list of potential retrofit projects in the highest-ranked catchment areas was developed and is in the process of being prioritized for implementation. MassDevelopment and CLF will work to develop a final list of projects and an implementation schedule that is acceptable for both parties, and the first two retrofit projects will be complete within five (5) years of the settlement effective date, or by February 5, 2026.

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? Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: <https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state>

- Yes
 No

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

Any updates as they relate to receiving waters, outfalls and impairments are reflected in the latest version of Devens' SWMP dated June 2022.

Part IV: Minimum Control Measures

Part IV includes some of the metrics that will be required in upcoming annual reports. For this annual report, please report on MCM1 and MCM2 and any other metrics below that have an asterisk (*), along with any other metrics that you have started within this reporting period. Other than the metrics with an asterisk, the rest of the metrics are optional for new permittees. Then, proceed to Part V.

*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: Webpage

Message Description and Distribution Method:

The Devens Enterprise Commission continued to maintain stormwater information on its website. The information is on the "Devens Residents" page under the "Living Green: Resources for Devens Residents and Businesses" subheading: <http://www.devensec.com/residents.html>. Information is also posted on the DEC's "News and Events" page under the subheading "Devens Stormwater Management Education and Awareness Initiative": <https://www.devensec.com/news.html>. Flyers are posted on the News and Events page specifically targeting Devens residents and business owners in the Nashua River watershed.

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

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:

BMP: Web Page/Handout

Message Description and Distribution Method:

The Devens Enterprise Commission continued to maintain stormwater-related materials, documentation, regulations, and procedures on their website during the reporting period. All regulations specific to developers and industrial facilities are easily accessible on the "Development Services" page of the DEC website: <http://www.devensec.com/devserv.html>. Additional information continued to be provided on the "Sustainable

Devens" page: <http://www.devensec.com/sustain.html>, and the DEC's Green Infrastructure Guidelines were posted to the website as well distributed to some prospective developers in person: http://www.devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf

Targeted Audience: Developers (construction). Industrial facilities

Responsible Department/Parties: MassDevelopment (Operations/Engineering)/Devens Enterprise Commission

Measurable Goal(s):

By continuing to make this information available on its website, Devens informs potential developers of the environmental requirements associated with construction in the Devens Enterprise Zone, raising awareness of Low-Impact Development and Green Infrastructure practices.

Message Date(s): FY2022

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:

BMP: Web Page

Message Description and Distribution Method:

Devens maintained the Devens Community website during the permit term, which provides educational information to residents, business owners, and prospective developers. The website includes direct links to Devens' Stormwater Management Rules & Regulations, flyers discussing proper pet waste, yard waste, and leaf litter disposal, and a stormwater pollution prevention guide for homeowners. The stormwater webpage is located under the "Engineering" heading at this link: <https://www.devenscommunity.com/live/>

Targeted Audience: Residents, Businesses, institutions and commercial facilities, Developers

Responsible Department/Parties: MassDevelopment

Measurable Goal(s):

The website was maintained and available to the public throughout the permit year. Overall, the Devens Community website had 23,634 views during the permit year, however it was not possible to attribute views to specific sub-sections or pages of the website. MassDevelopment was working to develop a tool to more accurately track webpage and PDF views during the permit year, however development will continue into FY2023 due to budget and time constraints.

Message Date(s): FY2022

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:

BMP: Social Media

Message Description and Distribution Method:

The Devens Enterprise Commission has active Facebook and Twitter pages, which were used to spread educational information about stormwater management, climate change, and nature-based solutions during the reporting period. These posts are intended for multiple target audiences, as they range in topic from sustainable housing to the Devens' Complete Streets policy to the Devens Climate Action Toolkit for Businesses.

Targeted Audience: Residents, Businesses, institutions, and commercial facilities, Developers (construction)

Responsible Department/Parties: DEC

Measurable Goal(s):

The DEC Facebook page has 324 followers, and the Twitter page has 49 followers. The social media postings reached these followers during the permit year.

Message Date(s): FY2022

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:

BMP: Virtual Course

Message Description and Distribution Method:

The DEC produced an on-line course on Green Infrastructure for Green Roofs for the Healthy Cities Living Architecture Academy: <https://livingarchitectureacademy.com/p/street-trees-and-community-wellbeing>
This course features the Devens Green Infrastructure Guidelines and was viewed by people throughout North America.

Additionally, Devens continued to maintain access to its green infrastructure guidelines through the Apple Country Natural Climate Solutions Project Report, which was developed in conjunction with Harvard and Bolton, MA under an initiative funded by the Municipal Vulnerability Preparedness (MVP) program: <https://climateresilient.wixsite.com/applecountry/project-story>

Targeted Audience: Businesses, Institutions and Commercial Facilities; Developers (construction)

Responsible Department/Parties: MassDevelopment/Devens Enterprise Commission

Measurable Goal(s):

By collaborating with the towns of Harvard and Bolton and with the Healthy Cities Living Architecture Academy, Devens expanded their public education efforts to a regional and national scale.

Message Date(s): Permit Year 4

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:

BMP: Messaging with Pet Licenses

Message Description and Distribution Method:

Devens continued to include an insert regarding proper pet waste collection and disposal with the issuance and renewal of dog licenses. Pet waste collection bags were made available at the licensing counter for residents. Devens also continued to maintain and empty four pet waste disposal bins located along popular walking routes. The bins are emptied on Mondays and Fridays.

Targeted Audience: Residents

Responsible Department/Parties: MassDevelopment

Measurable Goal(s):

Devens issued 55 dog licenses with the accompanying educational information during the reporting period.

Message Date(s): FY2022

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:**

Devens keeps their SWMP posted on their website for public review year-round. Hard copies of the SWMP are also kept at the MassDevelopment offices, the DEC office, and at the Department of Public Works.- Devens' MS4 Annual Reports for Years 1, 2 & 3 are also maintained on their website.

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:

Devens continued to provide public access to the recycling drop-off at the DPW facility and to provide access to the Regional Household Hazardous Products Collection Center during the reporting period, encouraging residents and business owners to properly handle all hazardous waste leaving their property. Yard waste was again collected on a weekly basis between April 1 and November 30 during the reporting period. Devens also continued to participate in the Eco-Efficiency Center, providing programs to assist local businesses in reducing the amount of waste they generate and the associated disposal costs, such as the Great Exchange program. Devens is in the planning stages of developing a stormwater-based curriculum for students in conjunction with the Nashua River Watershed Association. This curriculum will be developed and implemented in future permit years. Additionally, MassDevelopment holds monthly meetings with the Devens Committee, or a group representing the residents of Devens, and informs them of any projects, recently completed reports, or other items related to the MS4 Permit.

During the week of August 23 to August 29, 2021, the Town hosted an in-person community cleanup and a raffle for those who participated and posted on social media throughout the week.

Devens also participated in the Nashua River Watershed Association, attending multiple meetings and participating as a voting member to the Wild and Scenic River Stewardship Council.

The Devens Enterprise Commission engaged with graduate students in Tufts University's Urban and Environmental Policy and Planning program to develop multiple green and complete streets design alternatives for Goddard Street. This project allowed the students to implement Devens' green and complete streets policies for a development-in-progress, and a public facing report is available on the DEC website: https://www.devensec.com/news/Devens_FinalReport_OnlineVersion.pdf

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:

Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified since the effective date of the permit (July 1, 2018).

Total number of SSOs identified:

Total number of SSOs removed:

MS4 System Mapping

Below, check all that apply.

The following elements of the Phase I map have been completed:

- Outfalls and receiving waters
- Open channel conveyances
- Interconnections
- Municipally-owned stormwater treatment structures
- Waterbodies identified by name and indication of all use impairments
- Initial catchment delineations

Describe any additional progress you made on your map during this reporting period or provide additional status information regarding your map:

Devens is continuously updating its MS4 mapping, specifically the ownership status of its infrastructure. All changes to the MS4 map have been reflected in the SWMP.

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:

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:

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:

Employee Training

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

The annual IDDE training was not completed during this reporting period and will begin in Year 5, alongside the implementation of the IDDE plan that was finalized during this permit year (Year 4).

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 inspections completed:

Number of enforcement actions taken:

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

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

***As-built Drawings**

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites:

Devens' existing regulations, prior to the updates in Year 3, required the submission of as-built drawings at the completion of construction and required long term operation and maintenance plans for on-site stormwater management systems to be submitted prior to project approval. No changes were made to these measures during Permit Year 4.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment including any planned or completed changes to local regulations and guidelines:

Devens requires and incorporates LID practices for all public and private stormwater management projects where feasible. The Devens Enterprise Commission has parking maximums in place, as opposed to the minimums that other communities impose, as well as a Transportation Demand Management Program to reduce parking. 974 CMR 2.07, Street Design Standards, includes additional street types to reduce pavement and support LID. Sustainable indicators, such as impervious surface reductions from the incorporation of LID on private development projects, are monitored and tracked. The required street design and parking lots assessment report will be developed in Permit Year 6.

Green Infrastructure Report

Describe the status of the green infrastructure report including the findings and progress towards making the practice allowable:

Devens continues to use and improve on green infrastructure guidelines to guide, regulate, and incentivize green infrastructure on all development and redevelopment projects: https://devensec.com/development/Green_Infrastructure_Guidelines_Final_8-12-14.pdf

Impervious surface reductions in Devens are monitored in Sustainable Indicators Reports, and LID practices are required for stormwater management projects where feasible. Devens will develop the required green infrastructure report in Permit Year 6.

Retrofit Properties Inventory

Describe the status of the inventory of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

Devens will begin to assemble the retrofit properties inventory in Permit Year 6, as outlined in the SWMP, and as required in the permit for new permittees. Some overlap may exist between this retrofit property inventory and the list of retrofit projects developed to meet the terms of the settlement with CLF, discussed above. Many retrofit projects implemented to date, including road diets on Pine Road, Grant Road, Hospital Road, Lovell Street, the Bristol-Meyers Squibb (BMS) parking structure, and at the military redevelopment on Barnum Road; porous pavement at CMTC and Tara Vista; and other LID projects have mitigated impervious area within the Devens Enterprise Zone.

As part of the Hospital Road road reconstruction project, three existing separate drainage branches from Hospital Road, Elliot Road and Perimeter Road were replaced (deep sump catch basins were added) and were combined into one network, which conveys stormwater into a new infiltration basin and provides required recharge, attenuation of peak flows, and water quality treatment. Two outfalls discharging directly to Catacoonamug Brook, which flows into the Nashua River, which is impaired for phosphorus, were eliminated as part of this effort.

MCM6: Good Housekeeping

***Catch Basin Cleaning**

- The catch basin cleaning optimization plan or schedule is not complete
- The catch basin cleaning optimization plan or schedule is attached to the email submission
- The catch basin cleaning optimization plan or schedule can be found at the following website:

*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, if known.

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:

MassDevelopment inspected 305 catch basins during the reporting period, and cleaned 208 catch basins. Catch basin cleaning crews collect inspection and cleaning data electronically, and at the time this report was compiled, the DPW was having technical difficulties and was unable to extract the data collected during the reporting period from the iPads used in the field that indicated the precise amount of material that was removed. However, no catch basin that was cleaned was found to have a sump that was more than 50% full. MassDevelopment will submit the amount of material that was removed from catch basins cleaned during Permit Year 4, with the Year 5 Annual Report once the technical difficulties are solved and the data can be processed.

***Street Sweeping**

- The written procedures for sweeping streets and municipal-owned lots is not complete
- The written procedures for sweeping streets and municipal-owned lots is attached to the email submission
- The written procedures for sweeping streets and municipal-owned lots can be found at the following website:

<https://www.devenscommunity.com/live>

*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:

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

The procedures for sweeping these roads are included in the O&M procedures attached to the SWMP and can be accessed here: <https://www.devenscommunity.com/live/>

***O&M Procedures and Inventory of Permittee-Owned Properties**

Below, check all that apply.

The following permittee-owned properties have been inventoried:

- Parks and open spaces
- Buildings and facilities
- Vehicles and equipment

The following O&M procedures for permittee-owned properties have been completed:

- Parks and open spaces
- Buildings and facilities
- Vehicles and equipment

***Winter Road Maintenance**

- The written procedures for winter road maintenance including the storage of salt and sand is not complete
- The written procedures for winter road maintenance including the storage of salt and sand is attached to the email submission
- The written procedures for winter road maintenance including storage of salt and sand can be found at the following website:

<https://www.devenscommunity.com/live/>

***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:

No site inspections or corrective actions were taken due to the finalization of the SWPPP for the DPW facility and the Devens Regional Household Hazardous Products Collection Center during the current permit year (FY2022). These two sites are on the same parcel of land. The plan will be implemented, alongside quarterly SWPPP site inspections, during Permit Year 5 and continue for the permit duration.

Part V: 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 4 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree

- Complete IDDE ordinance
- Complete Construction/ Erosion and Sediment Control (ESC) ordinance
- Develop written IDDE plan including a procedure for screening and sampling outfalls
- Develop a written catchment investigation procedure and added the procedure to the SWMP

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
- Continue public education and outreach program
- Sweep all curbed roadways at least once within the reporting period
- Provide training within the reporting period to employees involved in IDDE program
- Clean catch basins in accordance with catch basin cleaning procedures to ensure that no catch basin is greater than 50% full

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

***Part VI: 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: Title:

Signature: Date:
[Signatory may be a duly authorized representative]