FRAMINGHAM
MASSACHUSETTS

Stormwater Management Plan



City of Framingham

EPA NPDES Permit Number: MAR041116

Updated September 2025

Summary of Revisions

Revision	Changes	Date
0	Original Plan	May 2009
1	Plan updated based on operational changes and infrastructure updates	2012
2	Draft revisions to prepare for requirements of draft MS4 permits	2015 - 2018
3	Plan updated for compliance with the 2016 NPDES MS4 permit	June 2019
4	Plan updated to reflect completed BMPs and Year 2 MS4 permit requirements	June 2020
5	Updated Table 1 - Framingham Water Body Known Impairments based on the most recent *Massachusetts Integrated List of Waters (2016 list, approved by EPA January 2020);* Grist Mill Pond was removed from Framingham's list of receiving waters (Table 1). Field work for outfall screening confirmed that no City-owned outfalls discharge directly to the pond.	March 2021
6	Plan updated to reflect completed BMPs and Year 3 MS4 permit requirements	June 2021
7	Plan updated to reflect Year 4 MS4 permit requirements, contact for pertinent personnel Updated Table 1 - Framingham Water Body Known Impairments based on the most recent *Massachusetts Integrated List of Waters (Final 2018/2020 list, approved by EPA February 2022);*	June 2022
8	Plan updated to reflect Year 5 MS4 permit requirements	June 2023
9	Plan updated to reflect Year 6 MS4 permit requirements	August 2024
10	Plan updated to reflect Year 7 MS4 permit requirements	September 2025

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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, 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: _____

1. Overview

1.1 Background

The City of Framingham, located 20 miles west of Boston, is approximately 26 square miles with nearly 69,000 inhabitants. The City's municipal separate stormwater sewer system (MS4) is completely separate from the sanitary sewer system. Based on the City's stormwater system, population, and urbanization, the EPA designated the City of Framingham as a MS4 regulated area under the National Pollutant Discharge Elimination System (NPDES) Phase II Program (**Figure 1**).

Although the City of Framingham controls most of the stormwater system in City, some infrastructure and outfalls are privately owned or are owned by other public agencies such as the Massachusetts Department of Transportation (MassDOT). In addition to municipal properties and facilities, several large state and federal facilities and infrastructure are located within the City limits, some of which are permitted under other NPDES permits, including: the Massachusetts Department of Transportation, Framingham State University , Massachusetts Correctional Institution – Framingham, National Guard Armory, US Postal Service Vehicle Maintenance Facility, Mass Bay Community College, Massachusetts Emergency Management Agency headquarters, and Callahan and Cochituate State Parks.

1.2 NPDES Phase II Program

Graphic: Courtesy NCDENR



The US Environmental Protection Agency (EPA) partners with the Massachusetts Department of Environmental Protection (MassDEP) to oversee the NPDES Storm Water MS4 Phase II permitting program in Massachusetts. The purpose of the Phase II program is to reduce pollutants in US water bodies from stormwater systems in municipalities with fewer than 100,000 residents.

The City of Framingham operates its stormwater management system under the NPDES Phase II Municipal Separate Storm Sewer System (MS4) General Permit, effective July 1, 2018, with modifications in 2020. A letter documenting administrative continuation of coverage under the permit was issued May 16, 2022, such that coverage which was set to expire July 1, 2022 will remain in force and effect until a general permit, individual permit or other general permit is issued. A copy of the current permit is provided in **Appendix A**. A copy of the City's Notice of Intent (NOI) and authorization letters for coverage under the permit are provided in **Appendix B**.

Under this permit, the City is required to utilize water quality Best Management Practices (BMPs), develop a program to detect and eliminate illicit discharges, and minimize erosion during construction and post construction.

Management of the drainage system under the Phase II MS4 Permit is based on the following six minimum control measures:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control

5. Post-Construction Stormwater Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

1.3 SWMP Objectives

The administration of the City of Framingham's stormwater management program is primarily the responsibility of the Department of Public Works, but also includes integration with other City Departments. This Stormwater Management Plan (SWMP) is designed to:

- Meet the requirements of the EPA's NPDES Phase II MS4 Permit, effective July 1, 2018, modified in 2020;
- Codify administrative, regulatory, and legal aspects of stormwater management;
- Support the development of an accurate and comprehensive GIS map and database of the MS4;
- Summarize the City's operations and maintenance of the MS4;
- Provide a framework to identify, assess, and address hydraulic deficiencies, water quality impacts, and structural concerns associated with the City's MS4; and,
- Support the development of capital improvement projects for drainage infrastructure.

1.4 Program Evaluation, Record Keeping, and Reporting

1.4.1 Program Evaluation

The City continuously evaluates the SWMP for regulatory compliance, appropriateness of identified best management practices, and progress towards achieving identified measurable goals. An annual self-assessment of compliance with the terms and conditions of the permit and appropriateness of selected BMPs is included in NPDES MS4 annual reports (**Appendix C**).

1.4.2 Record Keeping

The City will keep all records required by the permit for a period of at least five years. Records include information used in the development of any written program required by the 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.

1.4.3 Annual Reporting Requirements

The City must report annually to the EPA and the MassDEP regarding the status of our implementation of the six minimum control measures and other permit requirements. The annual report is due ninety days (i.e. September 28) from the close of each reporting period (i.e. June 30). The annual report provides a summary of stormwater management activities undertaken by the City, including descriptions of the outfall screening, public education programs, and other programs. Copies of the annual NPDES MS4 reports are included in **Appendix C** and are publicly available through the EPA's website.

Reports shall be submitted to EPA and MassDEP 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
OR submitted electronically to EPA at:
stormwater.reports@epa.gov

Massachusetts Department of Environmental Protection
One Winter Street – 5th Floor
Boston, MA 02108
ATTN: Frederick Civian
OR submitted electronically to MassDEP at:
laura.schifman@state.ma.us

2. MS4 System

2.1 Mapping

The City has very large and complex infrastructure. The City maintains GIS files and uses ArcGIS from ESRI and VUEWorks™ software to provide mapping to system users on City-owned water, sewer, and drainage systems. The City also maintains historical hardcopy drawings (on linen, Mylar®, and/or paper) and tie cards as backup to the software.

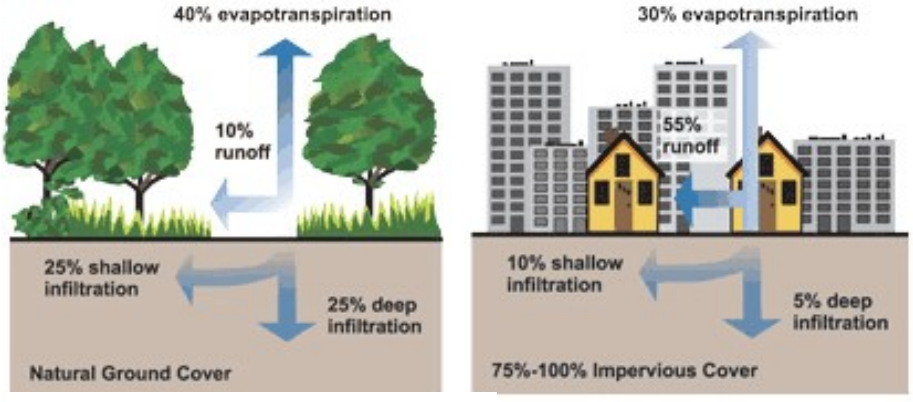
The following components of the City's drainage infrastructure are mapped:

- Outfalls
- Drainage pipes
- Drainage manholes
- Catch basins
- Open channel conveyances (e.g. swales)
- Miscellaneous drainage structures and BMPs
- Interconnections with other MS4s and other stormwater management systems (e.g. MassDOT's drainage for the Massachusetts Turnpike, private property)
- Sub-basin delineations
- Receiving water bodies

Each structure has a unique identifier. When available, additional information about the structures is included such as approximate year of construction, materials of construction, and inverts. Connectivity information such as lengths, connections, and flow direction are also provided. The drainage information in VUEWorks™ contains original plans and profiles for the system, when available.

2.2 Impervious Area

The City has a land area of approximately 26 square miles containing mixed land uses ranging from agricultural to highly urbanized, historically industrialized areas. Of that land area, approximately 24% is impervious (**Figure 2**).



Graphic: Courtesy of the USEPA

2.3 Receiving Waters

The City lies completely in the Sudbury River watershed (**Figure 3**) and therefore, all stormwater runoff from the City's MS4 ultimately flows to the Sudbury River. Collectively, the Sudbury, Assabet and

Concord Rivers Watershed are known as the "SuAsCo Watershed." A Total Maximum Daily Load (TMDL) has not been developed for the Sudbury River.

2.3.1 Impaired Waters

An impaired water or a 'water quality limited water body' 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 List of Waters*. The most recent *Massachusetts Integrated List of Waters* listing of waterbodies in Massachusetts that do not meet surface water quality standards (their capacity to support designated uses such as fishing, recreation, drinking water supply, or aquatic life support) has identified nine water bodies within Framingham that are currently identified as impaired and one water body within Sudbury into which tributaries in Framingham discharge (**Figure 4** and **Table 1**). The most recent list can be downloaded from the MassDEP's website (http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdls.html). Additional provisions (addressed in more detail in Section 4) are required by the permit for discharges from the MS4 to a water quality limited waterbody where the pollutants are typically found in stormwater. These pollutants are identified in bold red on **Table 1**.

Table 1. Framingham Water Body Known Impairments

Water Body	Impairment Cause
Eames Brook (MA82A-13)	(Debris*)
	Trash
	Benthic Macroinvertebrates
	Algae
	Odor
Farm Pond (MA82035)	(Eurasian Water Milfoil, Myriophyllum spicatum*)
	(Curly-leaf Pondweed*)
	(Fanwort*)
	Algae
	Turbidity
Framingham Reservoir #1 (MA82044)	(Eurasian Water Milfoil, Myriophyllum spicatum*)
	(Non-Native Aquatic Plants*)
	(Water Chestnut*)
	Mercury in Fish Tissue
Framingham Reservoir #2 (MA82045)	Mercury in Fish Tissue
	Turbidity
Saxonville Pond (MA82097)	(Fanwort*)
	(Non-Native Aquatic Plants*)
	(Water Chestnut*)
	Aquatic Plants (Macrophytes)
	Mercury in Fish Tissue
Lake Cochituate North Basin (MA82020)	(Eurasian Water Milfoil, Myriophyllum spicatum*)
	Dissolved Oxygen
	PCB in Fish Tissue
Sudbury River (MA82A-03) Outlet Saxonville Pond, Framingham to confluence with Hop Brook (the lower portion of Hop Brook was identified as Wash Brook on	**Escherichia Coli (E. Coli)**
	(Curly-leaf Pondweed*)
	(Eurasian Water Milfoil, Myriophyllum spicatum*)
	(Non-Native Fish/Shellfish/Zooplankton*)

USGS quads prior to 1987), Wayland.	(Water Chestnut*)
	Fish Bioassessments
	Mercury in Fish Tissue
Sudbury River (MA82A-26) Outlet from Framingham Reservoir #1 to inlet of Saxonville Pond	Benthic Macroinvertebrates
	(Water Chestnut*)
	Mercury in Fish Tissue
Cochituate Brook (MA82A-22)	(Debris*)
	(Trash*)
	(Curly-leaf Pondweed*)
	Benthic Macroinvertebrates
	Escherichia Coli (E. Coli)
	Nutrient/Eutrophication Biological Indicators
Waushakum Pond (MA82112)	(Non-Native Aquatic Plants*)
	Chlorophyll-a
	Aquatic Plants (Macrophytes)
	Oxygen, Dissolved
	Phosphorus (Total)
	Turbidity

** TMDL not required (Non-pollutant)*
Impairments in bold red have additional provisions required by the permit

2.3.2 Surface Public Drinking Water Supply Sources

Framingham Reservoirs #1, #2, and #3 are owned by the Massachusetts Department of Conservation and Recreation and operated by the Massachusetts Water Resources Authority. These reservoirs were officially removed from active use and classified as emergency water supply in 1976. Subsequent water forecasting needs combined with the impacts from the Nyanza Superfund site in Ashland, concluded that neither Reservoirs #1 or #2 were suitable supplies for the supply system. Framingham Reservoir #3 continues to serve as an emergency source water supply for the MWRA and remains a Class A public water supply.

2.3.3 Public Swimming Beaches

The City has three public swimming beaches that are operated by the Parks & Recreation Department and monitored by the Board of Health. These include:

Graphic: Learned Pond photo



- Learned Beach — located on Learned Pond at Lower Shawmut Terrace *(off Prindiville Avenue)*.
- Saxonville Beach — located on Lake Cochituate at Lake Road *(off Old Connecticut Path, near Wayland town line)*.
- Waushakum Beach — located on Waushakum Pond at Nipmuc Road *(off Winthrop Street, near Rt. 126 and Ashland town line)*.

2.4 Stormwater Studies and Capital Improvement Plans

The City of Framingham has prepared several stormwater master plans to meet the City's growth requirements as well as an increased understanding of the hydrologic life cycle and changing regulatory requirements. These reports are summarized below.

- "A Master Plan for Additions and Improvements to Sewerage and Drainage Systems," 1968, prepared Metcalf and Eddy. This report provided plans for improvements throughout the town. It was based on a goal of removing stormwater runoff as quickly as possible from the streets and developed properties to adjacent wetlands and water bodies.
- "Supplemental Stormwater Services Summary Report," 2006, prepared by SEA Consultants, Inc. This assessment of structures was not a comprehensive plan but did provide a conditional assessment of the existing system, and made recommendations for minor structural repairs and maintenance for individual structures within the drainage system.

The City continues to develop the current Stormwater Master Plan which includes field data collection, GIS data compilation, asset condition assessments, hydrologic/hydraulic modeling, water quality assessment, alternative improvements evaluations, and capital improvement recommendations. It was expected that a total of five (5) phases would comprise the comprehensive study of the City's MS4 and contributing watersheds. Phases I through III were completed, as detailed below, between 2008 and 2014. It is the City's current plan to forego the Phase IV and V reports, and instead conduct a comprehensive assessment. Due to current staffing and budget constraints, requests for funding related to this assessment have been deferred.

The goals of the plan include:

- Improve the water quality of receiving waters;
- Increase groundwater recharge and/or reduction in impervious surfaces;
- Mitigate potential flooding; and
- Implement infrastructure repair and improvements.

The completed phases and associated reports are summarized below:

- Phase I: "Final Report – Stormwater Management Plan for the Beaver Dam Brook and Farm Pond Sub-Basins," 2008, prepared by SEA Consultants, Inc. included Beaver Dam Brook, Farm Pond, and Course Brook drainage sub-basins.
- Phase II: "Final Report – Phase II of the Stormwater Master Plan," 2011, prepared by Geosyntec, Inc. included the Lokerville, Cochituate, Jacobs Brook, Sucker Pond, and Angelica Brook drainage sub-basins.
- Phase III: "Final Report – Phase III of the Stormwater Master Plan," 2014, prepared by Geosyntec, Inc. included the Hop Brook, Dunsdell Brook, Old Town Center, and 9/90 drainage sub-basins.
- Comprehensive Stormwater Management Plan will include a review of previously conducted reports as well as a City-wide review.

3. Minimum Control Measures

The following sections include detailed explanations of how the City implements the minimum control measures. The permit requires that the City identifies, implements, and tracks the progress of Best Management Practices (BMPs) to address each of six minimum control measures. A list of these BMPs with a brief description, responsible party, measurable goal, and schedule is included in **Appendix D**.

3.1 MCM 1 - 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*.





Required BMPs:

1. 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.
2. The permittee shall distribute a minimum of two (2) educational messages over the permit term to each audience. The distribution of materials to each audience shall be spaced at least a year apart.

The following are included in Framingham's education and outreach efforts:



- Distribution of educational materials concerning stormwater discharge impacts on water bodies within City;
- Increasing availability of translated materials to support our diverse community;
- Defined educational goals;
- Specific messages for targeted audiences including: residents, businesses, industry, and contractors/developers;
- Steps and/or activities that the public can take to reduce pollutants in stormwater runoff; and
- Coordination with local groups (e.g., schools, environmental groups, business organizations).

Topics may include, but are not limited to: litter and yard waste disposal, proper pet waste disposal, proper disposal of household hazardous wastes, proper use of fertilizer and pesticides, proper disposal of fats, oils, and grease (FOG), effects of impervious areas, erosion & sediment controls, ways to properly maintain and improve stormwater BMPs, Low Impact Development principles & techniques, and effects of pollutants on the environment.

Detailed BMP descriptions are included in **Appendix D**.

3.2 MCM 2 - Public Involvement and Participation



Storm drain marking project at Framingham High School

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

The City will involve the public in both the planning and implementation process of stormwater management and improving water quality. An involved public is more likely to understand the goals of the plan, to share that understanding with others, and to generate public support for the plan.

Required BMPs:

1. The SWMP and all annual reports shall be available to the public;
2. The permittee shall annually provide the public an opportunity to participate in the review and implementation of the SWMP.

Public involvement activities shall comply with state public notice requirements.

Some of the public involvement and participation efforts coordinated by Public Works include the following:



Stream clean-up with volunteers

- Volunteer programs, through groups such as OARS, Waushakum Pond Association, Lake Cochituate Watershed Council, Friends of Saxonville, schools, Keep Framingham Beautiful, local businesses, and scouting. Activities may include waterway cleanup and construction of BMPs such as rain gardens.
- Storm drain marking in neighborhoods to remind people not to put anything down a storm drain. The Department of Public Works conducts a "how-to" demonstration with volunteer groups and provides drain marker kits and maps of storm drain locations to mark.
- Household Hazardous Waste Collection Day.
- Guided walks and talks during activities in the City, such as Riverfest.

Detailed BMP descriptions are included in **Appendix D**.

3.3 MCM 3 - Illicit Discharge Detection and Elimination (IDDE)

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.*



Evidence of dumping at catch basin

Illicit discharges are defined in 40 CFR 122.26(b)(2) as "any discharge to a municipal separate storm sewer that is not composed entirely of stormwater…" with some exceptions. As required as part of the IDDE minimum control measure, the City developed a bylaw and regulations to prevent illicit discharges, maintains and continuously updates stormwater drainage system information in the City's Geographic Information System (GIS), conducts outfall monitoring, and performs source tracing (catchment investigations).

Required BMPs:

1. Legal authority for the City to prohibit illicit discharges; investigate suspected illicit discharges; eliminate illicit discharges; and implement appropriate enforcement procedures and actions;
2. Sanitary Sewer Overflow (SSO) inventory;
3. Stormwater management system mapping;
4. Written IDDE program;
5. Conduct dry and wet weather screening per the procedures outlined in the permit; and
6. Employee Training.

3.3.1 IDDE Legal Authority

Then Town Meeting approved a bylaw in 2008 to manage illicit discharges and connections, (Article V, Section 26) "Illicit Discharges to Municipal Separate Storm Sewer System." When the Town became a City, the bylaw was adopted as a general ordinance with no substantial changes. The Conservation Commission, Board of Health, and Division of Inspectional Services enforce the ordinance through regulations (Illicit Discharge Into Storm Drain Regulations), coordinated by Public Works. The bylaw and accompanying regulations can be found in **Appendix E**. Any discharge deemed a threat to public safety, public health, or the environment is in violation of this bylaw and thus subject to a removal order and/or fines.

The objectives of the ordinance are:

1. To prevent pollutants from entering the City's municipal separate storm sewer system (MS4);
2. To prohibit illicit connections and unauthorized discharges to the MS4;
3. To require the removal of all such illicit connections;
4. To comply with state and federal statutes and regulations relating to stormwater discharges; and
5. To establish the legal authority to ensure compliance with the provisions of the ordinance through inspection, monitoring, and enforcement.

The regulations are uniform across the departments, but are implemented under separate citations in each department. The regulations fit the existing enforcement procedures except to add illicit discharges as enforceable violations. Currently, Public Works coordinates the identification of the jurisdiction of the discharge and assigns the enforcement to one of the three departments. The structure for this enforcement can be changed without changing the ordinance or regulations.

3.3.2 Sanitary Sewer Overflow Inventory

The City's Sewer Department tracks and reports Sanitary Sewer Overflows (SSOs) as required by MassDEP's Bureau of Resource Protection – Wastewater Management Program. In the event of an overflow or bypass, a notification must be reported within 24 hours by phone to MassDEP, EPA, and other relevant parties. The Sewer Department notifies the Highway Department if the SSOs discharge to the stormwater system or receiving water body. Verbal notification must be followed up with a written report following MassDEP's SSO/bypass notification form within five (5) calendar days of the time the City becomes aware of the overflow, bypass, or backup.



Sanitary Sewer Overflow March 2010

The contacts are:

MassDEP – Northeast Region
205B Lowell Street
Wilmington, MA 01887
(978) 694-3200

EPA New England
5 Post Office Square
Boston, MA 02109
(617) 918-1510

The permit requires that the City identify and maintain an inventory of all known locations where SSOs have discharged to the MS4 within the previous five (5) years (**Appendix F**). The SSO inventory includes 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.

3.3.3 Map of Storm System

The City's GIS capabilities and summary of mapped public infrastructure is outlined in Section 2.1 of the SWMP. The permit requires a revised map of the separate stormwater management system in the permit area to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit sanitary sewer discharges. Milestones for completing mapping components are divided into two phases.

Phase I: The system map shall be updated within two years of the permit effective date (i.e. June 2020) to include the following information:

- Outfalls and receiving waters
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other stormwater 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. For the purpose of this permit, a catchment is the area that drains to an individual outfall or interconnection.

Phase II: The system map shall be updated annually as the following information becomes available during implementation of catchment investigation procedures. This information must be included in the map within ten years of the permit effective date (i.e. June 2028):

- 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

The City of Framingham's mapping currently meets all the Phase I and II requirements.

3.3.4 IDDE Program

The City has a written Illicit Discharge Detection and Elimination (IDDE) Implementation Plan as a separate document which outlines program procedures and responsibilities. The IDDE Implementation Plan comprises of the following sections:

- Identification of Priority Areas
- Outfall/Interconnection Inventory & Priority Ranking
- Detecting Potential Illicit Discharges
  - Reporting
  - Outfall Monitoring Program for dry and wet weather screening and sampling
- Tracing Sources (i.e. catchment investigations)
- Elimination through Enforcement
- IDDE Public Awareness and Participation Program
- Program Evaluation and Assessment



Dry Weather Sampling

3.3.5 Employee Training

The DPW will provide annual training to City employees involved in the IDDE program, including how to recognize illicit discharges and SSOs. Documentation of training is maintained in employees' records, provided in **Appendix G,** and included in annual reports.

3.4 MCM 4 - 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.*



Erosion & sedimentation after heavy storm

Construction erosion and sediment control measures apply to activities that result in land disturbance of greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. Development and redevelopment projects of that size within the City must comply with Massachusetts Surface Water Quality Standards, the MassDEP Stormwater Management Standards, and BMP design and construction guidance in accordance with the MassDEP Stormwater Handbook.

For all significant construction, a plan to control construction related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities shall be developed and implemented. Erosion, sediment, and pollution control shall consist of a combination of BMPs that best protects abutting properties and the MS4. Several BMPs are identified and described in the City's Construction Standards. These construction standards are maintained by the Engineering Division of the Department of Public Works, and are available on the Division's web page (http://www.framinghamma.gov/1116/Public-Works-Construction-Standards).

Required BMPs:

1. An ordinance or regulatory mechanism that requires the use of sediment and erosion control practices at construction sites.
2. Written procedures for site inspections and enforcement of sediment and erosion control measures.
3. Requirements for construction site operators to implement a sediment and erosion control program that includes appropriate BMPs.
4. Requirements for construction site operators to control wastes.
5. Written procedures for site plan review and inspection and enforcement.

3.4.1 Sediment and Erosion Control Ordinance

The City utilizes bylaws and regulations to manage stormwater during design and construction of properties, as described below.

- The Conservation Commission implements wetland protection laws, ordinance and regulations (http://www.framinghamma.gov/369/Wetland-Laws-Regulations). Wetlands requirements apply to any development and redevelopment projects where stormwater discharges may potentially affect a critical area within the jurisdiction of the Conservation Commission.
- The Subdivision Rules and Regulations (http://www.framinghamma.gov/1823/By-lawsRegulationsZoning-Map) apply to: (1) All commercial, industrial, and manufacturing sites, (2) Housing development and redevelopment projects comprised of detached single-family dwellings on five or greater lots, and (3) multi-family housing development and redevelopment projects with five or more units, including condominiums, cooperatives, apartment buildings and townhouses.

- The City's Zoning Ordinance includes Section V.F. for Land Disturbance and Stormwater Management (LDSM) (https://www.framinghamma.gov/1823/By-lawsRegulationsZoning-Map) is to ensure that development projects incorporate and utilize Best Management Practices (BMP) and Low Impact Development (LID) techniques. The City Council adopted amendments to the LDSM ordinance in April 2021 to comply with the MS4 permit requirements.

3.4.2 Site Plan Review Procedures

The City conducts pre-construction reviews of proposals and plans for new development or redevelopment requiring permits from the Building Commissioner, Planning Board or Conservation Commission, state-controlled Approval Not Required (ANR) review, and Street Opening Permits. To comply with construction standards, proposals and plans must include:

- Site design, including existing and proposed drainage system
- Planned operations
- Erosion & Sediment Control Plans
- Construction BMPs
- Post-Construction BMPs

During the plan review, the City considers potential water quality impacts and compliance with water quality standards. The public has opportunities to comment on proposed plans during public hearings, through the City's website, or in person to the City Engineer, Building Commissioner, Conservation Commission Agent, or Planning Board Administrator. Comments from the public will be considered during the review process.

In addition, construction shall comply with any applicable federal, state, and local requirements, including but not limited to required NPDES permits (e.g. Construction General Permit).

3.4.3 Site Inspections & Enforcement of Sediment and Erosion Control Measures Procedures

The City of Framingham will use the Standard Operating Procedures developed by the Central Massachusetts Regional Stormwater Coalition for Construction Inspections (**Appendix H)**. Inspectors from the City's Engineering Division, Building Inspection Division, Planning Board, and Conservation Commission regularly inspect construction projects. Written and photographic records shall be maintained for each site visit. The applicable departments will track the number of site reviews, inspections, and enforcement actions.

During the construction phase, it is important to inspect active sites regularly to ensure that practices are consistent with approved site plans and the site's Stormwater Pollution Prevention Plan (SWPPP) or other document, as required by the City's applicable authority. Inspections occur during construction of BMPs as well as after construction of BMPs to ensure they are working as described in the approved plans. Inspections to monitor stormwater compliance should be performed at least once per month at each active construction site, with priority placed on sites that require coverage under the USEPA NPDES Construction General Permit (i.e., that disturb one or more acres), and sites that are located in watersheds of any impaired waterbodies.

The City Inspector shall provide the site operator with a copy of the inspection report, and notice of the corrective action(s) to be taken. The site operator shall have no more than thirty days from the receipt of the notice to correct violations.

3.5 MCM 5 - Post Construction Stormwater Management in New Development and Redevelopment

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. 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*
- ***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).*



Installation of BMPs at DPW Operations Center

The Post Construction Stormwater Management in New Development and Redevelopment minimum control measure requires the implementation of post construction runoff controls for new development and redevelopment projects. Like the construction control measure, the post-construction control measure applies to activities that result in land disturbance of greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. The post-construction control measure also utilizes the Wetlands and Zoning bylaws and regulations, listed in Section 3.4.1.

The City's goal is to ensure that stormwater discharges from development and redevelopment projects comply with Massachusetts Surface Water Quality Standards, the MassDEP Stormwater Management Standards, and BMP design and construction guidance in accordance with the MassDEP Stormwater Handbook and City Construction Standards. On-site retainage of stormwater and implementation of stormwater management measures to control the rate, volume and characteristics of stormwater discharged to the City's storm drainage systems are required whenever feasible, with exceptions to be approved by the City Engineer. Several BMPs are identified and described in the City's Construction Standards. These construction standards are maintained by the Engineering Division of the Department of Public Works, and are available on the Division's web page (http://www.framinghamma.gov/1116/Public-Works-Construction-Standards).

Required BMPs:

1. Develop or modify an ordinance or other regulatory mechanism to address post-construction design requirements.
2. Require, at a minimum, the submission of as-built drawings no later than two (2) years after completion of construction projects.
3. Procedures to ensure adequate long-term operations and maintenance of stormwater management practices;

4. Develop a report assessing current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover.
5. Develop a report assessing existing local regulations to determine the feasibility of making LID and green infrastructure practices allowable when appropriate site conditions exist.
6. Identify a minimum of five (5) City-owned properties that could potentially be modified or retrofitted to reduce impervious area.

3.5.1 Post-Construction Ordinance

The City utilizes the wetlands and zoning rules and regulations discussed in Section 3.4.1 to also regulate post-construction stormwater management. As required by the permit, the rules and regulations:

- Encourage Low Impact Development (LID) for new construction and redevelopment projects to the maximum extent feasible.
- Require compliance with the MassDEP stormwater regulations and management standards from the Massachusetts Stormwater Handbook, as amended.
- Require the submission of as-built drawings no later than two (2) years after completion of construction projects

The City Council adopted amendments to the Land Disturbance and Stormwater Management ordinance in April 2021 to comply with the MS4 permit requirements.

3.5.2 Site Plan Review Procedures

The City reviews proposals and plans for new development or redevelopment, including those requiring Planning Board review, state-controlled Approval Not Required (ANR) review, and Street Opening Permit review. To comply with post-construction standards, proposals and plans must include:

- Existing and proposed drainage system
- Proposed post-construction BMPs
- Stormwater Report demonstrating compliance with the MassDEP Stormwater Management Standards
- Long-term Operations & Maintenance Plan

During the plan review, the City considers potential water quality impacts and compliance with water quality standards. The public has opportunities to comment on proposed plans during public hearings, through the City's website, or in person to the City Engineer, Building Commissioner, Conservation Commission Agent, or Planning Board Administrator. Comments from the public will be considered during the review process.



Subsurface infiltration basin during installation at Thompson Street

As-built drawings must be submitted to the DPW – Engineering Division no later than two (2) years after completion of construction projects.

3.5.3 Site Inspections & Enforcement of Post-Construction BMPs Procedures

The City of Framingham will use the Standard Operating Procedures developed by the Central Massachusetts Regional Stormwater Coalition for Inspections of Constructed BMPs (**Appendix H)**. Inspectors from the City's Engineering Division, Building Inspection Division, Planning Board, and Conservation Commission may conduct inspections. Written and photographic records shall be maintained for each site visit. The applicable departments will track the number of inspections and enforcement actions.

When construction is complete, the City will inspect constructed BMPs to ensure they are operating correctly and being maintained in accordance with the long-term operations & maintenance plan. Inspections to monitor stormwater compliance should be performed at least once a year for constructed BMPs, with priority placed on sites that are located in watersheds of any impaired waterbodies.

The City Inspector shall provide the site operator with a copy of the inspection 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 corrective actions.

3.5.4 Street Design & Parking Lot Guidelines

Reduction in impervious surfaces (e.g. roadway pavement, sidewalks, building roofs) is a critical factor in reducing the frequency or impact of flooding events and reducing pollutant loading within the sub-basins. While the City can request voluntary reduction in impervious surfaces, it is not required under the City's current bylaws.

The City contracted Weston & Sampson to develop a report assessing current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover. This assessment reviewed current ordinances, rules & regulations, plans, policies and design standards and recommended updates to support low impact design options, and reduce overall impervious areas. A copy of the assessment is contained in **Appendix I**.

3.5.5 Green Infrastructure Assessment

Green infrastructure is a cost-effective, resilient approach to managing wet weather impacts. Green infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits. While the City can request voluntary implementation of green infrastructure, it is not required under the City's current bylaws.



Rain garden at the entrance of Bowditch Field

The permit requires the City to 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:

- Green roofs;
- 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

- 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 Framingham and under what circumstances are they allowed. If the practices are not allowed, the City 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 City shall implement recommendations, in accordance with the schedules, contained in the assessment.

Mass Audubon prepared a report titled "Encouraging Low Impact Development in Framingham, MA: A bylaw review analysis" in April 2017 which is included as **Appendix I**. The report evaluates Framingham's land use regulations in relation to models and examples from the Commonwealth of Massachusetts' Smart Growth/Smart Energy Toolkit and other sources in relation to the use of LID and Green Infrastructure (GI) techniques in development. The focus is primarily on residential development.

3.5.6 List of Municipal Retrofit Opportunities

Integrating stormwater BMP retrofits into new and redevelopment projects on City property can reduce the impact of stormwater discharges and enhance projects. Properties and infrastructure for consideration 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 City 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. An inventory of at least five (5) City-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 are identified in **Appendix J**. The inventory identifies if the properties are located in a drainage area for a water quality limited waterbody with additional requirements for pollutant removal.

3.5.7 Off-site Mitigation

At the discretion of the Planning Board, stormwater management systems on redevelopment sites may utilize offsite mitigation within City to meet the retention or pollutant removal requirements within the same USGS HUC12 as the redevelopment site.

3.6 MCM 6 - MS4 Pollution Prevention and Good Housekeeping

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.*

Required BMPs:

1. Develop an inventory of and written operations & maintenance procedures for all City-owned facilities within the following categories: parks and open space, buildings and facilities where pollutants are exposed to stormwater, vehicles and equipment.
2. Establish a written program detailing the activities and procedures for MS4 infrastructure maintenance in a timely manner to reduce the discharge of pollutants from the MS4.
3. Optimize routine inspections, cleaning and maintenance of catch basins.
4. Establish and implement procedures for sweeping and/or cleaning streets, and City-owned parking lots.
5. Ensure proper storage of catch basin cleanings and street sweepings prior to disposal or reuse.
6. Establish and implement procedures for winter road maintenance.
7. Establish and implement inspection and maintenance frequencies and procedures for all stormwater treatment structures.
8. Develop and fully implement a Stormwater Pollution Prevention Plan (SWPPP) for each of the following permittee-owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities.

The City, through Public Works, is responsible for the operation and maintenance of roadways and associated drainage for all accepted streets under the City's ownership. The City is also responsible, through individual departments, for stormwater management of the properties owned by the City.

3.6.1 City-owned Facilities

The City of Framingham believes that it is essential to be a role model for the community by ensuring that the City is managing stormwater runoff from City-owned properties and operations to the maximum extent practicable. In efforts to ensure compliance with the MS4 Permit requirements, standard operating procedures (SOP) were developed and implemented for oversight of municipal facilities and operations. The goal is to provide guidance to City staff to reduce the overall impact the City has on the environment and stormwater runoff.



3.6.1.1 Inventory

As required by the permit, the City maintains an inventory of parks and open space, buildings and facilities where pollutants are exposed to stormwater, and storage areas for vehicles and equipment in our GIS. This includes public schools, operation centers, City offices, police stations, fire stations, City-owned parking lots and garages and other permittee-owned or operated buildings or facilities.

3.6.1.2 Parks and Open Space Operations and Maintenance Procedures

Framingham is fortunate to have a great deal of protected and publicly accessible open space and public parks. The City has an Open Space and Recreation Plan (OSRP) which serves as a guide for protecting, managing, improving, and expanding Framingham's open space and recreation resources. Open space is defined as un-built land (e.g., land used for farming and forestry, woodlands and fields used for passive recreation, and woodlands and wetland preserved for wildlife habitat and ecosystem function). Parks are defined as well as land developed for or developable for passive or active recreational use (e.g., walking trails, soccer fields, beaches, and playgrounds). The Conservation Commission manages most open space properties. The Parks and Recreation Department manages recreation land including parks and athletic fields on school property.

Operations & Maintenance procedures for Parks & Open Space are included in **Appendix K**.

3.6.1.3 Buildings and Facilities Operations and Maintenance Procedures

Operations & Maintenance procedures Buildings & Facilities are included in **Appendix K**.

3.6.1.4 Vehicles and Equipment Operations and Maintenance Procedures

The City's vehicles are stored at the DPW Operations Center, the Park Maintenance & Operations Facility, Memorial Hall, Pearl Street Parking Garage, the Police Station, Fire Stations, and Schools. A fueling station and wash bay is available at the DPW Operations Center. Regular maintenance of vehicles is performed at the DPW Operations Center, the Park Maintenance & Operations Facility, or at a subcontracted facility.



Operations & Maintenance procedures for Vehicles & Equipment are included in **Appendix K.**

3.6.2 Reporting and Management of Drainage Problems

The following procedure is used for the reporting and resolution of drainage problems.

- Problems are reported by both the public and City employees by the following methods:
  - Observations by City staff, reported to their supervisors;
  - Calls to the DPW's Operations Center: 508-532-6030;
  - Non-emergency issues can be reported to the City of Framingham from a smartphone, tablet, or computer through a partnership with SeeClickFix, available the City's website:

    http://www.framinghamma.gov/1868/Report-a-Concern

- All calls for roadway and drainage problems are directed to the Highway Department for initial assessment and logged. City departments will be notified if the problem is on property under their management (e.g. the Parks & Recreation Department will be contacted for drainage problems at City recreational parks).
- If the DPW can correct the problem, the DPW will do so and the Highway Department will log the response.



- If needed, the Highway Department will request technical support from the Engineering Department. If the Highway Department, with the Engineering Department's concurrence, determines that the problem requires an engineered solution, the Engineering Department will take ownership of the problem and develop a design for the solution.
- The Engineering Department will propose a solution to the Highway Department, with recommendations for an interim solution if necessary. The proposal will include a scope of work, an estimated cost, and recommendation to use DPW staff, consultants, and/or contractors for design and construction, as appropriate.
- The DPW Director will determine if the solution can be implemented using operating funds. If so, the Highway Department will take ownership of the problem and perform the required construction. If not, the project will be placed on a Public Works capital project list to be implemented using capital funds and managed by the Capital Engineering Program.

3.6.3 Regularly Scheduled Infrastructure Operations and Maintenance

The DPW's Highway Department, which includes a Stormwater Operations Supervisor and crew, is responsible for all drainage system operations and maintenance, including:



- Managing equipment and personnel;
- Coordinating logistic support and supplies for personnel and equipment;
- Tracking and recording inspections of system components;
- Tracking and recording progress of maintenance;
- Minor repairs and improvements;
- Making recommendations for major improvements;
- Monitoring weather and potential flood conditions and changes therein; and
- Communicating with other emergency and non-emergency agencies.

The DPW maintains records associated with maintenance and inspection activities. GIS and VUEWorks™ are used to log inspections and other reports of operations and maintenance of the systems such as work orders repairs/upgrades to existing structures, construction of new structures, catch basin cleanings, and filter replacements.

3.6.3.1 Street Sweeping

The Highway Department is responsible for the municipal street sweeping program. The Street Cleaning Program is designed to maintain municipal roads and parking lots so as to:

- Reduce the health and safety hazards to vehicular and pedestrian traffic;
- Improve the water quality of the receiving waters (rivers, lakes, ponds, streams, and wetlands); and
- Facilitate safe traffic flow for those drivers using roads.



The City of Framingham defines and prioritizes municipal roads for purposes of street sweeping. **Appendix L** includes additional information about the City's Highway Street Sweeping Policy and Procedures. Street sweeping operations are prioritized as follows:

1. Downtown Areas. Downtown roads are swept nightly.
2. Urban Areas: Swept once a month, and additionally in the months of January and February as weather permits.
3. Phosphorus and turbidity impaired waterbody subbasins: City-owned collector streets and parking lots in the Lake Waushakum, Farm Pond, and Reservoir #2 subbasins are swept, at minimum, twice a 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).
4. All other: Residential roads that are not collectors. All other streets are swept at least once per year in the spring.

Street sweeping residuals will be stockpiled at the DPW Operations Center, in accordance with the Operation Center's Stormwater Pollution Prevention Plan (SWPPP). Street sweeping residuals are managed in compliance with current MassDEP policies (https://www.mass.gov/files/documents/2018/05/14/street-sweepings.pdf).

3.6.3.2 Catch Basin Cleaning

The Highway Department is responsible for the municipal catch basin cleaning program. Cleaning serves to maintain the integrity and capacity of the system and removes pollutants that might otherwise discharge to receiving waters. Public Works may use internal resources or private contractors to clean the City's catch basins.

All catch basins will be cleaned annually. The schedule of catch basin inspections and cleanings will be adjusted, as needed, to prevent any catch basin from being more than 50 percent full. Frequency of inspections and cleanings may be increased if excessive sediment and debris loading is observed:

- On two consecutive inspections
    - If a catch basin sump is more than 50 percent full during two consecutive routine inspections/cleaning events, the City will document that finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources.
- Due to nearby construction activities.

Catch basin cleanings will be stockpiled at the Recycling Drop-off Center (RDC), in accordance with the RDC's SWPPP. Catch basin cleanings are handled, stored, sampled and disposed in compliance with current MassDEP policies (http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html).

3.6.3.3 Stormwater Treatment Structures Inspection & Maintenance

Stormwater treatment structures will be inspected annually, at a minimum. Maintenance schedules for water quality structures are determined by the manufacturer's recommendations and inspection history. The City prioritizes efforts based on prioritized receiving water bodies (i.e. impaired waters and swimming beaches).



Learned Beach closure due to bacteria after heavy rain in July 2014

An inventory of water quality structures operated by the DPW is provided in **Table 2** below:

Table 2. DPW Maintained City-owned Stormwater Treatment Structures

Location	Address	Description	Receiving Water Body
Commuter Lot	Downtown commuter rail station	Downstream Defender	Farm Pond
Dennison Avenue	19/21 Dennison Avenue	Stormceptor	Gleason Pond
Dennison Avenue	129 Dennison Avenue	Stormceptor	Gleason Pond
Eaton Pines Lane	@ Eaton Road	Leaching Basins	N/A
Griffin Road	@Temi Road	Downstream Defender	Norton Pond
Maple Street	@Franklin Street	Cultec Chambers and WQU	N/A
Prindiville Avenue	@ Berkshire Road	Downstream Defender	Gleason Pond
Prindiville Avenue	@ Hampshire Road	Downstream Defender	Gleason Pond
RDC	255 Mount Wayte	Downstream Defender	Eames Brook
Sewell	@ End	Leaching Basin	
Shawmut Terrace	@ End near beach/Learned Pond	Downstream Defender	Learned Pond
Shawmut Terrace	@ End near beach/Learned Pond	Smart Sponge	Learned Pond
Thompson/Pearl/Sanger	Park across from library.	Cultec Chambers and WQU	N/A
Thurber Street	@#5 Thurber	ADS Water Quality Unit	Learned Pond
Union Avenue	@ Senior Center	ADS Water Quality Unit	Sudbury River
Union Avenue	@ Bowditch Field	ADS Water Quality Unit	Sudbury River
Fountain Street	Near Keefe Tech & Loring Arena	ADS Water Quality Unit (2)	Farm Pond
Farm Pond Park	@ skate park	Rain garden	Farm Pond

3.6.3.4 Solid Waste Management and Recycling Programs

The DPW's Sanitation Department is responsible for the municipal recycling, trash, and hazardous waste collection programs. Proper solid waste management can help reduce floatables and other pollutants that can be washed into receiving water bodies. The DPW conducts weekly curbside pick-up of both trash and single stream recycling. The City operates a Recycling Drop-off Center (RDC) and yard waste recycling center, both of which have Stormwater Pollution Prevention Plans. The Sanitation Department also conducts household hazardous waste collection events annually.

3.6.4 As-needed Infrastructure Operations & Maintenance

3.6.4.1 Mosquito Control (Dredging)

Public Works contracts with Eastern Massachusetts Mosquito Control Project (EMMCP) to provide services to control the mosquito population in City. At times, this requires the removal of debris or dredging of open channels and BMPs that are part of the MS4. The following restrictions apply to EMMCP work performed in the City.

- The work shall be reviewed and approved by the Conservation Commission.
- The work shall remain within the limits set forth by the U.S. Army Corps of Engineers Programmatic General Permit for dredging and filling, Category I (less than 1,000 cy of upland disposal)
- Each project shall be limited to an area of no more than 5,000 square feet, including any upland disposal area.

3.6.4.2 Maintenance within Jurisdiction of Conservation Commission

Drainage systems often coincide with areas under the jurisdiction of the Conservation Commission. Public Works follows the requirements of the Wetlands Protection Act and the Framingham Wetlands Protection Bylaw (Article V, Section 18 for the Framingham Bylaws) for all construction and mitigation measures.

3.6.4.3 Mill Street Diversion Channel (Constance Fiske Dam)

The Constance Fiske Dam (located in Callahan State Park) was constructed as a Massachusetts Department of Conservation & Recreation project in the late 1980s. As part of this project, a diversion channel was constructed that provides overflow capacity for the main channel. The main channel flows south/southwest from the dam to join with Baiting Brook. The diversion channel branches off from the main channel just north of Littletree Lane, and flows east past Mill Street to a wetlands in the area around Grove Street and Cemetery Lane.

The City is responsible for maintaining this diversion channel, from its starting point at the split from the main channel to the bridge (a concrete culvert) at Mill Street. Maintenance includes keeping the channel and the first 2 feet of the banks on either side free of woody vegetation. Grassy vegetation and tree roots should be allowed to remain as they protect the channel bottom and banks from erosion.

3.6.5 Emergency Operations

3.6.5.1 Winter Road Maintenance Program

The Highway Department performs winter operations to maintain roads and sidewalks during inclement weather. The goals of the program are as follows.



- Reduce the hazards of icy conditions to vehicular and pedestrian traffic;
- Facilitate safe traffic flow for those drivers using roads;

- Minimize the handling of emergencies by Police, Fire, EMS, and Utility providers during a storm event;
- Match the level of response to the event in order to execute reasonable and safe road conditions; and
- Provide a cost-effective winter maintenance program.

The Highway Department develops an annual Winter Operations Guide (**Appendix M**) which includes a comprehensive plan for snow plowing, sanding and salting. Annual training on snow & ice operations is provided to DPW personnel. The Highway Department uses sensors and weather data from around the City to optimize road treatment. The Highway Department utilizes a fleet of computerized salt/sand spreader trucks to provide road treatment. Either 100% salt or a mixture of sand and salt is used to satisfy the following objectives:

- Melting of freshly fallen snow on priority routes;
- Preventing the formation of ice on roadways and bridge decks;
- Removing ice or hard packed snow after plowing operations cease; and
- Improving tire traction and braking quality.

The pretreatment of priority routes with anti-icing agents may be conducted when conditions warrant such action. Some of the Spreader Trucks are equipped with liquid calcium distribution systems to be used in conditions of extreme cold. Area Supervisors determine application rates and type of material to be used.

Salt is stored at the DPW's Henry Street facility and snow fighting equipment is stored and maintained at the DPW Operations Center. Both facilities have Stormwater Pollution Prevention Plans.

3.6.5.2 Environmental Releases (Spills)

Releases of oil or hazardous material to the MS4 are identified by Public Works, the Fire Department, the Board of Health or other first responders and reported the Highway Department's Stormwater Supervisor. Spills that are above the MassDEP reporting thresholds defined in 310 CMR 40.0000, which for most spills is 10 gallons or creation of a sheen on a receiving waterbody, are also reported to the MassDEP Spill Hotline (888) 304-1133.

If a spill is a result of DPW operations, the Highway Department's Stormwater Supervisor is responsible for coordinating spill cleanup. Cleanup efforts may include any of the following tasks:

- Applying absorbent material in the form of booms, pads, or granules around and over the spilled fluid;
- Applying absorbent materials at or in catch basins to capture the spilled fluid before it migrates through the drainage system;
- Jetting and vactoring drainage lines to remove spilled material from the drainage system;
- Properly disposing of spilled and used absorbent materials.

If the spill is a result of non-municipal operations, a potentially responsible party (PRP) is identified, notified, and held responsible for cleanup efforts. If the spill is reportable and MassDEP assumes responsibility, the problem is considered to be adequately regulated by MassDEP under 310 CMR 40.000 "The Massachusetts Contingency Plan." Public Works does not pursue further enforcement action except to ensure that the MS4 has been adequately repaired by the PRP where any damage to City-owned structures has occurred. Additional enforcement may occur through the Conservation Commission under the Wetlands Bylaw (Article V, Section 18) or the Illicit Discharge Bylaw (Article V, Section 26).

If the source is not known and cannot be identified, Public Works does not assume responsibility but will make a reasonable attempt to clean up the site as much as practicable. Occasions where this may arise include illegal dumping of chemicals into catch basins such as paint or oils. If the spill is reportable, MassDEP makes every attempt to identify the PRP and direct cleanup efforts.

3.6.6 Stormwater Pollution Prevent Plans (SWPPP)

Under the 2003 permit, the DPW operated under a comprehensive Spill Prevention Control and Countermeasure (SPCC) Plan and Stormwater Pollution Prevention Plan (SWPPP) that addressed all Public Works facilities in one document. Under the 2016 permit, the City developed and fully implemented separate SWPPPs for each of the following City-owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities. In 2020, the City completed and began implementing SWPPPs for the following facilities:

- DPW Operations Center at 100 Western Ave.
    - The DPW Operations Center contains two large garage bays which store the DPW's fleet. Maintenance is performed in a separate Fleet garage bay. The DPW Operations Center also includes a wash bay, fueling station, and outdoor storage yard.
- Henry Street Facility
    - The Henry Street facility includes an enclosed salt storage shed, outdoor storage yard and an administrative building.
- Arthur Street Facility
    - The Arthur Street facility is a fenced area that is used for stockpiling snow during winter operations and soil and other construction wastes, as needed, during construction operations. The Arthur Street site is also the access point for the MWRA's wastewater pumping and metering facility.



Salt storage shed at Henry Street facility

- Recycling Drop-off Center at 255 Mt. Wayte Avenue
    - The Recycling Drop-off Center consists of a decommissioned incinerator, an administrative building, and outdoor storage of recyclable materials and bulk items and an area for temporary storage of catch basin cleaning debris.
- Park Maintenance & Operations Facility on Fountain Street
    - The Park Maintenance & Operation Facility consists of two buildings and construction storage yard. The buildings consist of multi-bay storage areas for over 20 trucks and trailers, administrative areas, and a repair shop.

The SWPPPs contain the following elements:

1. Pollution Prevention Team
2. Description of the facility with map and identification of potential pollutant sources
3. Identification of stormwater controls
4. Management practices for: minimizing or preventing exposure, good housekeeping, preventative maintenance, spill prevention and response, erosion and sediment control, management of runoff, salt storage piles, employee training, and maintenance of control measures.

Site inspections for SWPPP compliance will be conducted quarterly. At least one of the quarterly inspections shall occur during a rain event.

4. Requirements Related to Discharges to Certain Water Quality Limited Waterbodies

The 2016 NPDES Permit has additional requirements related to discharges from an MS4 to Certain Water Quality Limited Waterbodies. A 'water quality limited water body' 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). Additional provisions are required for discharges from the MS4 to a water quality limited waterbody where the pollutants are typically found in stormwater, including the following pollutants:

- Nitrogen
- Phosphorus
- Bacteria or pathogens
- Chloride
- Solids
- Oils and grease (hydrocarbons)
- Metals

In Framingham, these additional requirements apply to the following waterbodies and their subbasins.

Table 3. Framingham Waterbodies with Additional Requirements

Waterbody	Impairment
Lake Waushakum	Phosphorus (Total); Turbidity
Farm Pond	Turbidity
Framingham Reservoir #2	Turbidity
Cochituate Brook	E. Coli
Sudbury River (from Saxonville Pond to Wayland)	E. Coli

4.1 Phosphorus Impaired Waterbodies

The permit requires the following to address phosphorus in discharges from the City's MS4 into Lake Waushakum.

Required Additional or Enhanced BMPs

1. Additional public outreach.
    - Annual message in the spring (March/April) encouraging the proper use and disposal of grass clippings and the proper use of slow-release and phosphorous-free fertilizers.
    - Annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate.
    - Annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter.
2. Adopt or amend City bylaws and regulations to include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal;
3. Establish procedures to properly manage grass cuttings and leaf litter on City property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces;
4. Increased street sweeping frequency of City owned streets and parking lots 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).

5. By June 2022, complete a Phosphorus Source Identification Report.(Completed. See **Appendix D**)
6. By June 2023, evaluate all City-owned properties identified as presenting retrofit opportunities or identified in the Phosphorus Source Identification Report for BMP opportunities and provide a plan and schedule for implementation.
7. By June 2024, install a minimum of one structural BMP as a demonstration project within the drainage areas of the water quality limited waters or their tributaries.
8. Estimate the phosphorus removal by the BMP(s) on an annual basis.

Detailed BMP descriptions to address the additional and enhanced BMP requirements for public education and bylaw or regulation modifications are included in **Appendix D**. Public education messages are combined with requirements for Minimum Control Measure 1 – Public Education and Outreach discussed in Section 3.1. The City's ordinances were updated in April 2021 to comply with the permit requirements. Procedures for proper management of organic waste materials are addressed in the City's O&M procedures for Parks & Open Space and the SWPPP for the Yard Waste Recycling Facility. Increased street sweeping is discussed in Section 3.6.3.1.

The Phosphorus Source Identification Report is complete and included in **Appendix D**. The Phosphorus Source Identification Report identifies potential retrofit opportunities (Section 3.5.3) within the Lake Waushakum drainage area and evaluates the estimated schedule, cost, engineering and regulatory feasibility of the identified retrofit BMPs. The DPW Capital Program will incorporate BMP design and construction into the 10-year Capital Improvement Plan so that BMPs can be designed by June 2023 and construction of at least one demonstration project will be completed by June 2024.

4.2 Solids/Turbidity Impaired Waterbodies

The permit requires the following to address turbidity in discharges from the City's MS4 into Lake Waushakum, Farm Pond, and Framingham Reservoir #2:

Required Additional or Enhanced BMPs

1. 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.
2. 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.

As part of the City's construction and post-construction BMP program, the City's regulations and construction standards require commercial and industrial properties to incorporate shutdown or containment to isolate systems in the event of an emergency spill or other unexpected event.

The City is increasing the street sweeping and catch basin inspections to twice a year in these drainage areas, as discussed in Sections 3.6.3.1 and 3.6.3.2 respectively.

4.3 Bacteria or Pathogen Impaired Waterbodies

The permit requires the following to address fecal coliform in discharges from the City's MS4 into Cochituate Brook and the Sudbury River (from Saxonville Pond to Wayland):

Required Additional or Enhanced BMPs

1. Additional public outreach.
    - Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate.
    - Provide information to owners of septic systems about proper maintenance
2. Designate 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.

Detailed BMP descriptions to address the additional and enhanced BMP requirements for public education are included in **Appendix D.** Public education messages are combined with requirements for Minimum Control Measure 1 – Public Education and Outreach discussed in Section 3.1. Catchment prioritization and IDDE implementation is discussed in Section 3.3.

5. Flood Control

An important role of the City's MS4 and stormwater management operations is for the purpose of flood control. The City maintains structural flood controls and also implements several activities to reduce the potential for flooding.

5.1 Automated Stream Gauges

The City of Framingham currently maintains surface water level sensors and communications equipment at nine (9) sites. Five stream gauges were installed in 2011 and upgraded in 2018-2019. Four additional sensors were installed in 2022. These sensors provide information on water elevation to help Highway Department staff monitor major problem areas during major storms.

The system is operated and managed by the Highway Department. Access to the system is via the Internet maintained by the City's Technology Services Department, DPW Operations staff, and Emergency Operations Center staff.

The User's Manual for the Automated Stream gauges is included in **Appendix N.**

5.2 Clearing Debris Before and During Storm Events

Prior to anticipated storms, the Highway Department monitors the following locations for debris buildup that may exacerbate flooding situations. Debris is removed from entrances to headwalls, trash gates or similar potential log jam locations. Other locations are inspected as requested.

- Beaver Dam Brook near the border with Ashland
- Outlet for Lake Waushakum at Hollis Street
- Beaver Dam Brook near the border with Natick, from Taralli Terrace to Second Street
- Beaver Dam Brook at Herbert Street
- Birch Meadow Brook at Littletree Lane, Belknap Road and Knight Road Extension
- West of the corner of Livoli Road and McAdams Road (a tributary to Dunsdell Brook)
- Drainage swale east of Butterworth Park at Bishop and Arthur Streets
- Oakcrest Road
- Temple Street Playground (between Route 9 and Pleasant Street)
- Headwalls in the area of Sloane Drive, Gregory Road, and Hemenway Road
- Dunsdell Brook near Florita Drive



Beaver Dam Brook

During flood events, the following locations are monitored for potential flood mitigation efforts.

- Herbert, Tripp, and Eames Streets
- Second Street, Taralli Terrace, Beaver Street, and Beaver Park Road
- Parker Road near Gates Street
- Gates at Country Club Lane
- Oakvale Road intersection with Whittemore Road
- McAdams Road
- Knight Road Extension
- Gilbert and Berry Streets

- Sudbury River behind the Callahan Senior Center on Union Avenue
- Victory Street at Pershing Avenue
- Headwall off Baldwin Avenue

5.3 Dams

There are nine (9) dams in the City. The City owns two (2) of the dams. The other seven are owned and operated by the Massachusetts Water Resource Authority, Massachusetts Department of Conservation and Recreation (DCR), or are privately owned. The dams are shown on a map in **Figure 5.**

The City owns the Landham Pond Dam, located in the central northern area, between Hiram Road and Janebar Circle. This dam impounds approximately two to three acre-feet. Because it impounds less than fifteen acre-feet of water, there are no federal or state requirements, such as for emergency action plans that apply to other dams in the City. Maintenance consists of biennial inspection of the dam to ensure the impoundment wall is in good condition.

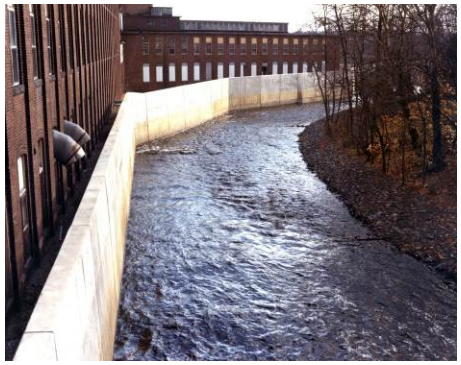


Photo Saxonville Mill Dam

The City also owns the "Mt. Wayte Outlet Works", located on the northern end of Farm Pond with an outlet to Eames Brook. This is a registered dam classified as a "Low Hazard Potential" which required inspection every ten (10 years). The dam was last inspected in 2017. The City's Department of Parks, Recreation, & Cultural Affairs manages this dam.

5.4 Saxonville Levee

The City of Framingham operates and maintains the flood protection works known as the Saxonville Flood Damage Reduction Project (Saxonville Levee). The levee comprises 2,500 feet of earthen dikes, 1,350 feet of concrete floodwalls, a pump station at Watson Place with associated drainage, a steel vehicular gate on Concord Street, and a sluice gate at the Central Street Dam. The Central Street Dam itself is privately owned and operated.



Floodwall at Saxonville Mill

The levee was designed and constructed by the U.S. Army Corps of Engineers (USACE) between 1972 and 1979 in response to a flood event in August 1955. The levee has been in continual operation since that time. It is inspected semiannually by Public Works, with annual inspections by the USACE.

After the massive destruction caused by Hurricane Katrina in August 2005, the Federal Emergency Management Agency (FEMA) embarked on a program to ensure that levees throughout the country be in good repair before FEMA can commit to assistance in case of flooding. FEMA requires certified accreditation under National Flood Insurance Plan (NFIP) Regulations 44 CFR 65.10 "Mapping of Areas Protected by Levee Systems." Under these regulations, FEMA will only recognize levee systems that are certified to meet minimum design,

operation, and maintenance standards to provide protection during a 100-year flood. In 2009, the City of Framingham completed a certification of the Saxonville Levee to meet the FEMA requirements. The Operation and Maintenance Manual for Flood Protection Works on Sudbury River at Framingham, Massachusetts (Saxonville) covers several areas of operations that must be maintained including: dikes, floodwalls, drainage structures (sluice gates and drainage lines), pumping station, Concord Street vehicular gate, and miscellaneous facilities. Comprehensive emergency actions are also included in the O&M Manual. The O&M Manual has been updated to reflect physical changes to the levee and regulatory changes by the USACE.

Highlights of the Saxonville Levee O&M Manual are as follows:

- Dikes (earthen walls) are kept free from encroachments, animal burrows, vegetation, erosion/settlement of the top or sides of the levee. The grass at non-riprap locations is maintained to prevent erosion.
- Vegetation along the dikes and floodwalls shall be controlled. A vegetation-free zone extends 15 feet from the toe of both sides of the levee to the centerline of the tree.
- The rip rap embankment along the Sudbury River is to be maintained and kept clear of woody vegetation.
- Floodwalls (concrete) are kept in good repair, including joint sealants, concrete surfaces, closure structures, and foundations.
- The pump station is kept in good operating condition including the building, sluice gates, pipes, fencing, pumps and motors, control panels, and electrical systems.
- The sluice gates (one at Saxonville Pond and one at the pump station) are maintained and kept free of debris.
- The drainage lines are kept open and free of debris.

The O&M Manual can be found at the Saxonville Levee Pump Station, in the Highway Department and Engineering Division files, and electronically in Public Works files. The Emergency Action Plan is provided in **Appendix O**.

5.4.1 Saxonville Levee Emergency Operations

The Saxonville Levee O&M Manual provides procedures for comprehensive emergency actions at the pump station, vehicular gate, sluice gate, and Danforth Street. The following is a summary of emergency operations for the levee system.

5.4.1.1 Procedures for Operating the Watson Place Pump Station

- Activate the pump station when the river level reaches 20 feet (8.5 feet on the staff gauge).
- Shut off the automatic sump pump.
- Open the 26” and 42” sump gates and close the 48” gravity conduit gate.
- Start the pumps. Alternate No. 1 and No. 2 pumps as follows:
  a. No. 1 pump – start at river level of 20 feet.
  b. No. 2 pump – start at river level of 20.5 feet.
- If the inflow to the pump station is such that the pump operating cycle is less than 20 minutes between start of a diesel engine, open the bypass valve on the discharge line to allow water to be recycled into the pump station sump to maintain diesel engine operation.

5.4.1.2 Procedures for Closing the Vehicular Gate at Concord Street.

- Mobilize the gate closure crew when the river level reaches 24.5 feet (12 feet on the staff gauge).
- Start closure procedures when the river level reaches 26 feet (13.5 feet on the staff gauge).
- Notify the police and fire department of the gate closing to prevent traffic over the river.
- Erect warning signs on either side of the bridge to read "FLOOD GATES CLOSED - DETOUR".
- Clean obstructions from the roadway.
- Fill sand bags and have ready for placement.
- Close the gate
  a. Unlock the padlocks and remove bolts locking gate doors to abutment walls (at the mitre end of the gate)
  b. Release the gate jack. If heavy winds, use guy ropes to control gate doors.
  c. Insert eyebolts and pins to hold gate doors together.
  d. Tighten turnbuckles at top and bottom of gate to achieve final closure.
  e. Engage the jacks on each gate door by cranking the jacks down.
  f. Lower the movable plates at bottom of each gate door to be in contact with the roadway.
- Place sandbags on the river side of the gate.

5.4.1.3 Procedures for Sluice Gate at Central Street Dam.

- The sluice gate is located on the eastern side of the Central Street Dam. It normally remains in the closed position.
- If it is open prior to flooding events, close the gate when the river level reaches a height of 20 feet (7.5 feet on the staff gauge). Reopen when the river levels falls below 20 feet.

5.4.1.4 Procedures for Closing Danforth Street.

- Mobilize the road closure crew when the river level reaches 29 feet (16.5 feet on the staff gauge).
- Place sandbags diagonally across Danforth Street.

Return to normal operations (re-open the vehicular gate, remove sandbags) when the river level returns to the mobilization levels (26 feet for vehicular gate, 29 feet for Danforth Street, 20 feet for sluice gate).

5.5 Eames Brook (Sherwin Terrace) Gate and Pump

Under normal flow conditions, Farm Pond drains through Eames Brook to the Sudbury River. During certain storm events, the Sudbury River flows backward into Eames Brook to Farm Pond, flooding the surrounding properties. The Sudbury River is considered to be flowing back into Eames Brook when the manual river gauge at Watson Place (Saxonville Levee) reads higher than 7 feet. To prevent this flooding, the City installed a pump system in the early twentieth century. The structure consists of a flood gate at Sherwin Terrace with a pump support structure that was repaired in 2009. Normal operations



Eames Brook

and maintenance of the support structure are described below.

- The ductile iron pipe at the top of the slope shall be capped when not in use.
- A portable Godwin 71 hp pump shall be regularly maintained and inspected by Highway staff. For problems with the pump, refer to Godwin Pump Operations and Maintenance manual.
- Quick-disconnect couplings shall be protected from debris, damage, and standing water (due to freezing impacts) when not in use. Permanent piping connections shall be inspected annually to ensure that flanges and pipe supports remain tight.
- Polyvinyl chloride (PVC) suction piping should be checked semi-annually and in advance of storm events to ensure that debris has not been caught in the pipe.
- In case of loss of suction during pumping operations, utilize suction hose to pump from Brook and backflow water through piping system to dislodge debris.
- In case of PVC pipe damage, during dry weather, disconnect the ductile iron bend and PVC pipe at the flange located above the pipe support. Remove and replace the damaged PVC section.

When back-flow conditions are encountered, the Highway Department takes following actions to operate the Eames Brook Pump Connection.

- Close the gate at Sherwin Terrace.
- Observe the gauge located in the retention area upstream of the gate. When the water elevation exceeds the "flood" mark on the stream gauge, connect the portable pump to the existing quick-disconnect fitting using flexible piping and start pumping operations. Pumping may be delayed depending on the forecast conditions.
- Cease pumping operations when the Watson Place (Saxonville Levee) gauge measures less than 7 feet (19.5 feet as officially reported) and open the gate. To prevent suction of air through the perforated intake pipe, cease pumping operations when the Brook elevation at the upstream gauge is below the "safe" mark on the stream gauge.
- Alternative: Observe water levels at upstream and downstream Eames Brook staff gauges. Based on Highway judgment of the brook conditions, stop pumping, open the gate, and use staff gauges to determine the direction of flow. If the downstream water elevation appears to be higher than the upstream water elevation (back-flow conditions), close the gate and restart pumping operations.

5.6 Beaver Dams

A long-term beaver dam management plan is among the projects that Public Works and the Conservation Commission would like to develop over the next several years. Currently Public Works follows procedures developed under MGL §131, s.80A, "An Act Relative to Foothold Traps and Certain Other Devices" and 321 CMR 2.08 and 10.00 (Wetlands Protection Act). If a beaver dam is creating a flooding situation that may potentially damage City infrastructure, Public Works will mitigate the problem. Public Works does not mitigate beaver-caused flooding that solely affects City owned property with no potential infrastructure damage (e.g. ball fields), privately owned properties, or privately owned infrastructure (e.g. private driveways).

The Board of Health is the responsible authority who may issue emergency permits for the following problems:

- Beaver or muskrat occupancy of a public water supply (MassDEP must make this determination);
- Beaver or muskrat-caused flooding of drinking water wells, well fields, pumping stations, sewage pumping stations, public ways, or other public utility structures or facilities;

- Beaver or muskrat-caused flooding affecting the public use of incineration, resource recovery facilities, or other facilities where flooding may result in the release of hazardous or noxious materials; and
- Damage (gnawing, chewing, entering or other damage) to electric or gas facilities, transmission or distribution equipment, cable, alarm systems, or facilities, caused by beavers or muskrats.

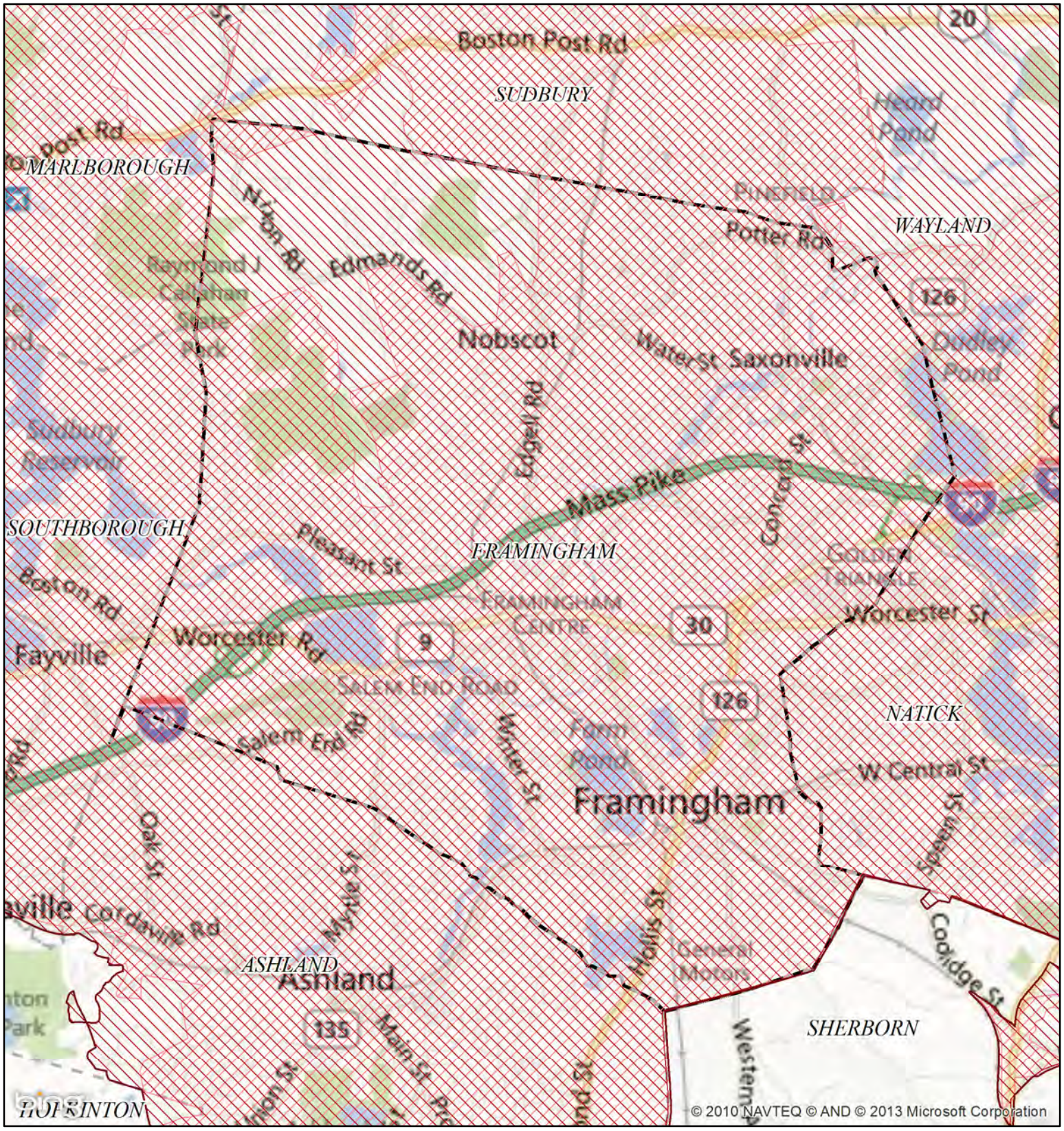
The problem and proposed solution are submitted in an application to the Board of Health for an emergency permit. No fee is required for applications from Public Works. The Board of Health then issues a 10-Day Emergency Beaver or Muskrat Application and Permit Form (see **Appendix P** for a sample form). It allows the permittee to "immediately remedy the threat to human health and safety" and lists one or more remedy options:

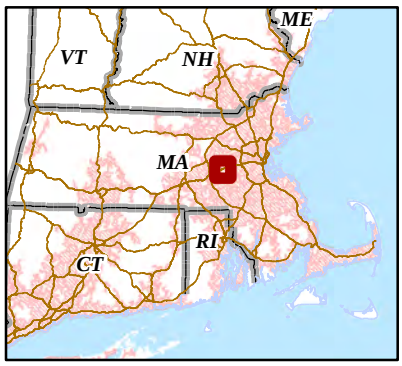
1. The use of conibear or box or cage-type traps for the taking of beaver or muskrat, subject to the regulations promulgated by the Division of Fisheries and Wildlife;
2. The breaching of dams, dikes, bogs or berms, so-called; and/or
3. Employing any non-lethal management or water-flow devices.

If Public Works determines that option(s) 2 and/or 3 are required, an application for emergency certification must be made to the Conservation Commission regarding specifications for breach size and/or water-flow device installation. The Conservation Commission emergency certification (WPA Emergency Certification Form, **Appendix P**) is valid for 30 days.

The Board of Health permit is renewable once only. If more time is required, an application for a 30-day extension permit must be co-signed by the Board of Health, and sent to the local Massachusetts Division of Fisheries and Wildlife office at 68 Harris Street, Acton, MA 01720. See **Appendix P** for a sample form.

If a landowner's permission is required to access property to perform management activities, a Landowner Consent Form is completed by the landowner and returned to the City for filing with the project. See **Appendix P** for a sample form.





NPDES Phase II Stormwater Program
Automatically Designated MS4 Areas
Framingham MA

Regulated Area:

UA Based on 2000 Census | UA Based on 2010 Census

0 1 2 3 4 Kilometers

0 1 2 3 Miles

Town Population: 68235

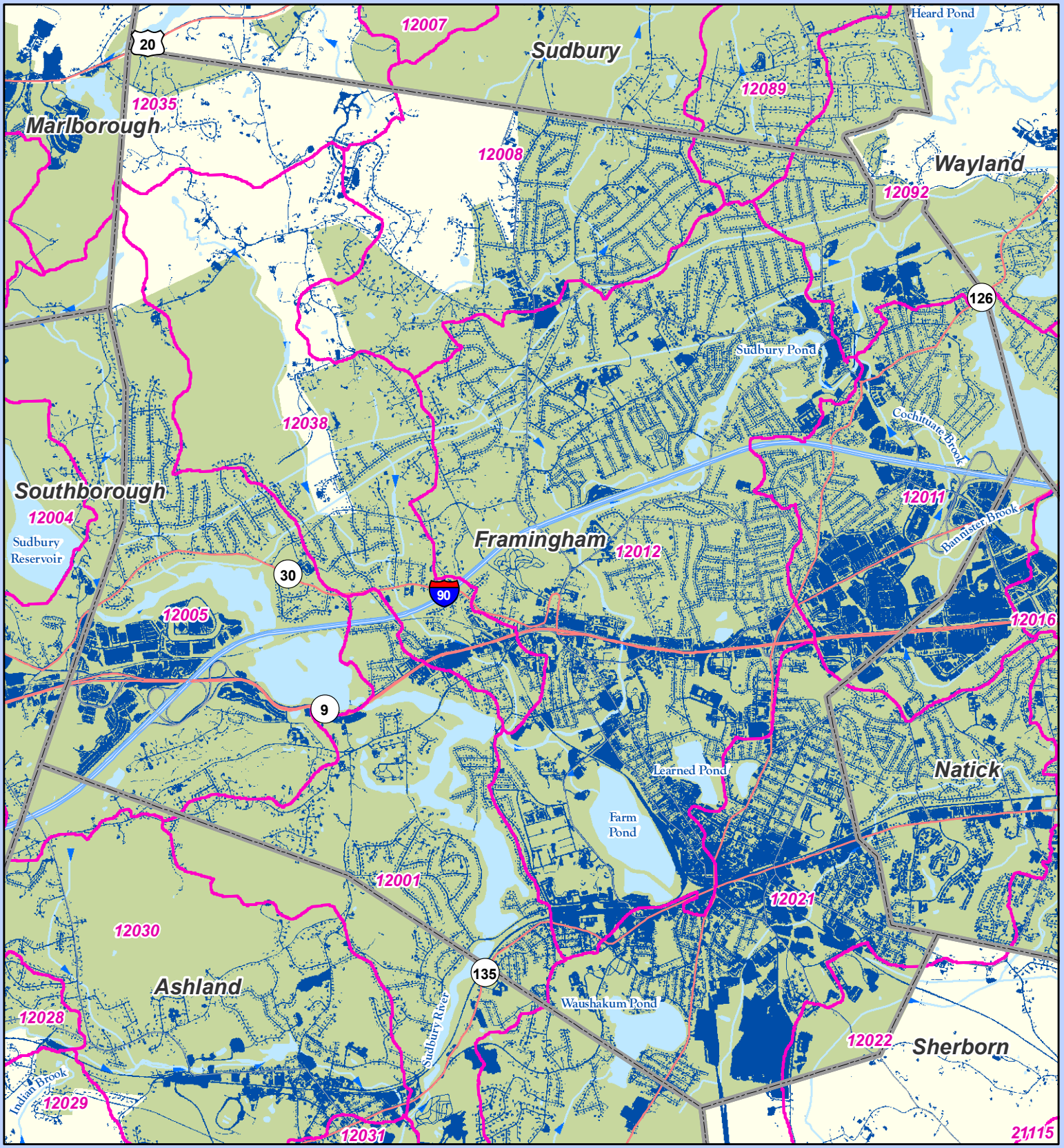
Regulated Population: 68235

(Populations estimated from 2010 Census)

EPA

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

US EPA Region 1 GIS Center Map #8824, 8/9/2013



Map produced by EPA Region 1 GIS Center
Map Tracker ID 4291, March 3, 2010
Data Sources: TeleAtlas 2007, US Census Bureau 2000, USGS 2009, MADEP 2008, MassGIS 2007

EPA United States Environmental Protection Agency New England

N

0 1 Mile

Impervious Cover & Watershed Delineation by Subbasin or GWCA

Framingham, MA

26.52 Square Miles Total

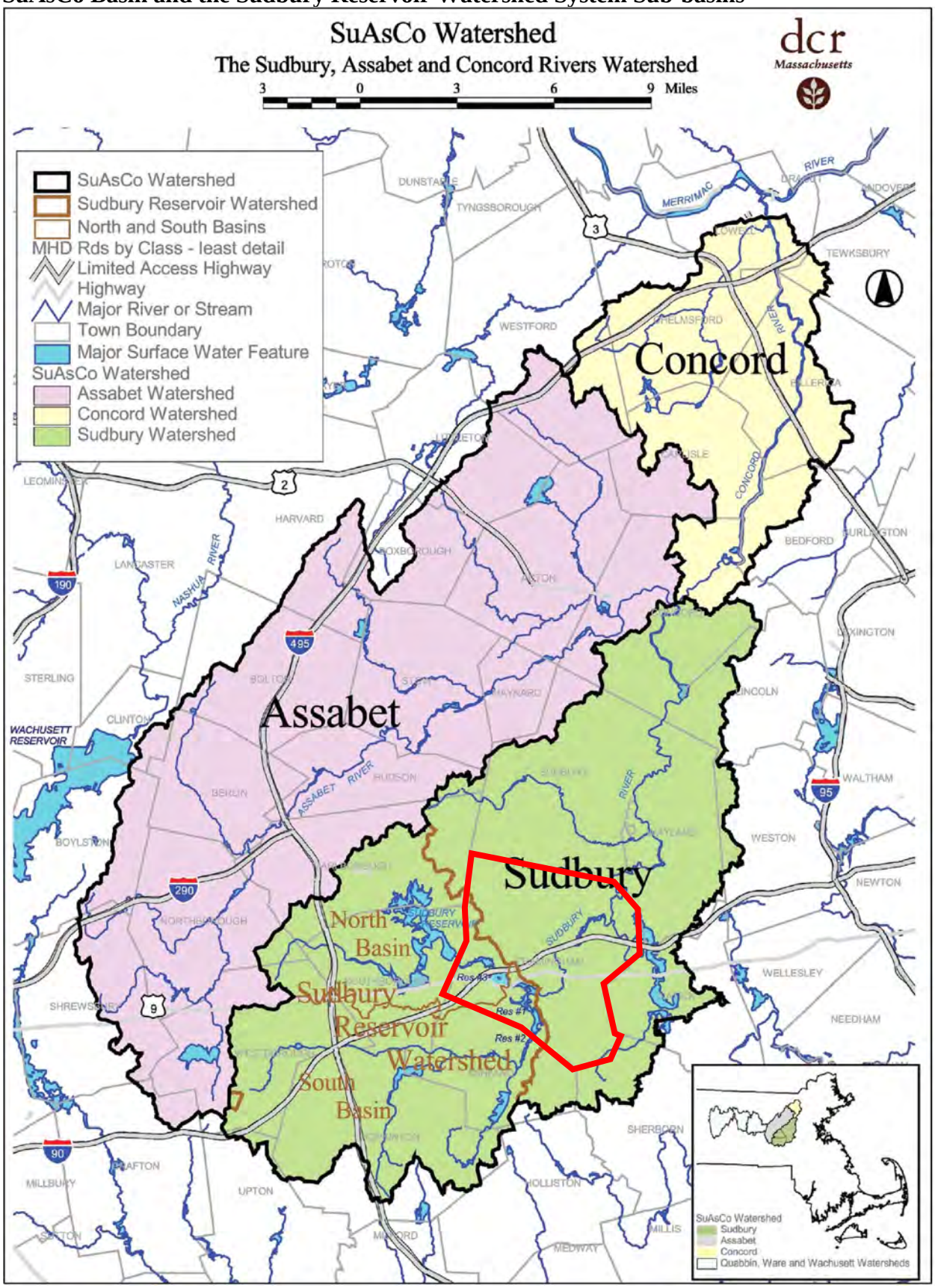
6.37 Square Miles Impervious

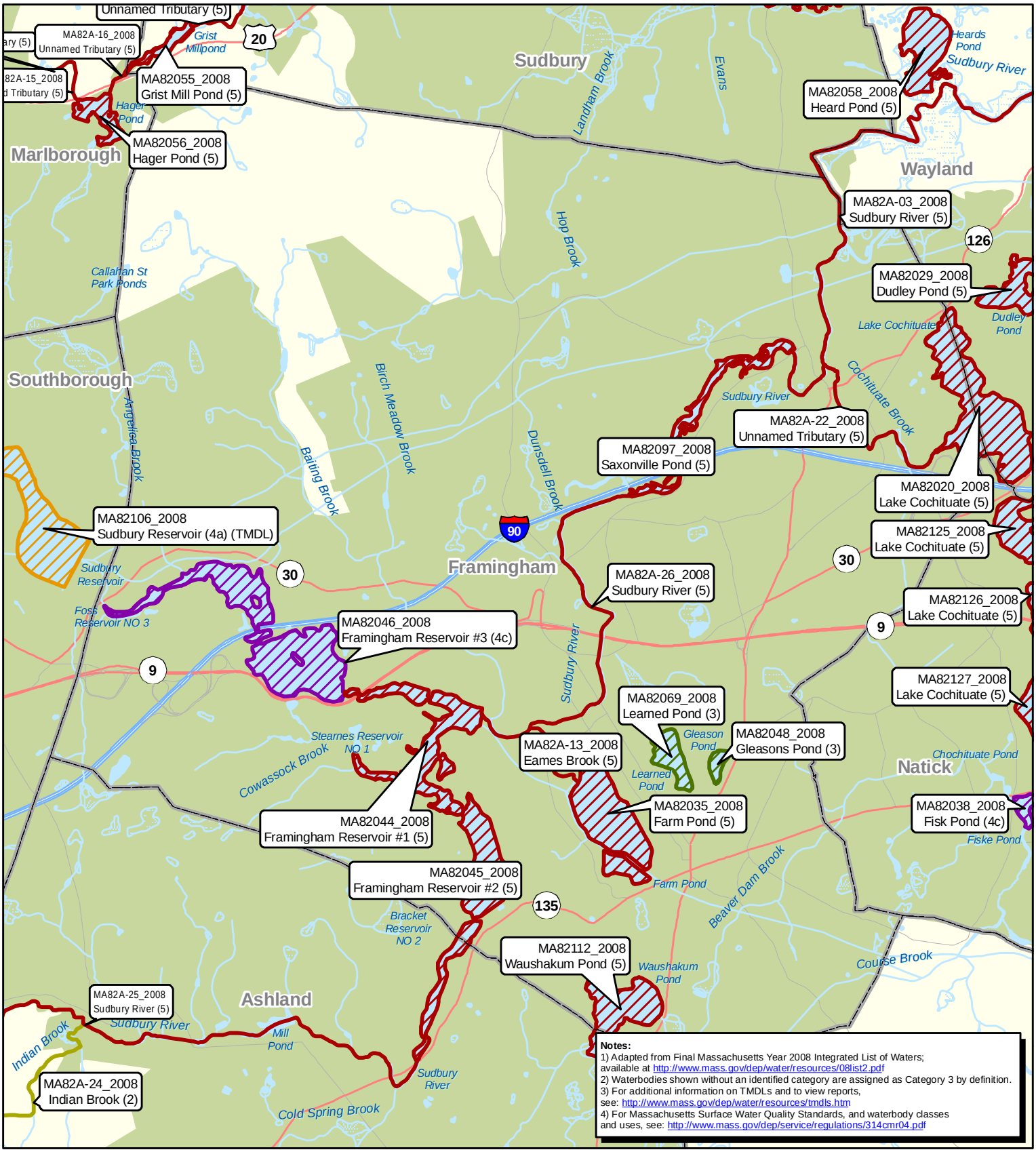
24.01 % Impervious

Legend

- Subbasins
- Groundwater Contributing Areas (GWCA)
- Impervious Area
- MS4 Urban Area
- MA Towns
- Water Bodies

SuAsCo Basin and the Sudbury Reservoir Watershed System Sub-basins





Waterbody Assessment and TMDL Status
Framingham, MA

N

0 0.5 Miles

EPA

Map produced by EPA Region I GIS Center
Map Tracker ID 6678, February 25, 2010
Data Sources: TeleAtlas, Census Bureau, USGS, MassDEP

Waterbody Label

State ID,
Waterbody Name (Category)
(TMDL(s) approved for this waterbody)

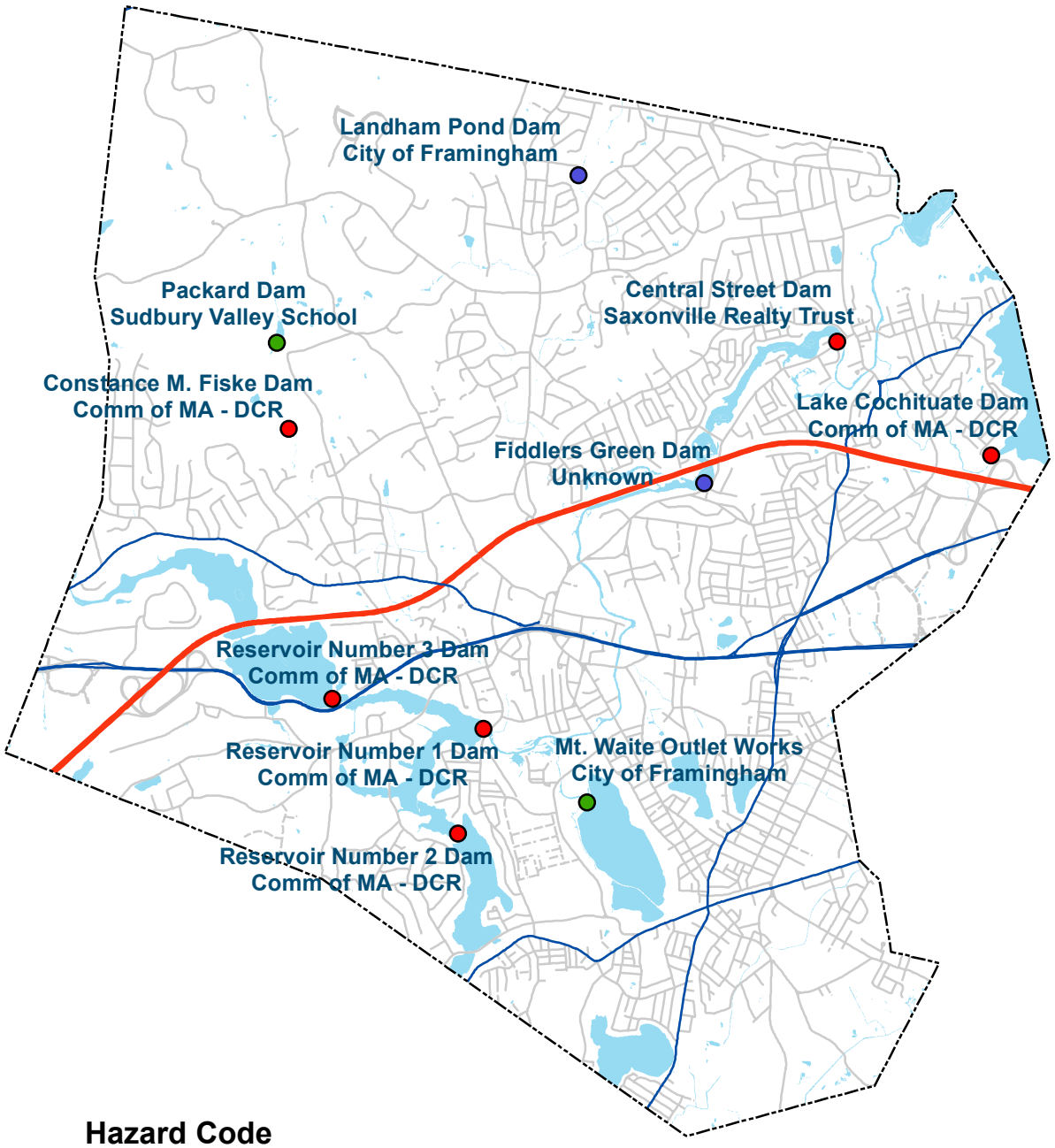
See companion table for a listing of pollutants, non-pollutants, and TMDLs for each waterbody

Assessment of Waterbody Segment

- Category 2: Attaining some uses; other uses not assessed
- Category 3: Insufficient information to make assessments for any use.
- Category 4a: TMDL is completed and approved for one or more pollutants
- Category 4c: Impairment not caused by a pollutant.
- Category 5: Impaired or threatened for one or more uses and requiring a TMDL.

- Waterbodies
- Swamp/Marsh
- MS4 Urbanized Areas (2000 Census)
- Municipal Boundaries

Framingham Dams



Hazard Code

- High
- Low
- N/A

Department of Public Works
Engineering and Transportation Division

Robert A. Lewis, Director

LAST REVISED: June, 2019

APPENDIX A

NPDES PHASE II

MUNICIPAL SEPARATE STORM SEWER SYSTEM PERMIT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square – Suite 100
BOSTON, MA 02109-3912

VIA EMAIL

May 16, 2022

Re: 2016 Massachusetts Small Municipal Separate Storm Sewer System General Permit - Administratively Continued Permit Coverage

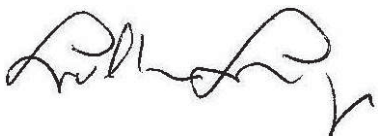
Dear Permit Holder:

You are receiving this letter because stormwater discharges from your municipal separate storm sewer system (MS4) are currently authorized under the 2016 Massachusetts Small MS4 Permit (MA MS4 permit), which will expire on July 1, 2022. In accordance with Part 1.6 of the MA MS4 Permit, the MA MS4 Permit will be administratively continued on July 1, 2022. The MA MS4 Permit will remain in force and effect for discharges that were authorized prior to July 1, 2022 until such discharges are authorized under a reissued general permit, an individual permit, or other alternative general permit. No action is required at this time to remain covered under the MA MS4 Permit.

If you have any questions regarding this matter, please contact Newton Tedder (tedder.newton@epa.gov) at USEPA or Laura Schifman (laura.schifman@mass.gov) at MassDEP.

Sincerely,

Lynne Jennings, Chief
Water Permits Branch
Water Division
USEPA



Lealdon Langley, Director
Division of Watershed Management
MassDEP

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

VIA EMAIL

December 14, 2018

Yvonne M. Spicer
Mayor

And;

Kerry Reed
Senior Stormwater Engineer
100 Western Ave
Framingham, MA. 01702
kr@framinghamma.gov

Re: National Pollutant Discharge Elimination System Permit ID #: MAR041116, City of Framingham

Dear Kerry Reed:

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

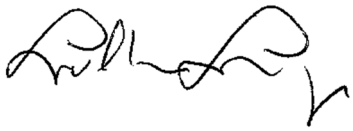
any questions regarding this permit please contact Newton Tedder at tedder.newton@epa.gov or (617) 918-1038.

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

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 (as modified)

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;

This modifies parts: 2.0; 2.1; 2.1.1; 2.1.2.a; 2.2.; 2.2.2 (paragraphs 2 and 3); 2.3.3; 2.3.5; 2.3.6; 2.3.7.b; 4.1; 4.4; 5.1.5; 6.5; Appendix F part A.I; Appendix F part A.II; and Appendix H of the permits that became effective on July 1, 2018

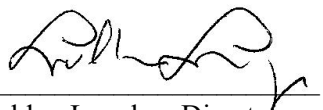
These permit modifications become effective on **January 6, 2021**.

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

Signed this **7th** day of **December 2020**

/S/Signature On File
_____
Ken Moraff, Director
Water Division
United States Environmental Protection Agency
5 Post Office Square – Suite 100
Boston, Massachusetts 02109-3912

Signed this **7th** day of **December 2020**


_____
Lealdon Langley, Director
Division of Watershed Management
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, Enteroccus 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.

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

- 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

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 online[1] 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.

- 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;
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;

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

This section includes terms and conditions necessary 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 meet applicable water quality standards as set forth in part 2.1.1. below.

2.1.1. Requirement to Meet Water Quality Standards

a. The permittee's discharges shall meet applicable water quality standards by complying with parts 2.1.1.b and/or 2.1.1.c in accordance with the schedules set forth therein.[2] Any other

[2] Applicable water quality standards are the state standards that have been federally approved or promulgated as of the issuance date of this permit and are compiled by EPA at http://www.epa.gov/waterscience/standards/wqslibrary/.

discharge of a pollutant that: (i) is not addressed by part 2.1.1.b, part 2.1.1.c, part 2.2.1, and/or part 2.2.2, (ii) is not the result of an illicit discharge subject to part 2.3.4, and (iii) does not meet applicable water quality standards, either independently or in conjunction with other discharges, shall comply with part 2.1.1.d.

b. If there is a discharge from the MS4 to a waterbody (or its tributaries in some cases) that is subject to an EPA approved or established 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, alternative schedules and requirements in Appendix F. A permittee's compliance with all applicable requirements and BMP implementation schedules in Appendix F or any alternative schedules applicable to it will constitute compliance with part 2.1.1.a. of the Permit for discharges of pollutants addressed in Appendix F.

c. If (i)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 (ii)the MS4 is located within a municipality listed in part 2.2.2.a.-b., then 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 for discharges of pollutants addressed in Appendix H.

d. Pursuant to Part 2.1.1.a, upon notice from EPA or MassDEP to the permittee that a discharge of a pollutant from the MS4 that is exceeding applicable water quality standards, the permittee must, within 60 days, remedy the exceedance or eliminate the discharge. However, where such remedy or elimination within 60 days is impracticable, the permittee shall submit to EPA, by the same deadline, a schedule of actions to achieve a remedy or elimination in the shortest time not impracticable. The permittee shall implement such actions on the schedule submitted to EPA and report on progress in its annual reports unless or until EPA takes any other action that effectively replaces the schedule..

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 appropriate[3]. Any authorization of an increased discharge by MassDEP shall be incorporated into the permittee's SWMP. If an applicable MassDEP approval specifies conditions or requirements related to the increased discharge, such requirements may be independently enforceable under State law and may be adopted into a future permit.

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

[3] Contact MassDEP for guidance on compliance with 314 CMR 4.04

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

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.

Permittees are subject to the applicable requirements in part 2.2.1, Appendix F, or an approved alternative structural control implementation schedule, and/or the applicable requirements in part 2.2.2, and Appendix H.

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
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.

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	Mattapoisett
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
Franklin	Stoughton
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 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
Ca rlisle	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
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, Enteroccus 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 is not subject to part 2.1.1.b for those pollutants, 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. Permittees notified by EPA or MassDEP during the permit term that they are discharging to a water quality limited water shall update their SWMP to include measures they must take in accordance with Appendix H.

In the absence of a defined pollutant reduction target and where no approved TMDL has been established as of the issuance date of this permit, this permit part and Appendix H define an iterative approach addressing pollutant reductions to waterbodies where the permittee's discharge is not meeting applicable water quality standards due to nutrients (Total Nitrogen Total Phosphorus), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enteroccus or Fecal Coliform), chloride (Chloride), metals (Cadmium, Copper, Iron, Lead or Zinc) or oil and grease (Petroleum Hydrocarbons or Oil and Grease).

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;

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
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	

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, Enteroccus 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.

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, all documents submitted to EPA in accordance with Appendix F, and all annual reports shall be available to the public online if the permittee has a website on which to post these documents.

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.

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.

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
- 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 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

[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.

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,
- 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 concern[5]

    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) <u>Follow-up ranking of outfalls and interconnections</u>:

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).

[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

ii. Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input[6] 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 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 input[7] 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

[6] 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.

[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.

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, 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. <u>For all catchments</u>
   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 manholes[8] 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. <u>For all catchments with a minimum of one (1) SVF identified</u>
   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

[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.

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.

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 Construction General Permit in that the former is implemented by the MS4 operator to ensure that runoff from construction sites discharging to the MS4 are controlled consistent with the MS4's applicable requirements, whereas the latter is implemented by construction site operators to comply with the terms and conditions of EPA's permit (https://www.epa.gov/npdes/2017-construction-general-permit-cgp).

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 iii. 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. The ordinance or regulatory mechanisms shall provide that the permittee may, to the extent authorized by law, impose sanctions to ensure compliance with the local program. 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 plan review, site inspections and enforcement of sediment and erosion control measures by the permittee. If not already existing, these procedures shall be completed within one (1) year from the effective date of the permit.

1. 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;
   - consideration of potential water quality impacts;
   - procedures for the receipt and consideration of information submitted by the public; and
   - evaluating the incorporation of Low Impact Development (LID) site planning and design strategies, unless such practices are infeasible.
2. The site inspection and enforcement procedures shall include:
   - who is responsible for site inspections and the necessary qualifications for performing inspections, as well as who has authority to implement enforcement procedures;
   - the requirement that inspections of BMPs occur during construction of BMPs as well as after construction of BMPs to ensure they are working as described in the approved plans
   - 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.

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 the requirements of EPA's Construction General Permit (including the development of a SWPPP) to the extent they are consistent with the program requirements of this part. The program may include references to BMP design standards in state manuals, such as the 2008 Massachusetts Stormwater Handbook[9], or design standards developed by the

[9] The handbook is available at: https://www.mass.gov/guides/massachusetts-stormwater-handbook-and-stormwater-standards

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. Control wastes that may be discharged, 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); and
8. Inspect stormwater controls at consistent intervals.

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.b.)

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 three (3) 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 implemented unless infeasible in order to reduce the discharge of stormwater from development sites..

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2. Stormwater management systems design shall be consistent with, or more stringent than, the requirements of the 2008 Massachusetts Stormwater Handbook.
:

3. Stormwater management systems on new development 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 impervious surface area on the site[10].

a) Average annual pollutant removal requirements in 2.3.6.a.ii.3 are achieved through one of the following methods:
   1. installing BMPs that meet the pollutant removal percentages based on calculations 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 BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or
   2. retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site; or
   3. meeting a combination of retention and treatment that achieves the above standards; or
   4. utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the new development site.

4. Stormwater management systems on redevelopment sites shall be designed to meet an average annual pollutant removal equivalent to 80% of the average annual post-construction load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site[11].

a) Average annual pollutant removal requirements in 2.3.6.a.ii.4 above are

[10] Pollutant removal is calculated based on average annual loading and not on the basis of any individual storm event

[11] Pollutant removal is calculated based on average annual loading and not on the basis of any individual storm event

achieved through one of the following methods:

1. installing BMPs that meet the pollutant removal percentages based on calculations 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 BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or
2. retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-construction impervious surface area on the redeveloped site; or
3. meeting a combination of retention and treatment that achieves the above standards; or
4. utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the redevelopment site.

b) 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 unless infeasible and are exempt from part 2.3.6.a.ii.4. 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..

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 meets applicable water quality standards.

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.

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 request the permittee to add, modify, repair, replace or change BMPs or other measures described in the annual reports as needed to satisfy the conditions of this permit.

Any changes requested by EPA or MassDEP will be in writing and may set forth the schedule for the permittee to develop the changes and may offer the permittee the opportunity to propose alternative program changes to satisfy the permit conditions..

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

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 that do not meet applicable water quality standards;
- 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:

- 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, Enteroccus 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 appropriate[12]. 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.

5.1.5 Dischargers Subject to Appendix F Part A.I

Those dischargers not identified in Appendix F Table F-2 or Table F-3 discharging to waterbodies in the Charles River Watershed or to an MS4 that discharges to a waterbody in the Charles River Watershed shall coordinate with the municipality in which they are located to facilitate compliance

[12] Contact MassDEP for guidance on compliance with 314 CMR 4.04

with the phosphorus reduction applicable to the municipality. In each annual report the permittee shall indicate planned phosphorus reduction activities on site and coordination progress with the municipality. In addition, the year 4 annual report shall contain the following information:

a. Estimated current impervious area of permittee owned property,
b. Land Use information for permittee owned property,
c. Phoshorus removal in pounds per year for any structural BMP owned by the permittee, calculated in accordance with Appendix F Attachment 3
d. Date of last maintenance activity for all structural BMPs for which phosphorus removal is calculated

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 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, Enteroccus 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 appropriate[13]. 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.

6.5 Dischargers Subject to Appendix F Part A.I

Those dischargers not identified in Appendix F Table F-2 or Table F-3 discharging to waterbodies in the Charles River Watershed or to an MS4 that discharges to a waterbody in the Charles River Watershed shall coordinate with the municipality in which they are located to facilitate compliance with the phosphorus reduction applicable to the municipality. In each annual report the permittee shall indicate planned phosphorus reduction activities on site and coordination progress with the municipality. In addition, the year 4 annual report shall contain the following information:

a. Estimated current impervious area of permittee owned property,
b. Land Use information for permittee owned property,
c. Phosphorus removal in pounds per year for any structural BMP owned by the permittee, calculated in accordance with Appendix F Attachment 3,
d. Date of last maintenance activity for all structural BMPs for which phosphorus removal is calculated

[13] 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:

- 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.

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 Appendix[1].

Applicants also have an independent ESA obligation to ensure that their activities do not result in any prohibited "take" of listed species[12]. 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 septentriolis)*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 metyoumay 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 area[1] 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 provided 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 12345-6789

Email: Phone Number: (123) 456-7890

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? *(Part II,III,IV or V, Subpart B.3.(a.) of 2003 permit)* 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?: *(Part II,III,IV or V, Subpart B.3.(b.) of 2003 permit)* Effective Date or Estimated Date of Adoption (MM/DD/YY):

Construction/Erosion and Sediment Control (ESC) Authority Adopted?: *(Part II,III,IV or V, Subpart B.4.(a.) of 2003 permit)* Effective Date or Estimated Date of Adoption (MM/DD/YY):

Post- Construction Stormwater Management Adopted?: *(Part II,III,IV or V, Subpart B.5.(a.) of 2003 permit)* 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
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
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	

		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	
		Chlorophyll-a Dissolved oxygen saturation Escherichia coli Mercury Nitrogen (Total)	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

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 applicable waste lod 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**
		Residents			
		Businesses, Institutions and Commercial Facilities			
		Developers (construction)			
		Industrial Facilities			
		Residents			
		Businesses, Institutions and Commercial Facilities			
		Developers (construction)			
		Industrial Facilities			

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 implementation
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

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)

Part III: Stormwater Management Program Summary

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**
Site inspection and enforcement of Erosion and Sediment Control (ESC) measures	Complete written procedures of site inspections and enforcement procedures		Complete by the end of Year 1	
Site plan review	Complete written procedures of site plan review and begin implementation		Complete by the end of Year 1	
Erosion and Sediment Control	Adoption of requirements for construction operators to implement a sediment and erosion control program			
Waste Control	Adoption of requirements to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes.			

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 III: Stormwater Management Program Summary

Actions for meeting Total Maximum Daily Load (TMDL) Requirements

Use the drop-down menus to select the best categorization of your BMP and responsible party. If no options are applicable, or more than one, **enter your own text to override drop-down menus.**

Applicable TMDL	**Action Description**	**Responsible Department/ Parties** (enter your own text to override the drop down menu)

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.**

Actions for meeting Requirements Related to water Quality Limited Waters

Part III: Stormwater Management Program Summary

Notice of Intent (NOI) for coverage under Small MS4 General Permit (continued)

Pollutant	Waterbody ID(s)	Action Description	Responsible Department/Parties (enter your own text to override the drop down menu)

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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Attachment 3 - Phosphorus Reduction Credits For Selected Structural BMPs

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	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 0.80 $P_{exp} \leq P_{allow} + (P_{RR}\ X\ 0.80)$	8 years after permit effective date
1-13	Performance Evaluation	9 years after permit effective date
1-14	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 0.75	10 years after permit effective date

	$P_{exp} \leq P_{allow} + (P_{RR}\ X\ 0.75)$	

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-2[3] and Table F-3[4] list the permittees subject to phosphorus reduction requirements along with the estimated Baseline Phosphorous 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 requirements[5]. 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 BMPs[6] 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	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 $P_{exp} \leq P_{allow} + (P_{RR}\ X\ 0.65)$	13 years after permit effective date
2-10	Performance Evaluation	14 years after permit effective date
2-11	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 $P_{exp} \leq P_{allow} + (P_{RR}\ X\ 0.50)$	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 party[7] 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 BMPs[8] 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	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 $P_{exp} \leq P_{allow} + (P_{RR}\ X\ 0.30)$	18 years after permit effective date
3-10	Performance Evaluation	19 years after permit effective date
3-11	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 BMPs[9] 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 TMDLs[10] 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 municipalities[11] 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%
	Pikes Pond	38%
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-tmdls.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	27%
	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	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 $P_{exp} \leq P_{allow} + (P_{RR}\ X\ 0.80)$	8 years after permit effective date
13	Performance Evaluation	9 years after permit effective date
14	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 $P_{exp} \leq P_{allow} + (P_{RR}\ X\ 0.60)$ 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	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 $P_{exp} \leq P_{allow} + (P_{RR}\ X\ 0.30)$	
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}) $P_{exp} \leq P_{allow}$	15years 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 BMPs[12] 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 date[13]. 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. Equation2 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.

$$P_{exp}\left(\frac{mass}{yr}\right) = P_{base}\left(\frac{mass}{yr}\right) - \left(P_{Sred}\left(\frac{mass}{yr}\right) + P_{NSred}\left(\frac{mass}{yr}\right)\right) + P_{DEVinc}\left(\frac{mass}{yr}\right)$$

Equation 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	Shumatuscacant 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	Shumatuscacant 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	Popponesset 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	Shumatuscacant 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 measuress 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	Popponesset 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	Taylors 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 nitrogen[17], 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	

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 Kikemuit River, Kickemuit River, Ten Mile River, Central Pond, Turner Reservoir, Lower Ten Mile River, and Omega Pond TMDLs[18]. 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 Kikemuit River, Ten Mile River, Lower Ten Mile River and Omega Pond TMDLs[19] 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 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:
Baseline P Load $_{IND}$ = (TA_{IND}) x (PLER for industrial use (Table 1-1))
= 11.0 acre x 1.27 lbs/acre/year
= 14.0 lbs P/year

Baseline P Load $_{MDR}$ = (TA_{MDR}) x (PLER for medium density residential (Table 1-1))
= 3.0 acre x 0.49 lbs/acre/year
= 1.5 lbs P/year

Baseline P Load $_{FOR}$ = (TA_{FOR}) x (PLER for forest (Table 1-1))
= 4.0 acre x 0.12 lbs/acre/year
= 0.5 lbs P/year

Baseline Phosphorus Load = 14.0 lbs P/year + 1.5 lbs P/year + 0.5 lbs P/year
= **16.0 lbs P/year**

(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

*From Table 1-1; ** From Table 1-2

The phosphorus load increase is calculated as:

Baseline Load = (Baseline P Load $_{IND}$) +
(Baseline P Load $_{MDR}$) +
(Baseline P Load $_{FOR}$)
= **16.0 lb/year** (determined in Example 1-1)

P_{DEV} = $(TA_{IND} \times PLER_{IND})+(IA_{HDR} \times PLER_{HDR})+(PA_{MDR} \times PLER_{MDR})+(PA_{FOR} \times PLER_{For})$
= (11.0 acres * 1.27) + (2.0 acres * 2.32) + (1.5 acres * 0.21) + (3.5 * 0.12)
= **19.0 lbs P/year**

$\mathbf{P_{DEVinc}}$ = P_{DEV} – Baseline Load
= 19.0 – 16.0
= **3.0 lbs/year**

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:

- 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:

$$Credit_{sweeping} = IA_{swept} \times PLE_{IC\text{-}land\ use} \times PRF_{sweeping} \times AF \qquad \textbf{(Equation 2-1)}$$

Where:

$Credit_{sweeping}$ = 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)

$PLE_{IC\text{-}land\ use}$ = Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr) (see Table 2-1)

$PRF_{sweeping}$ = 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 ($PRF_{sweeping}$) for sweeping impervious areas

Frequency[1]	Sweeper Technology	$PRF_{sweeping}$
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

[1]For 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
$PLE_{IC\text{-}HDR}$	= 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.

$Credit_{sweeping}$ = IA_{swept} x $PLE_{land\ use}$ x $PRF_{sweeping}$ x AF
= 20.3 acres x 2.32 lbs/acre/yr x 0.08 x 0.75
= 2.8 lbs/yr

(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:

$$Credit_{CB} = IA_{CB} \times PLE_{IC\text{-}land\ use} \times PRF_{CB} \quad \textbf{(Equation 2-2)}$$

Where:

$Credit_{CB}$	=	Amount of phosphorus load removed by catch basin cleaning (lb/year)
IA_{CB}	=	Impervious drainage area to catch basins (acres)
$PLE_{IC\text{-}and\ use}$	=	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
$PLE_{IC\text{-}MDR}$	= 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:

Credit $_{CB}$	= IA_{CB} x $PLE_{IC\text{-}MDR}$ x PRF_{CB}
	= 15.3 acre x 1.96 lbs/acre/yr x 0.02
	= 0.6 lbs/yr

(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:

$$Credit_{leaf\ litter} = (Watershed\ Area) \times (PLE_{IC\text{-}land\ use}) \times (0.05) \qquad \textbf{(Equation 2-3)}$$

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
$PLE_{IC\text{-}land\ use}$	= 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 $_{\text{leaf litter}}$): 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 $_{\text{leaf litter}}$ is:

Watershed Area = 12.5 acres; and
PLE $_{\text{IC-commercial}}$ = 1.78 lbs/acre/yr (from Table 2-1)

Substitution into equation 2-4 yields a Credit $_{\text{leaf litter}}$ of 1.1 pounds of phosphorus removed per year:

Credit $_{\text{leaf litter}}$ = (12.5 acre) x (1.78 lbs/acre/yr) x (0.05)
= 1.1 lbs/yr

The permittee also may earn a phosphorus reduction credit for enhanced sweeping of roads and parking lot areas (i.e., Credit $_{\text{sweeping}}$) for the three months of use. Using equation 2-1, Credit $_{\text{sweeping}}$ is:

Credit $_{\text{sweeping}}$ = IA $_{\text{swept}}$ x PLE $_{\text{IC-land use}}$ x PRF $_{\text{sweeping}}$ x AF **(Equation 2-1)**
IA $_{\text{swept}}$ = 12.5 acre
PLE $_{\text{IC-commercial}}$ = 1.78 lbs/acre/yr (from Table 2-1)
PRF $_{\text{sweeping}}$ = 0.05 (from Table 2-3)
AF = 3 mo./12 mo. = 0.25

Substitution into equation 2-1 yields a Credit $_{\text{sweeping}}$ of 0.28 pounds of phosphorus removed per year.

Credit $_{\text{sweeping}}$ = IA $_{\text{swept}}$ x PLE $_{\text{IC-commercial}}$ x PRF $_{\text{sweeping}}$ x AF
= 12.5 acre x 1.78 lbs/acre/yr x 0.05 x 0.25
= 0.3 lbs/yr

ATTACHMENT 3 TO APPENDIX F

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.

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 lessor 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 compliment 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:

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.

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:

BMP Load $= (IA_{Ind} \times PLER_{Ind}) + (PA_{Ind} \times PLER_{Ind}) + (PA_{FOREST} \times PLER_{For})$
$= (10.13 \times 1.78) + (1.85 \times 0.21) + (0.89 \times 0.12)$
= 18.53 lbs P/year

Table 3-1: Average annual distinct phosphorus load (P Load) export rates for use in estimating phosphorus load reduction credits the MA MS4 Permit

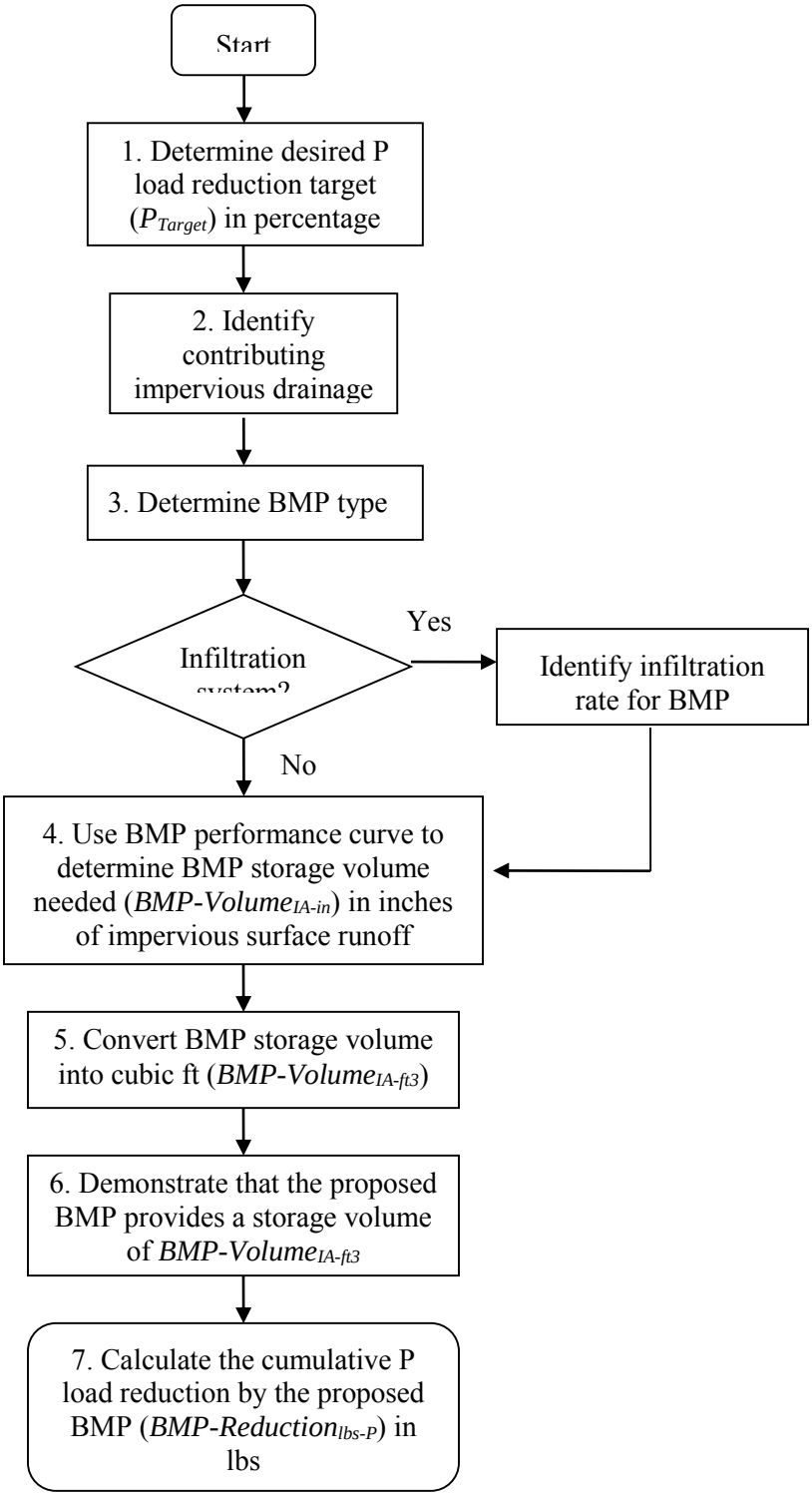
Phosphorus Source Category by Land Use	Land Surface Cover	P Load Export Rate, lbs/acre/year	P Load Export Rate, kg/ha/yr
Commercial (Com) and Industrial (Ind)	Directly connected impervious	1.78	2.0
	Pervious	See* DevPERV	See* DevPERV
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected 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

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:

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 $_{IA\text{-}in}$), 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 $_{IA\text{-}ft^3}$) using BMP-Volume $_{IA\text{-}in}$ determined from step 4 and equation 3-1:

BMP-Volume $_{IA\text{-}ft^3}$ = IA (acre) x BMP-Volume $_{IA\text{-}in}$ x 3630 ft^3/ac-in **(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 $_{IA\text{-}ft^3}$, 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 $_{lbs\text{-}P}$) 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:

BMP-Reduction $_{lbs\text{-}P}$ = BMP Load x (P_{target} /100) **(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 $_{IA\text{-}ft^3}$); and

B) Cumulative phosphorus reduction in pounds that would be accomplished by the BMP (BMP-Reduction $_{lbs\text{-}P}$)

Solution:

1) Contributing impervious drainages area (IA) = 2.57 acres

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 $_{IA\text{-}in}$) 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 $_{IA\text{-}in}$ for a P_{target} = 70% is 0.36 in.

5) The BMP-Volume $_{IA\text{-}in}$ is converted to cubic feet (BMP-Volume $_{IA\text{-}ft^3}$) using Equation 3-1:

BMP-Volume $_{IA\text{-}ft^3}$ = IA (acre) x BMP-Volume $_{IA\text{-}in}$ x 3,630 ft^3/acre-in
BMP-Volume $_{IA\text{-}ft^3}$ = 2.57 acre x 0.36 in x 3,630 ft^3/acre-in
= **3,359 ft^3**

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 ft^3, exceeds the BMP-Volume $_{IA\text{-}ft^3}$ needed, 3,359 ft^3 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 $_{lbs\text{-}P}$) is calculated using Equation 3-2. The BMP Load is first determined using the method described above.

BMP Load = IA x impervious cover phosphorus export loading rate for commercial use (see Table 3-1)
= 2.57 acres x 1.78 lbs/acre/yr
= 4.58 lbs/yr

BMP-Reduction $_{lbs\text{-}P}$ = BMP Load x (P_{target} /100)
BMP-Reduction $_{lbs\text{-}P}$ = 4.58 lbs/yr x (70/100)
= **3.21 lbs/yr**

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

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 $_{IA\text{-}in}$) 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 $_{IA\text{-}in}$ for $PR_{IR=0.39}$ of 70% is between 0.3 and 0.4 inches and can be determined by interpolation:

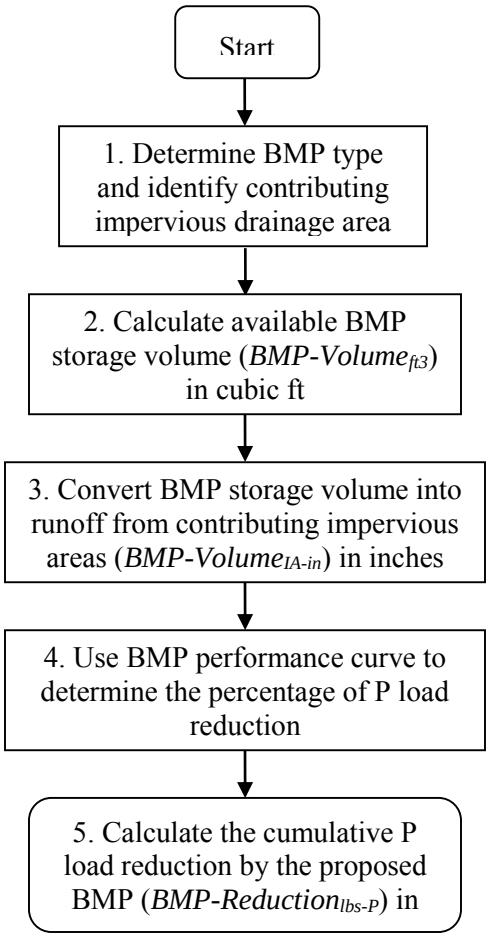
$$\text{BMP-Volume}_{IA\text{-}in} = (70\% - 65\%)/ (75\% - 65\%) \times (0.4 \text{ in} – 0.3 \text{ in}) + 0.3 \text{ in}$$
$$= 0.35 \text{ inches}$$

5 alternative) Convert the resulting BMP-Volume $_{IA\text{-}in}$ to cubic feet (BMP-Volume $_{IA\text{-}ft^3}$) using equation 3-1:

$$\text{BMP-Volume}_{IA\text{-}ft^3} = 2.57 \text{ acre} \times 0.35 \text{ in} \times 3{,}630 \text{ ft}^3/\text{acre-in}$$
$$= \mathbf{3{,}265 \text{ ft}^3}$$

(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.



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 $_{IA\text{-}in}$) using equation 3-3:

BMP-Volume $_{IA\text{-}in}$ = BMP-Volume $_{ft^3}$/ IA (acre) x 12 in/ft x 1 acre/43560 ft^2 **(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 $_{IA\text{-}in}$ calculated in step 3; and

5) Calculate the cumulative phosphorus load reduction in pounds of phosphorus for the structural BMP (BMP Reduction $_{lbs\text{-}P}$) 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:

BMP Reduction $_{lbs\text{-}P}$ = BMP Load x (BMP Reduction $_{\%\text{-}P}$/100) **(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 ft^2 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 $_{\%\text{-}P}$) 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 $_{lbs\text{-}P}$)

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 (ft^3) of the bio-filtraton system (BMP-Volume $_{BMP\text{-}ft^3}$) is determined using the surface area of the system, depth of ponding, and the porosity of the filter media:

BMP-Volume $_{BMP\text{-}ft^3}$ = (surface area x pond maximum depth) + ((soil mix depth + gravel layer depth)/12 in/ft) x surface area x gravel layer porosity)
= (1,200 ft^2 x 0.5 ft) + ((38/12) x 1,200 ft^2 x 0.4)
= 2,120 ft^3

Solution continued:

3) The available storage volume capacity of the bio-filtration system in inches of runoff from the contributing impervious area (BMP-Volume $_{IA\text{-}in}$) is calculated using equation 3-3:

BMP-Volume $_{IA\text{-}in}$ = (BMP-Volume $_{ft}^3$/ IA (acre) x 12 in/ft x 1 acre/43560 ft^2
BMP-Volume $_{IA\text{-}in}$ = (2120 ft^3/1.49 acre) x 12 in/ft x 1 acre/43560 ft^2
= 0.39 in

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

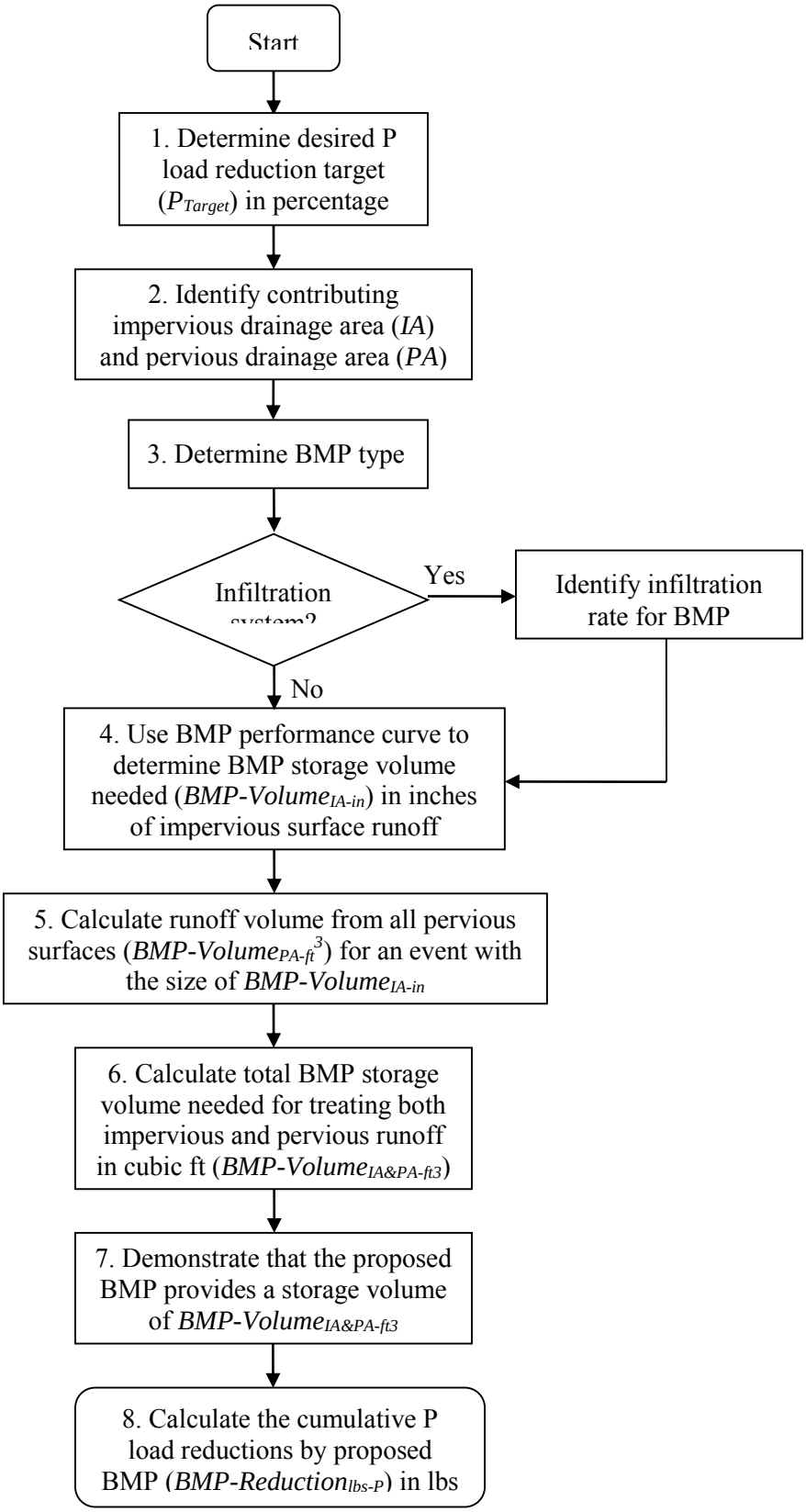
5) Calculate the cumulative phosphorus load reduction in pounds of phosphorus for the bio-filtration system (BMP Reduction $_{lbs\text{-}P}$) using the BMP Load as calculated from the procedure described above and the BMP Reduction $_{\%\text{-}P}$ determined in step 4 by using equation 3-4. First, the BMP Load is determined as specified above:

BMP Load = IA x impervious cover phosphorus export loading rate for HDR (see Table 3-1) = 1.49 acres x 2.32 lbs/acre/yr
= 3.46 lbs/yr

BMP Reduction $_{lbs\text{-}P}$ = BMP Load x (BMP Reduction $_{\%\text{-}P}$/100)
BMP Reduction $_{lbs\text{-}P}$ = 3.46 lbs/yr x (51/100)
= **1.76 lbs/yr**

(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.


Start
1. Determine desired P load reduction target (P_{Target}) in percentage
2. Identify contributing impervious drainage area (*IA*) and pervious drainage area (*PA*)
3. Determine BMP type
Infiltration system?
Yes
Identify infiltration rate for BMP
No
4. Use BMP performance curve to determine BMP storage volume needed (*BMP-Volume*$_{IA\text{-}in}$) in inches of impervious surface runoff
5. Calculate runoff volume from all pervious surfaces (*BMP-Volume*$_{PA\text{-}ft}{}^{3}$) for an event with the size of *BMP-Volume*$_{IA\text{-}in}$
6. Calculate total BMP storage volume needed for treating both impervious and pervious runoff in cubic ft (*BMP-Volume*$_{IA\&PA\text{-}ft3}$)
7. Demonstrate that the proposed BMP provides a storage volume of *BMP-Volume*$_{IA\&PA\text{-}ft3}$
8. Calculate the cumulative P load reductions by proposed BMP (*BMP-Reduction*$_{lbs\text{-}P}$) in lbs

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 $_{IA\text{-}in}$);

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 $_{PA\text{-}ft^3}$) for a rainfall size equal to the sum of BMP Volume $_{IA\text{-}in}$, determined in step 4. The runoff volume for each distinct pervious area must be determined;

   BMP-Volume $_{PA\ ft^3}$ = $\sum$ (PA x (runoff depth) x 3,630 ft^3/acre-in) $_{(PA1,\ldots\ PAn)}$ **(Equation 3-5)**

6) Using equation 3-6 below, calculate the BMP storage volume in cubic feet (BMP-Volume $_{IA\&PA\text{-}ft^3}$) needed to treat the runoff depth from the contributing impervious (IA) and pervious areas (PA);

   BMP-Volume $_{IA\&PA\text{-}ft^3}$ = BMP Volume $_{PA\text{-}ft^3}$ + (BMP Volume $_{IA\text{-}in}$ x IA (acre) x 3,630 ft^3/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 $_{IA\&PA\text{-}ft^3}$, will be provided to achieve the P $_{Target}$; and

8) Calculate the cumulative phosphorus load reduction in pounds of phosphorus (BMP-Reduction $_{lbs\text{-}P}$) 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:

BMP-Reduction $_{lbs\text{-}P}$ = BMP Load x (P $_{target}$ /100) **(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 $_{IA\&PA\text{-}ft^3}$); and
B) Cumulative phosphorus reduction in pounds that would be accomplished by the BMP (BMP-Reduction $_{lbs\text{-}P}$)

Example 3-3 continued:
Solution:

1) The BMP type is gravel wetland system.

2) The phosphorus load reduction target (P_{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 $_{IA\text{-}in}$) 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):

Runoff depth (HSG C) = (0.71 – 0.6)/(0.8 – 0.6) x (0.09 in – 0.06 in) + 0.06 in
= 0.07 inches

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 ft^3/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 $_{IA\&PA\text{-}ft^3}$) 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:

BMP $Volume_{IA\&PA\text{-}ft^3}$ = BMP Volume $_{PA\ ac\text{-}in}$ + (BMP Volume $_{IA\text{-}in}$ x IA (acre)) x 3,630 ft^3/acre-in)

BMP $Volume_{IA\&PA\text{-}ft^3}$ = (508 ft^3+ (0.71 in x 4.00 acre)) x 3,630 ft^3/acre-in
= 10,817 ft^3

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 ft^3. This volume is greater than 11,834 ft^3 ((BMP-Volume $_{IA\&PA\text{-}ft^3}$), calculated in step 6) and is therefore sufficient to achieve a P_{Target} of 55%.

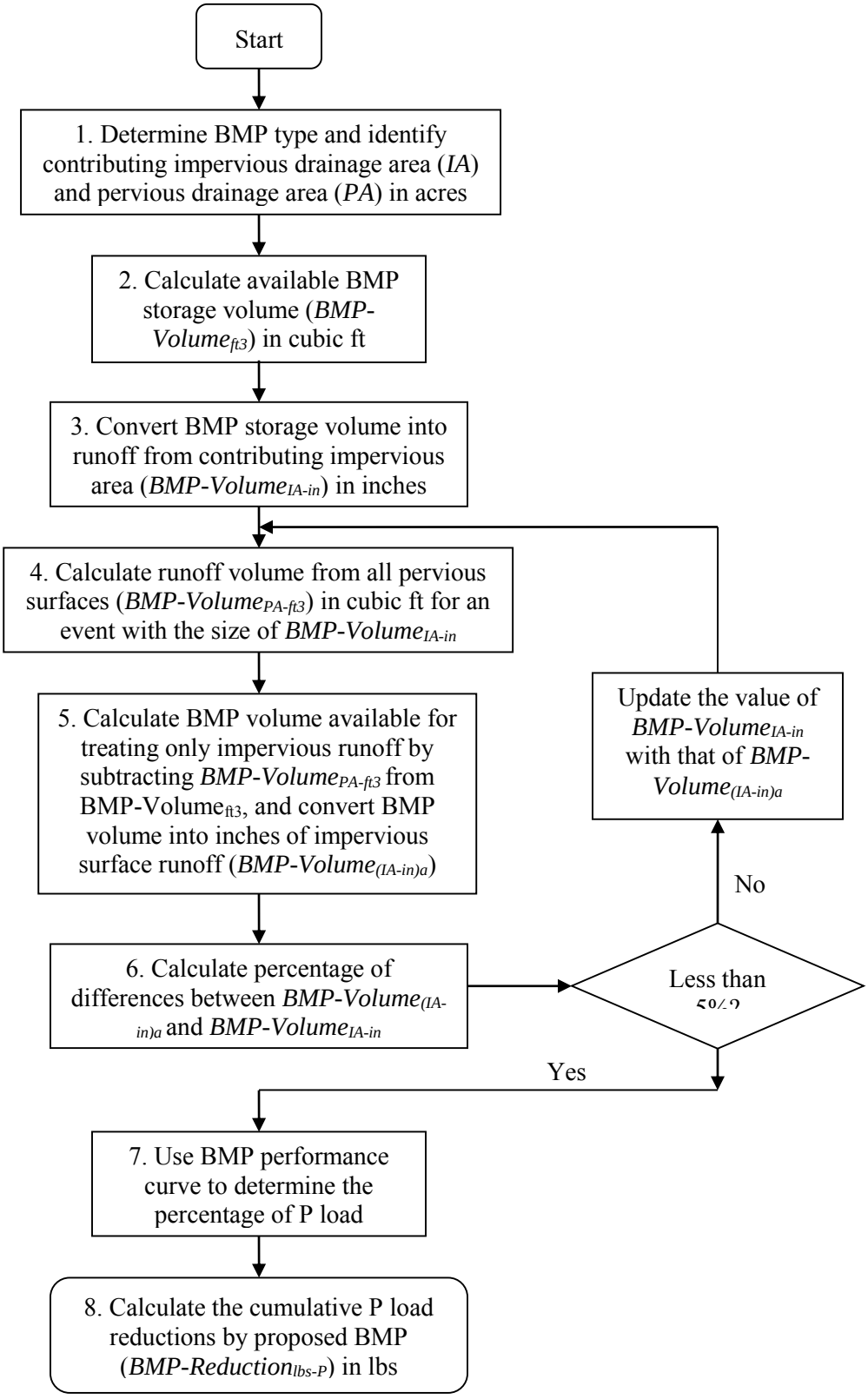
6) The cumulative phosphorus load reduction in pounds of phosphorus (BMP-Reduction $_{lbs\text{-}P}$) for the proposed gravel wetland system is calculated by using equation 3-2 with the BMP Load and the P_{target} = 55%.

BMP-Reduction $_{lbs\text{-}P}$ = BMP Load x (P_{target} /100) (**Equation 3-2**)

Using Table 3-1, the BMP Load is calculated:
BMP Load = (IA x PLER $_{HDR}$) + (PA lawn $_{HSG\,B}$ x PLER $_{HSG\,B}$) + (PA lawn $_{HSG\,C}$ x PLER $_{HSG\,C}$) +(PA forest x PA PLER $_{For}$)
= (4.00 acre x 2.32 lbs/acre/yr) + (0.50 acres x 0.12 lbs/acre/yr) + (1.00 acre x 0.21 lbs/acre/yr) + (1.00 acres x 0.13)
= 9.68 lbs/yr
BMP-Reduction $_{lbs\text{-}P}$ = BMP Load x (P_{target} /100)
BMP-Reduction $_{lbs\text{-}P}$ = 9.68 lbs/yr x 55/100
= **5.32 lbs/yr**

(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.


Start
1. Determine BMP type and identify contributing impervious drainage area (*IA*) and pervious drainage area (*PA*) in acres
2. Calculate available BMP storage volume (*BMP-Volume*$_{ft3}$) in cubic ft
3. Convert BMP storage volume into runoff from contributing impervious area (*BMP-Volume*$_{IA\text{-}in}$) in inches
4. Calculate runoff volume from all pervious surfaces (*BMP-Volume*$_{PA\text{-}ft3}$) in cubic ft for an event with the size of *BMP-Volume*$_{IA\text{-}in}$
5. Calculate BMP volume available for treating only impervious runoff by subtracting *BMP-Volume*$_{PA\text{-}ft3}$ from BMP-Volume$_{ft3}$, and convert BMP volume into inches of impervious surface runoff (*BMP-Volume*$_{(IA\text{-}in)a}$)
6. Calculate percentage of differences between *BMP-Volume*$_{(IA\text{-}in)a}$ and *BMP-Volume*$_{IA\text{-}in}$
Less than
No
Update the value of *BMP-Volume*$_{IA\text{-}in}$ with that of *BMP-Volume*$_{(IA\text{-}in)a}$
Yes
7. Use BMP performance curve to determine the percentage of P load
8. Calculate the cumulative P load reductions by proposed BMP (*BMP-Reduction*$_{lbs\text{-}P}$) in lbs

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 (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) 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 $_{ft^3}$) 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 imperious area for the unknown rainfall depth of *i* inches (see equation 3-6b):

$$\text{BMP-Volume}_{ft^3} = \text{BMP-Volume}_{(IA\text{-}ft^3)i} + \text{BMP-Volume}_{(PA\text{-}ft^3)i} \quad \textbf{(Equation 3-6a)}$$

Where:

BMP-Volume $_{ft^3}$= the available storage volume of the BMP;

BMP-Volume $_{(IA\text{-}ft^3)i}$ = 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 $_{(PA\text{-}ft^3)i}$ = 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 $_{(IA\text{-}ft^3)i}$:

$$\text{BMP-Volume}_{(\text{IA-ft}^3)i} = \text{BMP-Volume}_{\text{ft}^3} - \text{BMP-Volume}_{(\text{PA-ft}^3)i} \quad \textbf{(Equation 3-6b)}$$

To determine $\text{BMP-Volume}_{(\text{IA-ft}^3)i}$, 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 ($\text{BMP-Volume}_{\text{ft}^3}$). 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 $\text{BMP-Volume}_{\text{ft}^3}$ determined in step 2 into inches of runoff from the contributing impervious area ($\text{BMP Volume}_{(\text{IA-in})1}$) using equation 3-7a.

$$\text{BMP-Volume}_{(\text{IA-in})1} = (\text{BMP-Volume}_{\text{ft}^3}/\text{IA (acre)}) \times (12 \text{ in/ft} / 43{,}560 \text{ ft}^2/\text{acre}) \quad \textbf{(Equation 3-7a)};$$

For iterations 2 through n (2…n), convert the $\text{BMP Volume}_{(\text{IA-ft}^3)2\ldots n}$, determined in step 5a below, into inches of runoff from the contributing impervious area ($\text{BMP Volume}_{(\text{IA-in})2\ldots n}$) using equation 3-7b.

$$\text{BMP-Volume}_{(\text{IA-in})2\ldots n} = (\text{BMP-Volume}_{(\text{IA-ft}^3)2\ldots n} / \text{IA (acre)}) \times (12 \text{ in/ft} / 43{,}560 \text{ ft}^2/\text{acre}) \quad \textbf{(Equation 3-7b)};$$

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 (ft^3) from the contributing PA ($\text{BMP Volume}_{\text{PA-ft}^3}$) for a rainfall size equal to the sum of $\text{BMP-Volume}_{(\text{IA-in})1}$, determined in step 3. The runoff volume for each distinct pervious area must be determined.

$$\text{BMP Volume}_{(\text{PA-ft}^3)1\ldots n} = \sum ((\text{PA} \times (\text{runoff depth})_{(\text{PA1, PA2..PAn})} \times (3{,}630 \text{ ft}^3/\text{acre-in}) \quad \textbf{(Equation 3-8)}$$

5) For iteration 1, estimate the portion of BMP Volume that is available to treat runoff from only the IA by subtracting $\text{BMP-Volume}_{\text{PA-ft}^3}$, determined in step 4, from $\text{BMP-Volume}_{\text{ft}^3}$, determined in step 2, and convert to inches of runoff from IA (see equations 3-9a and 3-9b):

$$\text{BMP-Volume}_{(\text{IA-ft}^3)2} = ((\text{BMP-Volume}_{\text{ft}^3} - \text{BMP Volume}_{(\text{PA-ft}^3)1}) \quad \textbf{(Equation 3-9a)}$$

$$\text{BMP-Volume}_{(\text{IA-in})2} = (\text{BMP-Volume}_{(\text{IA-ft}^3)2}/\text{IA (acre)}) \times (12 \text{ in/ft} \times 1 \text{ acre}/43{,}560 \text{ ft}^2) \quad \textbf{(Equation 3-9b)}$$

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 ($\text{BMP-Volume}_{(\text{IA-in})3..n+1}$) by subtracting $\text{BMP Volume}_{(\text{PA-ft}^3)2..n}$, determined in step 4, from $\text{BMP Volume}_{(\text{IA-ft}^3)3..n+1}$, determined in step 5, and by converting to inches of runoff from IA using equation 3-9b):

6) For iteration a (an iteration between 1 and n+1), compare BMP Volume $_{(IA\text{-}in)a}$ to BMP Volume $_{(IA\text{-}in)a\text{-}1}$ determined from the previous iteration (a-1). If the difference in these values is greater than 5% of BMP Volume $_{(IA\text{-}in)a}$ then repeat steps 4 and 5, using BMP Volume $_{(IA\text{-}in)a}$ as the new starting value for the next iteration (a+1). If the difference is less than or equal to 5 % of BMP Volume $_{(IA\text{-}in)a}$ then the permittee may proceed to step 7;

7) Determine the % phosphorus load reduction for the structural BMP (BMP Reduction $_{\%\text{-}P}$) using the appropriate BMP performance curve and the BMP-Volume $_{(IA\text{-}in)n}$ 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 $_{lbs\text{-}P}$) using the BMP Load as calculated from the procedure in Attachment 1 to Appendix F and the percent phosphorus load reduction (BMP Reduction $_{\%\text{-}P}$) determined in step 7 by using equation 3-4:

BMP Reduction $_{lbs\text{-}P}$ = BMP Load x (BMP Reduction $_{\%\text{-}P}$/100) **(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 $_{\%\text{-}P}$) 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 $_{lbs\text{-}P}$)

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 $_{ft^3} = 48{,}155\ ft^3$.

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 $_{(IA\text{-}in)1}$) using equation 3-5a.

BMP Volume $_{(IA\text{-}in)1}$ = (48,155 ft^2/ 11.75 acre) x (12 in/ft /43,560 ft^2/acre)
= 1.13 in

4-1) The total volume of runoff (ft^3) from the contributing PA (BMP Volume $_{PA\text{-}ft^3}$) for a rainfall size equal to the sum of BMP Volume $_{(IA\text{-}in)1}$ 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.

BMP Volume $_{(PA\text{-}ft^3)1}$ = ((3.84 acre x (0.33 in) + (0.96 acre x (0.13 in)) x 3,630 ft^3/acre-in
= 5052 ft^3

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 $_{(PA\text{-}ft^3)1}$, determined in step 4-1, from BMP Volume$_{ft^3}$, determined in step 2, and converted to inches of runoff from IA:

BMP Volume $_{(IA\text{-}ft^3)\,2}$ = 48,155 ft^3 – 5052 ft^3
= 43,103 ft^3
BMP Volume $_{(IA\text{-}in)\,2}$ = (43,103 ft^3/11.75 acre) x (12 in/ft x 1 acre/43,560 ft^2)
= 1.01 in

Solution continued:

6-1) The % difference between BMP Volume $_{(IA\text{-}in)\,2}$, 1.01 in, and BMP Volume $_{(IA\text{-}in)1}$, 1.13 in is determined and found to be significantly greater than 5%:

% Difference = ((1.13 in – 1.01 in)/1.01 in) x 100
= 12%

Therefore, steps 4 through 6 are repeated starting with BMP Volume $_{(IA\text{-}in)\,2}$ = 1.01 in.

Solution Iteration 2

4-2) BMP-Volume $_{(PA\text{-}ft^3)2}$ = ((3.84 acre x 0.21 in) + (0.96 acre x 0.12 in)) x 3,630 ft^3/acre-in
= 3,358 ft^3

5-2) BMP-Volume $_{(IA\text{-}ft^3)\,3}$ = 48,155 ft^3 – 3,358 ft^3
= 44,797 ft^3
BMP-Volume $_{(IA\text{-}in)\,3}$ = (44,797 ft^3/11.75 acre) x (12 in/ft x 1 acre/43,560 ft^2)
= 1.05 in

6-2) % Difference = ((1.05 in – 1.01 in)/1.05 in) x 100
= 4%

The difference of 4% is acceptable.

7) The % phosphorus load reduction for the infiltration basin (BMP Reduction $_{\%\text{-}P}$) is determined by using the infiltration basin performance curve for an infiltration rate of 0.27 in/hr and the treatment volume (BMP-Volume $_{Net\ IA\text{-}in}$ = 1.05 in) calculated in step 5-2 and is **BMP Reduction $_{\%\text{-}P}$ = 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 $_{\%\text{-}P}$ = 93% for IR = 0.27 in/hr and BMP Reduction $_{\%\text{-}P}$ = 95% for IR = 0.52 in/hr).

8) The cumulative phosphorus load reduction in pounds of phosphorus (BMP-Reduction $_{lbs\text{-}P}$) for the proposed infiltration basin is calculated by using equation 3-2 with the BMP Load and the P $_{target}$ of 93%.
BMP-Reduction $_{lbs\text{-}P}$ = BMP Load x (P $_{target}$ /100) **(Equation 3-2)**

Using Table 3-1, the BMP load is calculated:
BMP Load = (IA x impervious cover phosphorus export loading rate for industrial)
+ (PA $_{HSG\,D}$ x pervious cover phosphorus export loading rate for HSG D)
+ (PA $_{HSG\,C}$ x pervious cover phosphorus export loading rate for HSG C)

Solution continued:

= (11.75 acre x 1.96 lbs/acre/yr) + (3.84 acre x 0.37 lbs/acre/yr)
+ (0.96 acre x 0.21 lbs/acre/yr)
= 24.65 lbs/yr

BMP-Reduction $_{lbs\text{-}P}$ = 24.22 lbs/yr x 93/100 = **22.93 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 ft^3) 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 $_{\%\text{-}P}$) 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 $_{lbs\text{-}P}$) 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:
   Storage Volume $_{IA\text{-}in}$ = (668.4 ft^3/(0.75 acre x 43.560 ft^2/acre)) x 12 inch/ft
   = 0.25 inches

2. Determine the ratio of the contributing impervious area to the receiving pervious area:
   IA:PA = 0.75 acres/0.09 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 $_{IA\text{-}in}$	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 $_{lbs\text{-}P}$) is calculated using Equation 3-2. The BMP Load is first determined using the method described above.

Solution continued:

BMP Load = IA x phosphorus export loading rate for commercial IA (see Table 3-1)
= 0.75 acres x 1.78 lbs/acre/yr
= 1.34 lbs/yr

BMP Reduction $_{lbs-P}$ = BMP Load x (BMP Reduction $_{\%-P}$/100)

BMP Reduction $_{lbs-P}$ = 1.34 lbs/yr x (39/100)
= **0.53 lbs/yr**

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:

2. 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%

3. 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.

BMP Reduction $_{lbs-P}$ = BMP Load x (BMP Reduction $_{\%-P}$/100)
For PA of 0.09 acres HSG C the BMP Reduction $_{lbs-P}$ is calculated as follows:
BMP Reduction $_{lbs-P(0.09ac- HSG C)}$ = 1.34 lbs/yr x (7/100)
= **0.09 lbs/yr**
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 $_{\%\text{-}P}$) 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 $_{lbs\text{-}P}$).

Solution:

1. Determine the area of IA to be converted to PA:
   New PA = (((3.7 mi x 4 ft) + (3.2 mi x 4 ft)) x 5280 ft/mi)/43,560 ft^2/acre
   = 3.35 acres

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.
   BMP Load = IA x phosphorus export loading rate for MDR IA (see Table 3-1)
   = 3.35 acres x 1.96 lbs/acre/yr
   = 6.57 lbs/yr
4. The cumulative phosphorus load reduction in pounds of phosphorus for the IA conversion (BMP-Reduction $_{lbs\text{-}P}$) is calculated using Equation 3-2.
   BMP Reduction $_{lbs\text{-}P}$ = BMP Load x (BMP Reduction $_{\%\text{-}P}$/100)
   BMP Reduction $_{lbs\text{-}P}$ = 6.57 lbs/yr x (94.1/100)
   = 6.18 lbs/yr

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)

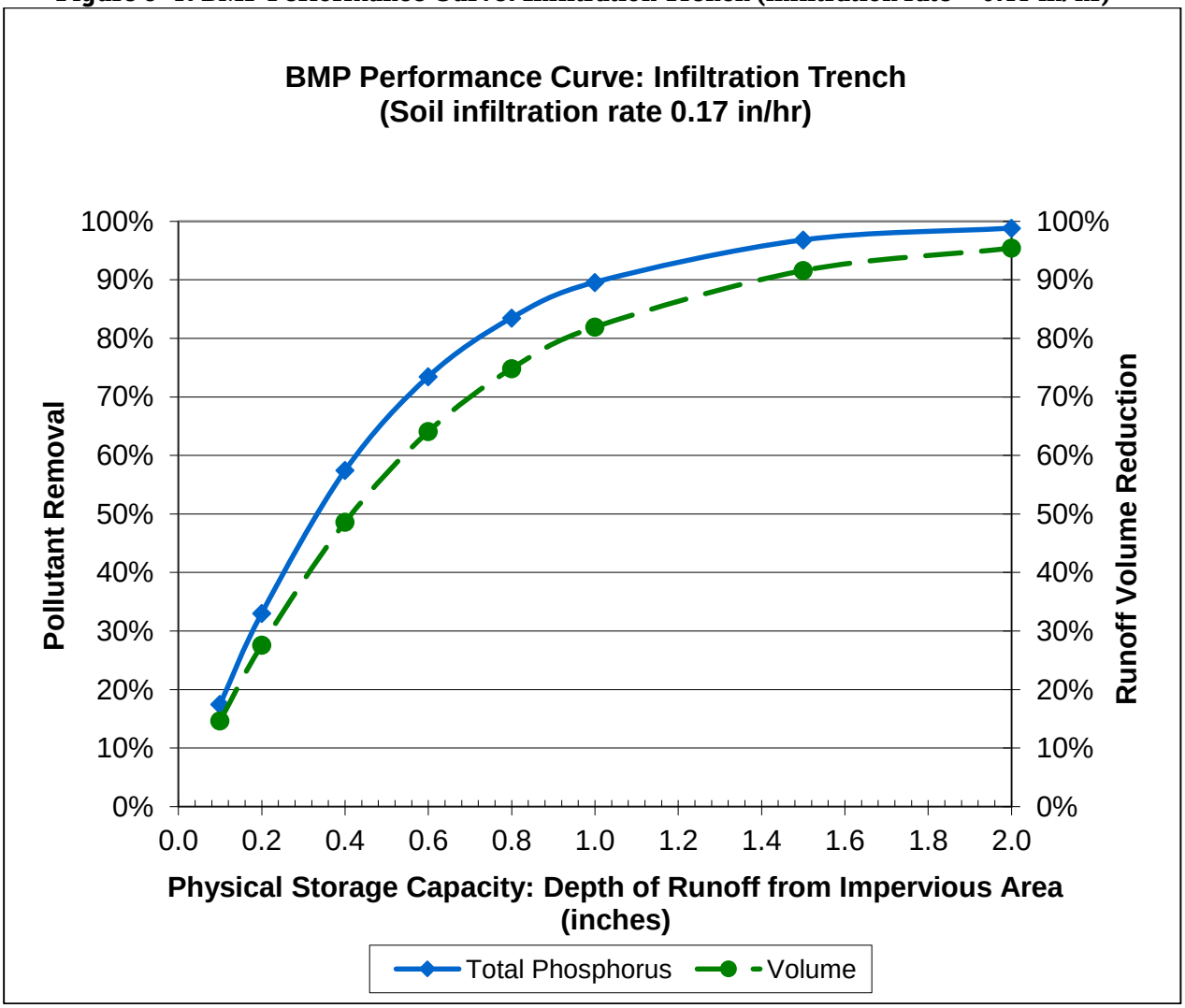


Table 3- 5: Infiltration Trench (IR = 0.27 in/hr) BMP Performance Table

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)

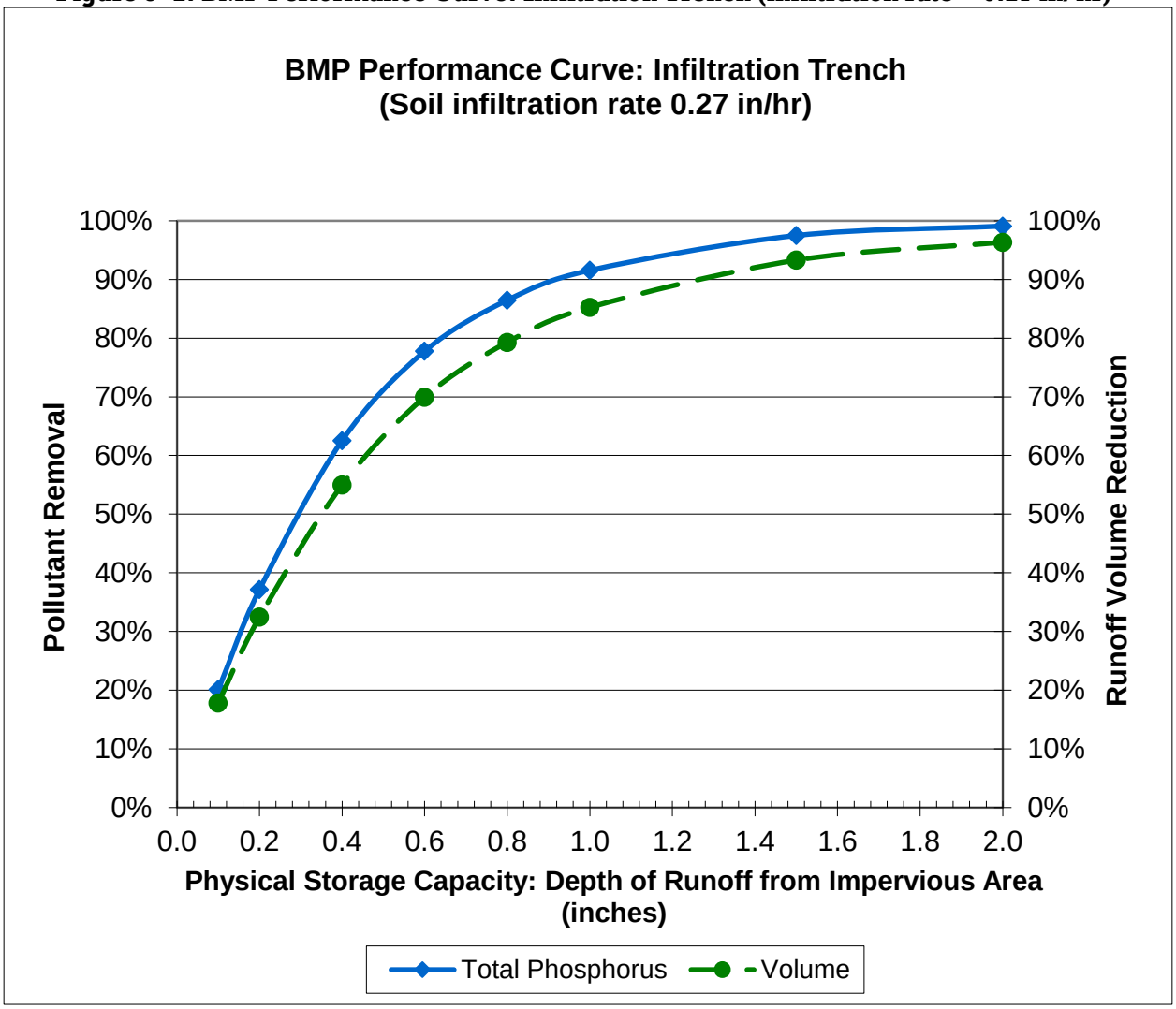


Table 3- 6: Infiltration Trench (IR = 0.52 in/hr) BMP Performance Table

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)

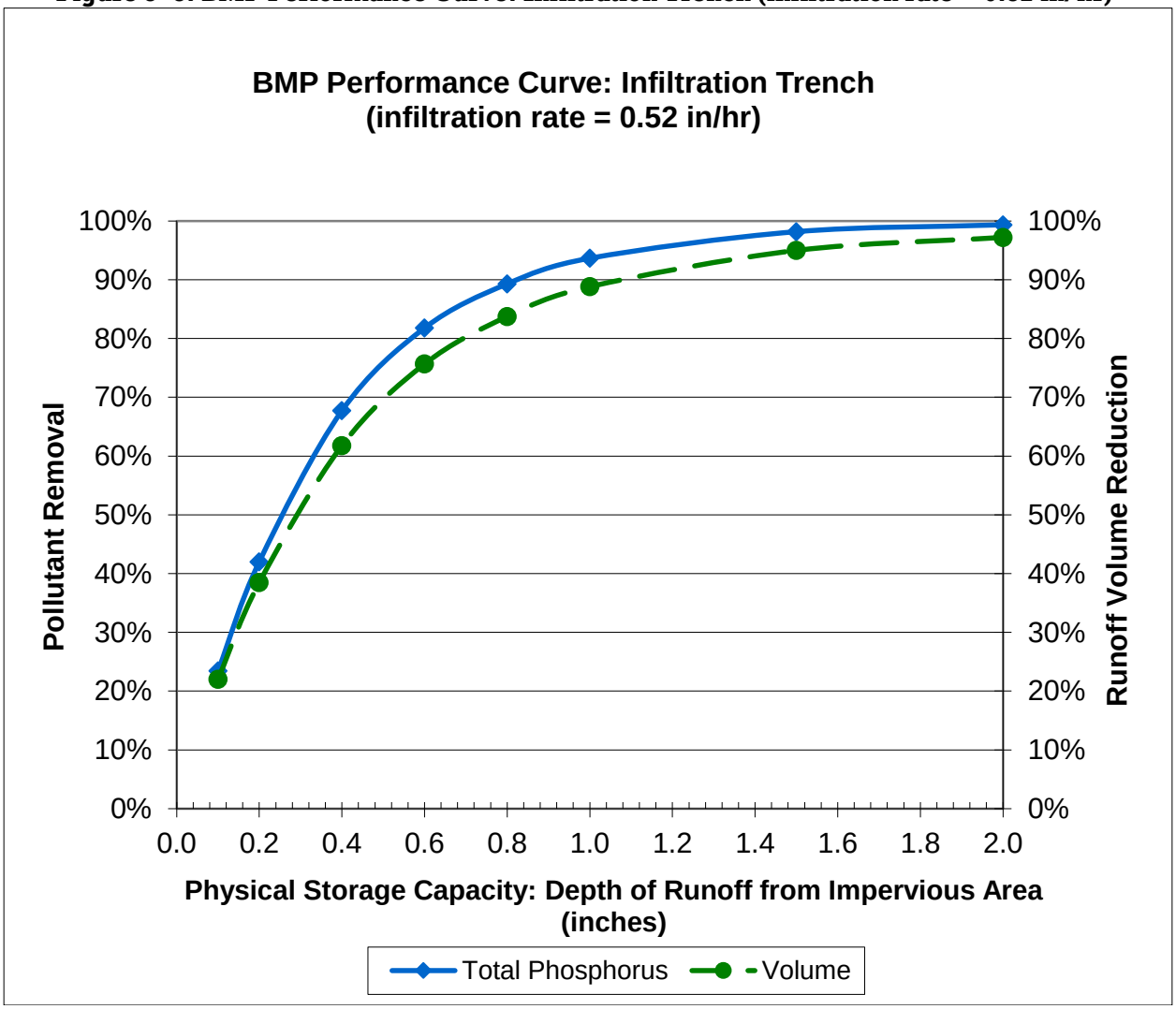


Table 3- 7: Infiltration Trench (IR = 1.02 in/hr) BMP Performance Table

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)

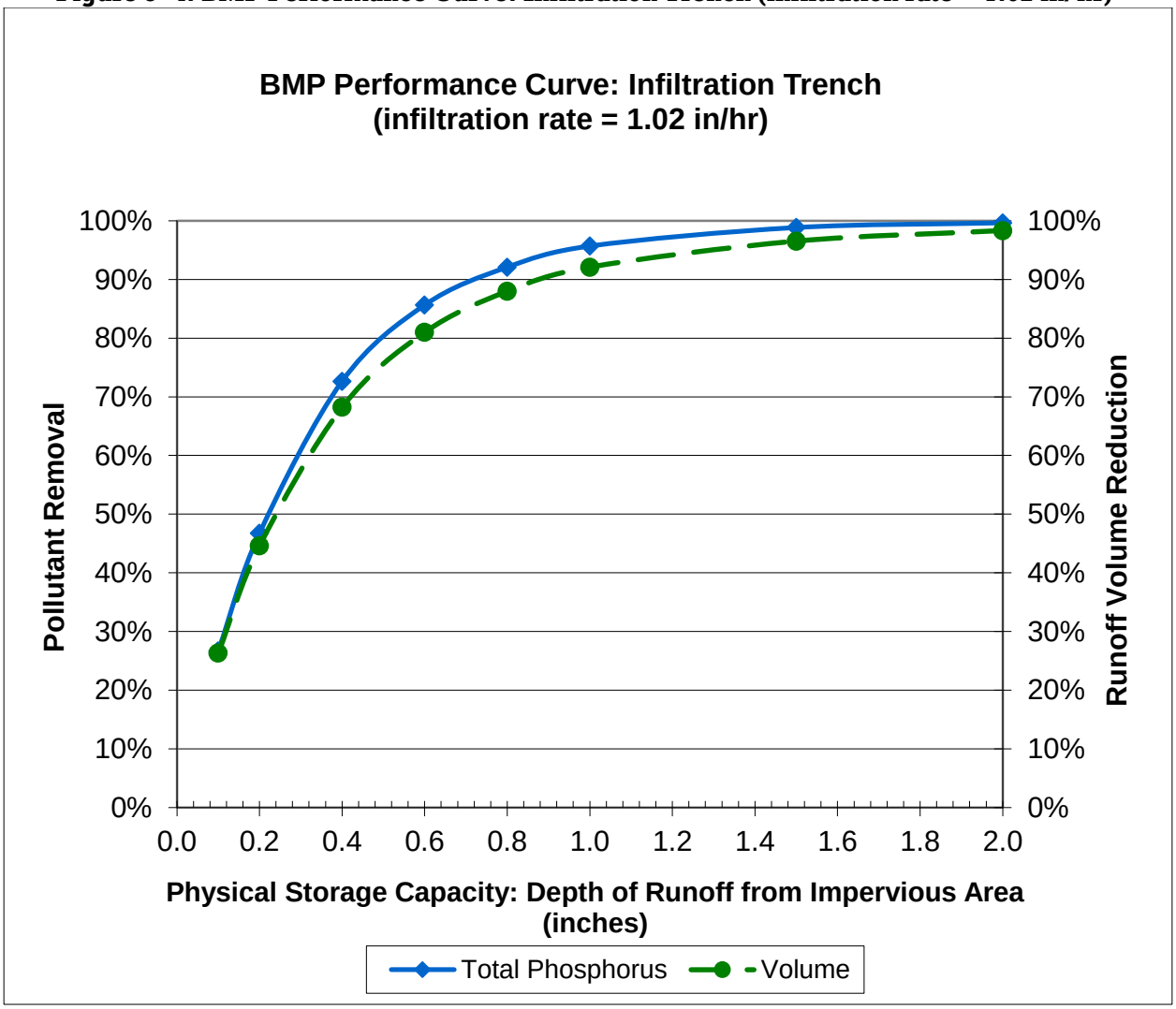


Table 3- 8: Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table

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)

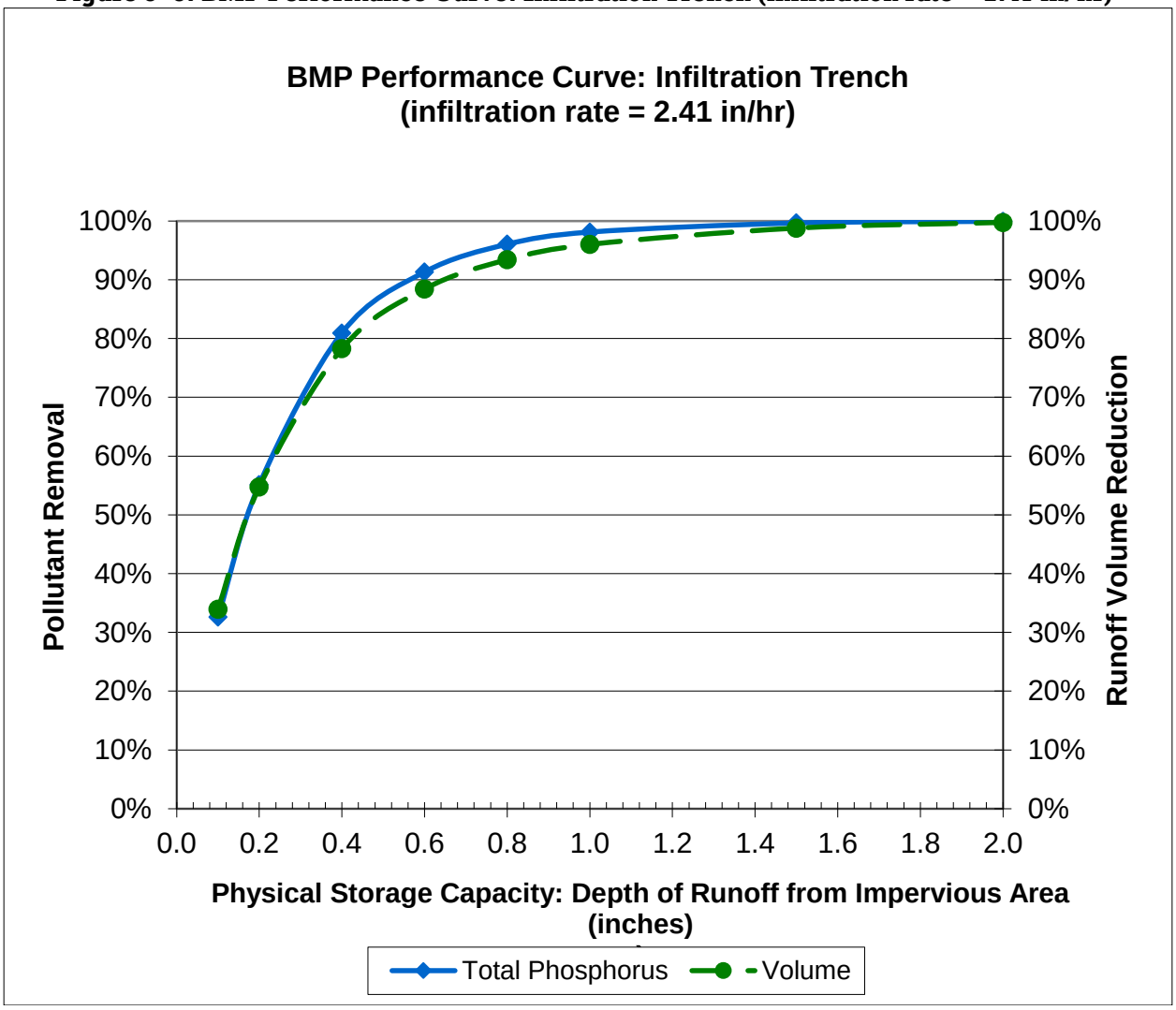


Table 3- 9: Infiltration Trench (8.27 in/hr) BMP Performance Table

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)

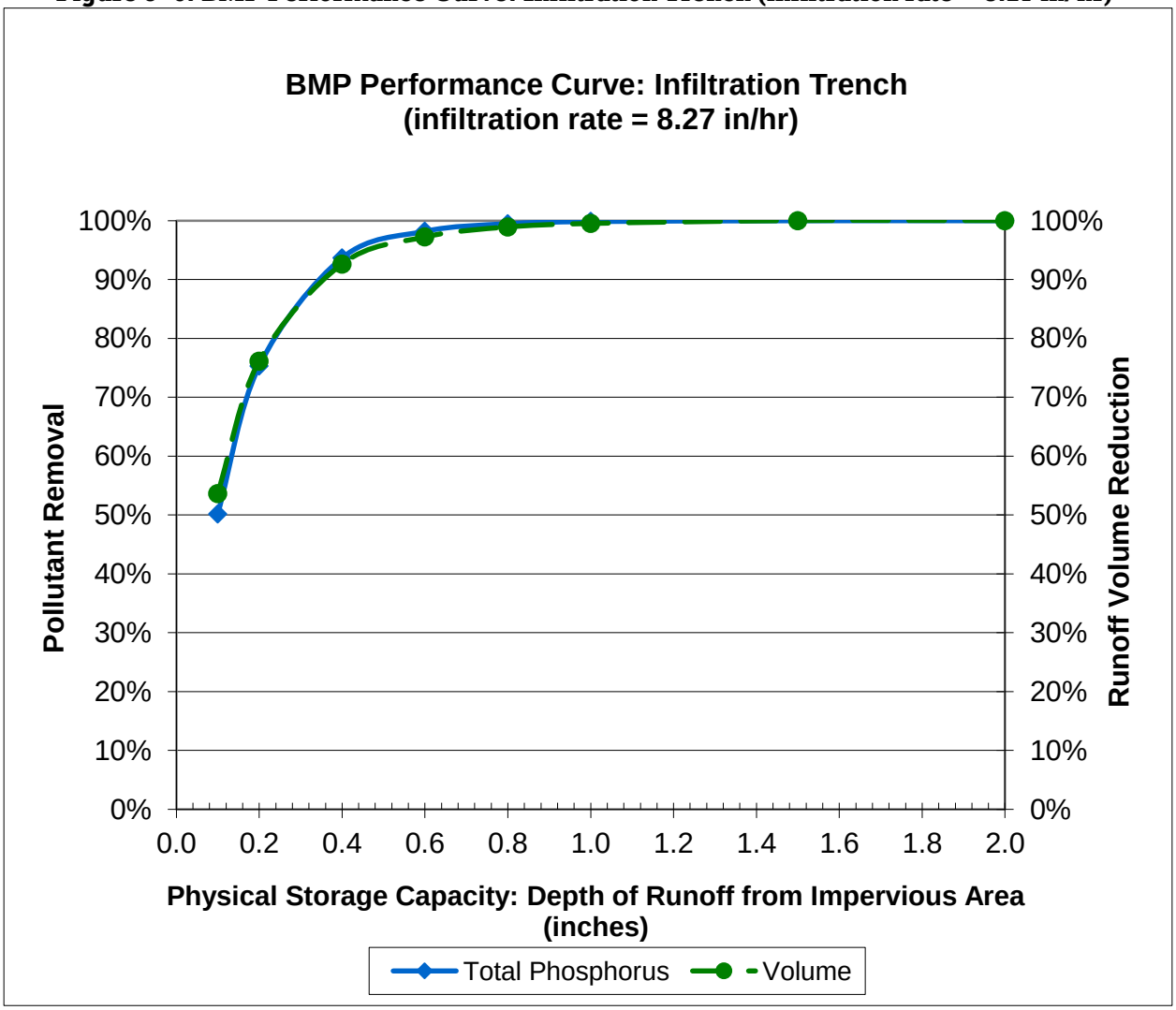


Table 3- 10: Infiltration Basin (0.17 in/hr) BMP Performance Table

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)

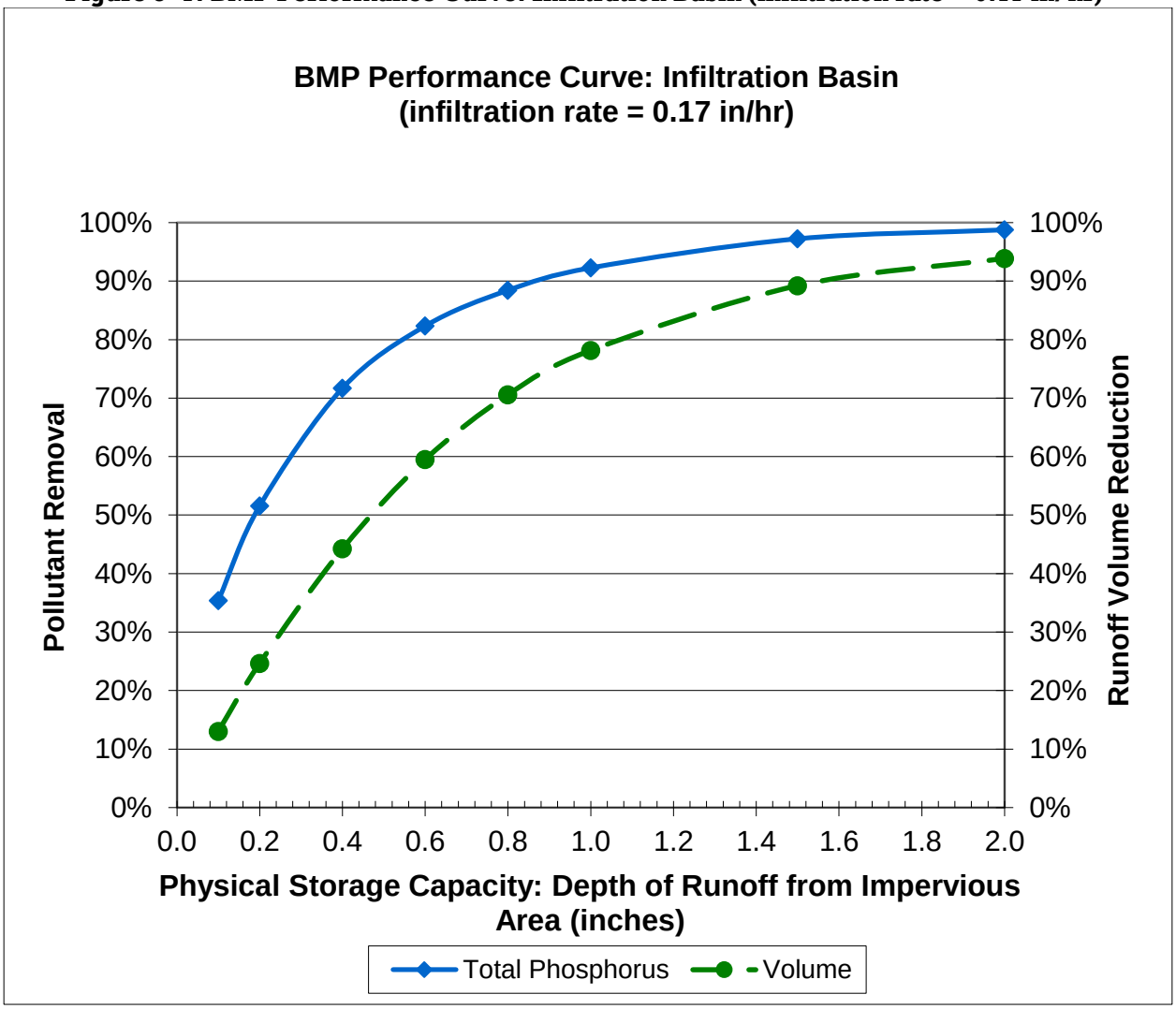


Table 3- 11: Infiltration Basin (0.27 in/hr) BMP Performance Table

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)

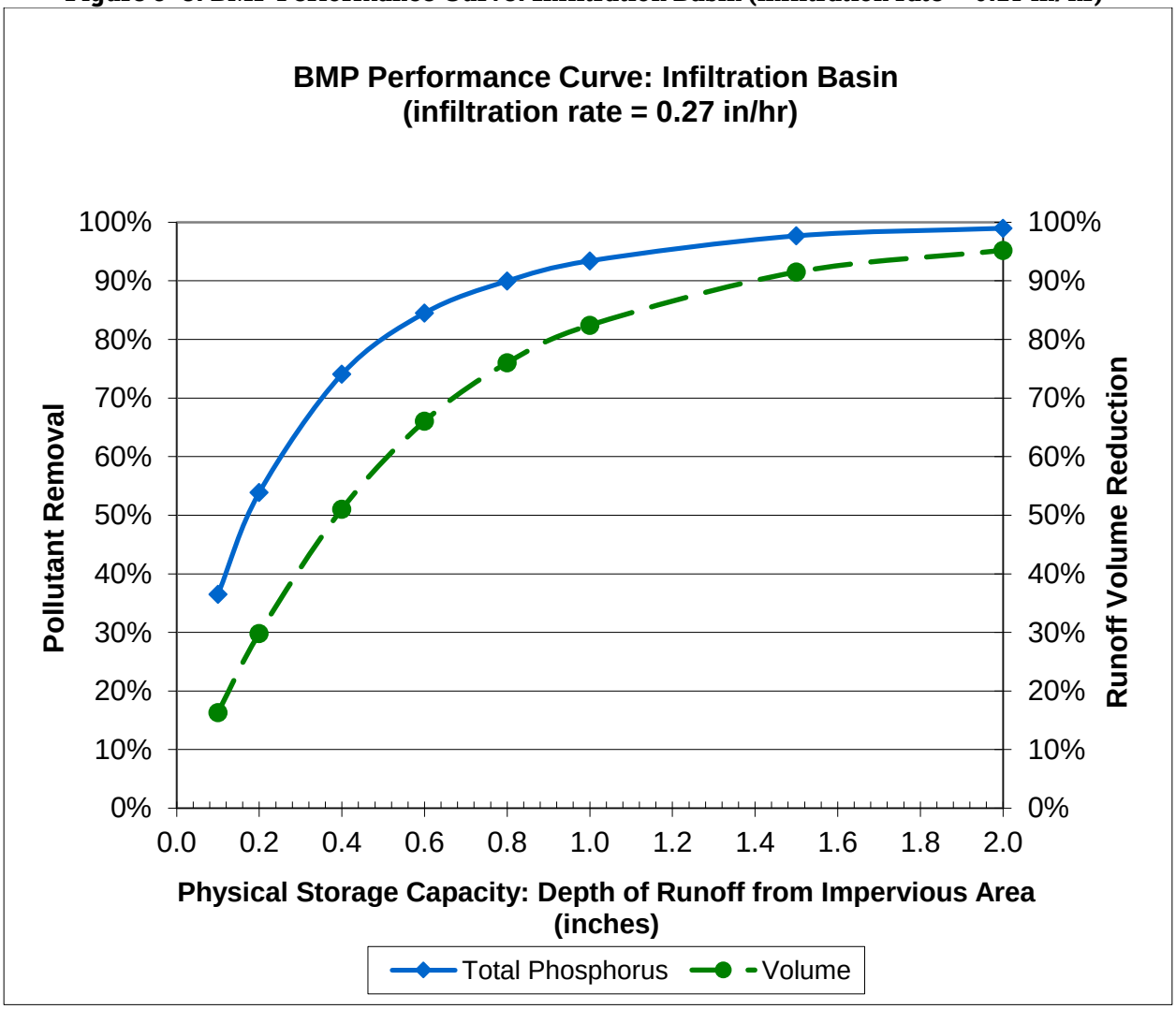


Table 3- 12: Infiltration Basin (0.52 in/hr) BMP Performance Table

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)

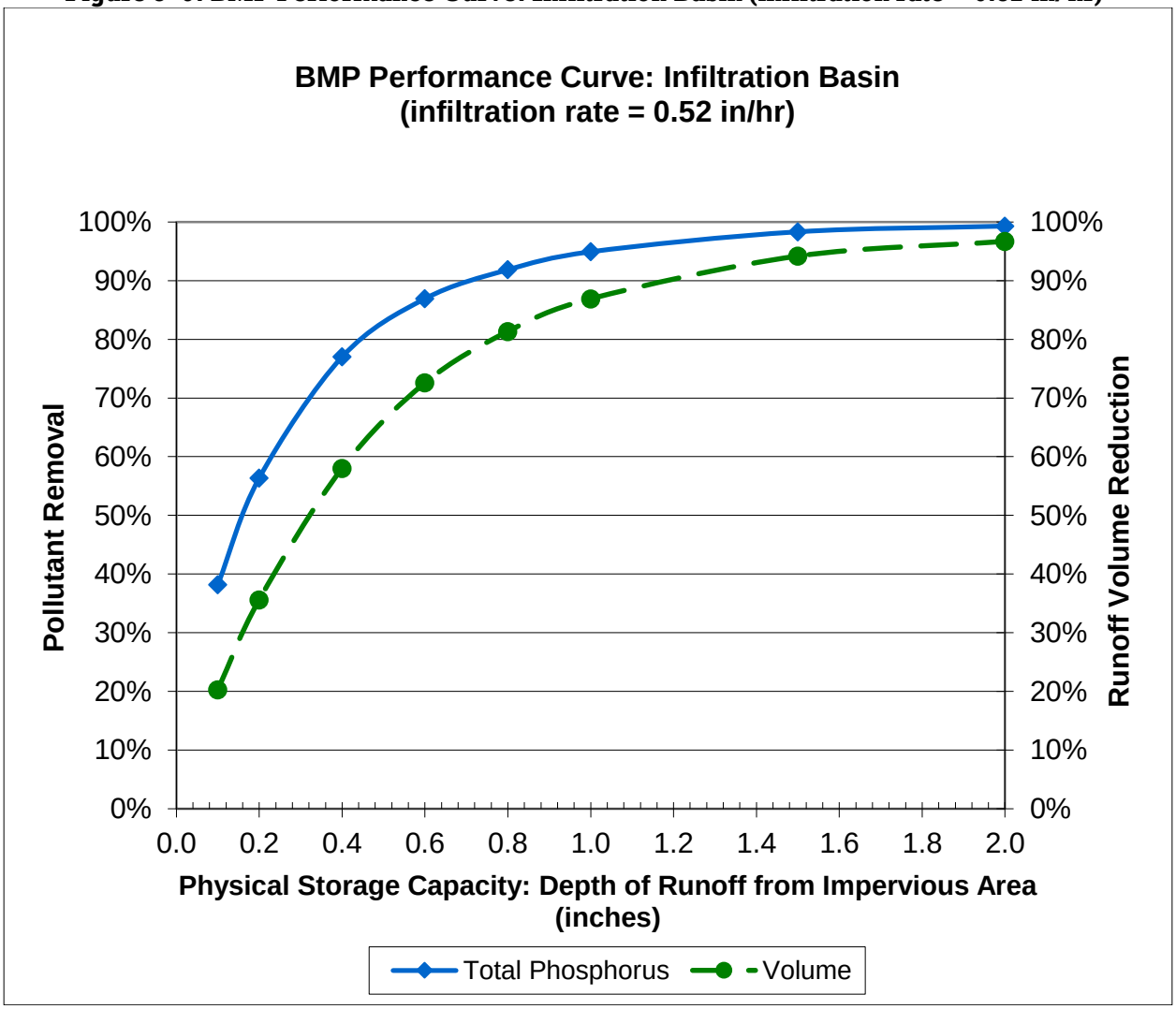


Table 3- 13: Infiltration Basin (1.02 in/hr) BMP Performance Table

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)

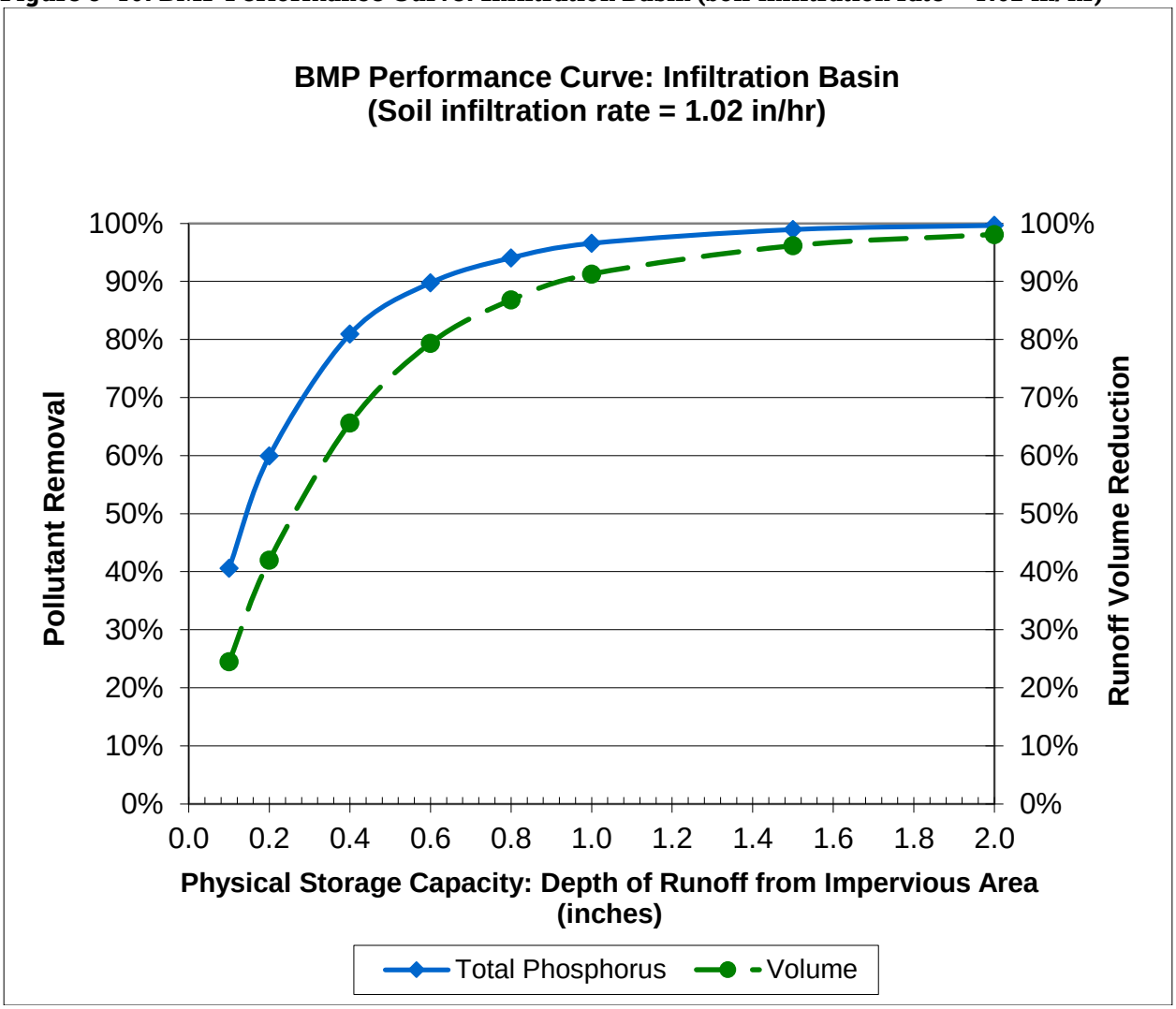


Table 3- 14: Infiltration Basin (2.41 in/hr) BMP Performance Table

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)

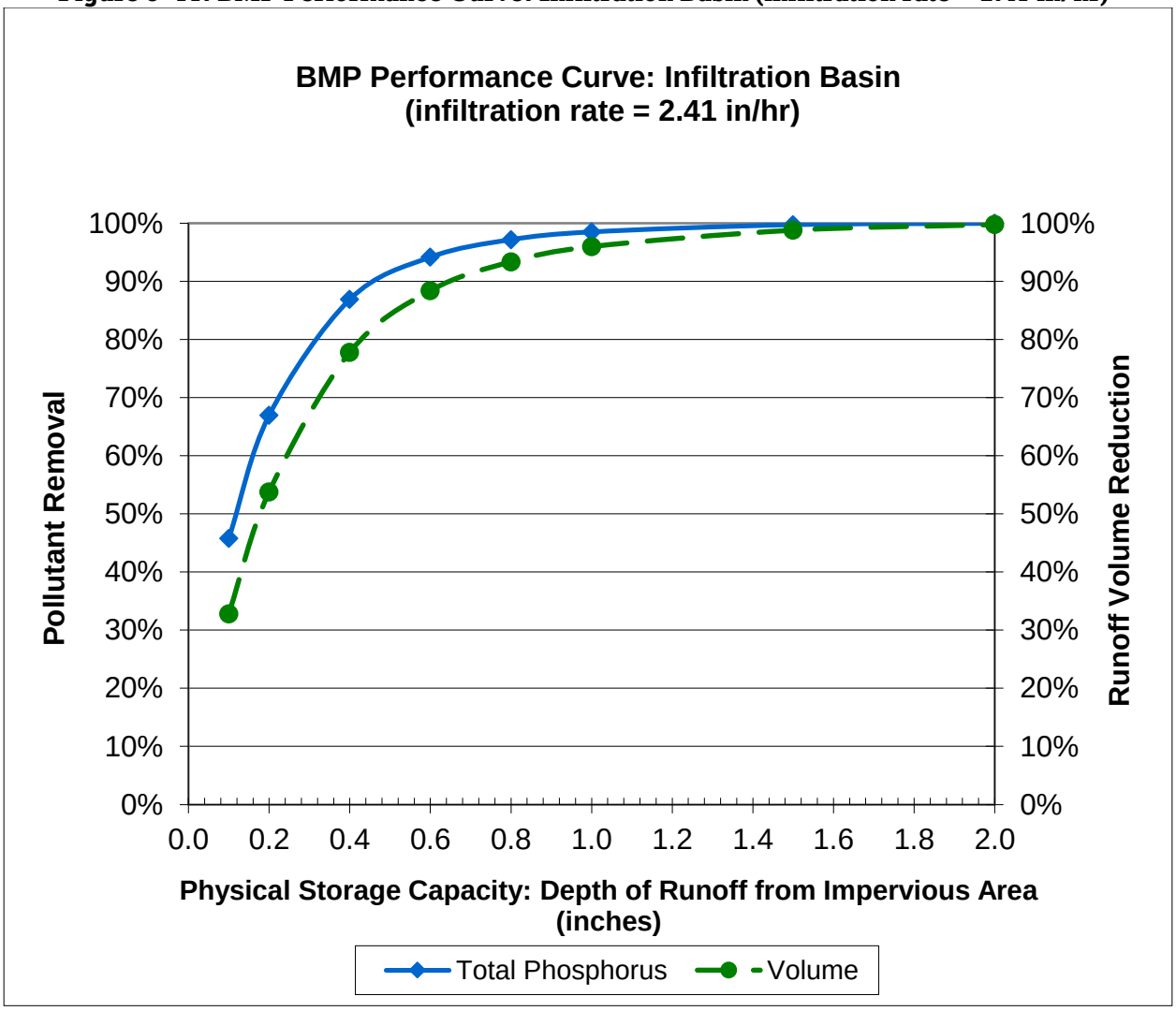


Table 3- 15: Infiltration Basin (8.27 in/hr) BMP Performance Table

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)

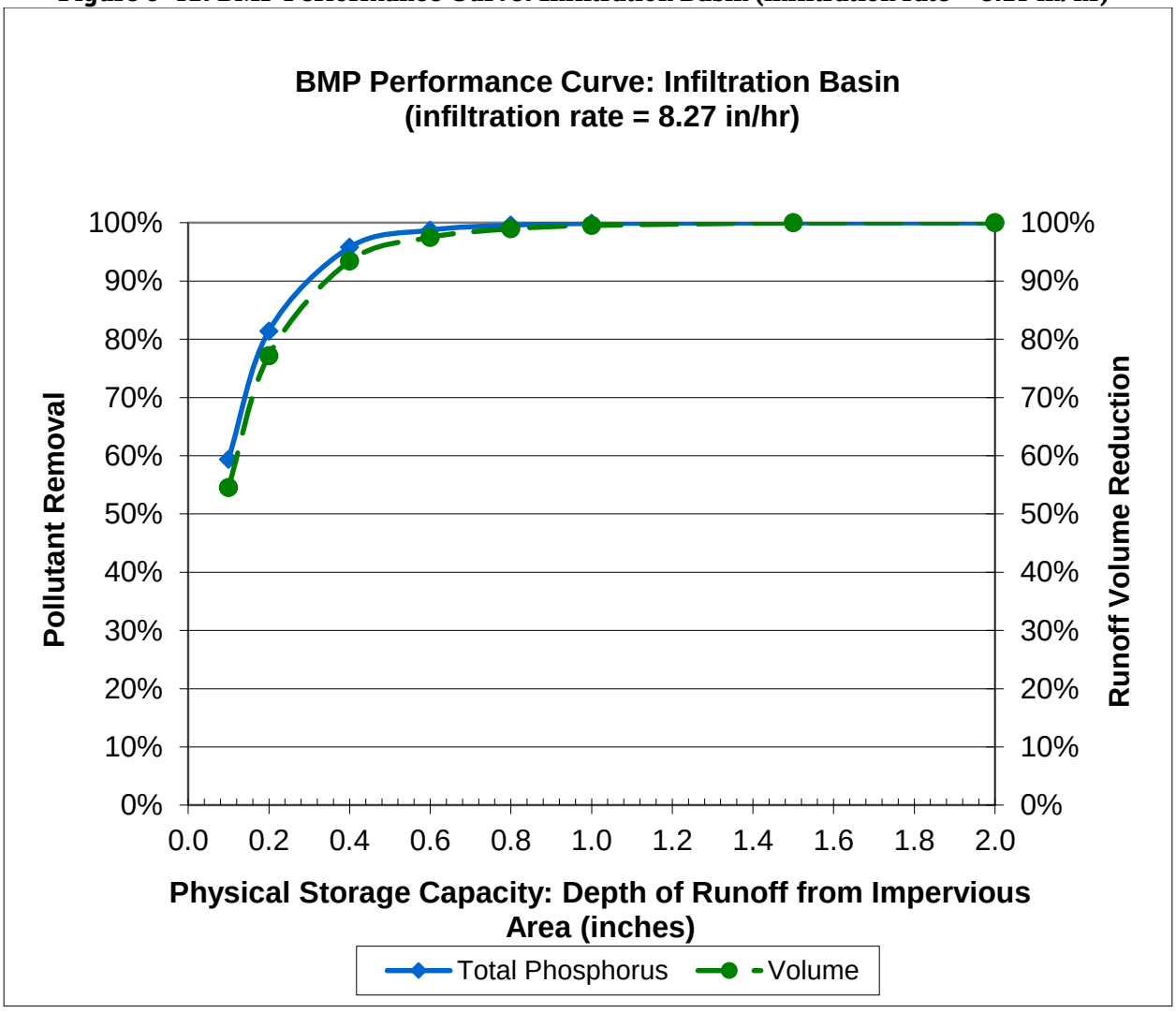


Table 3- 16: Biofiltration BMP Performance Table

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

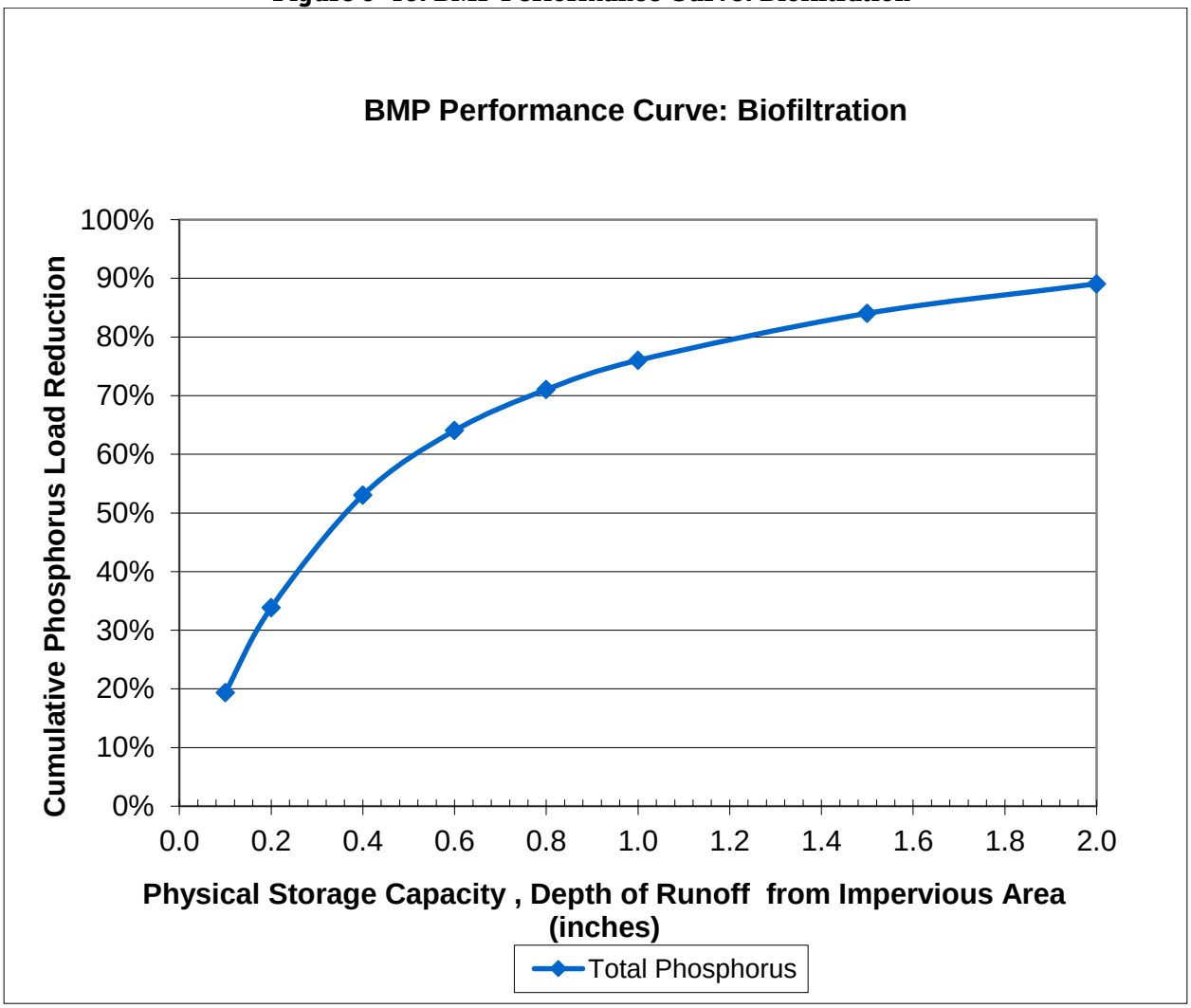


Table 3- 17: Gravel Wetland BMP Performance Table

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

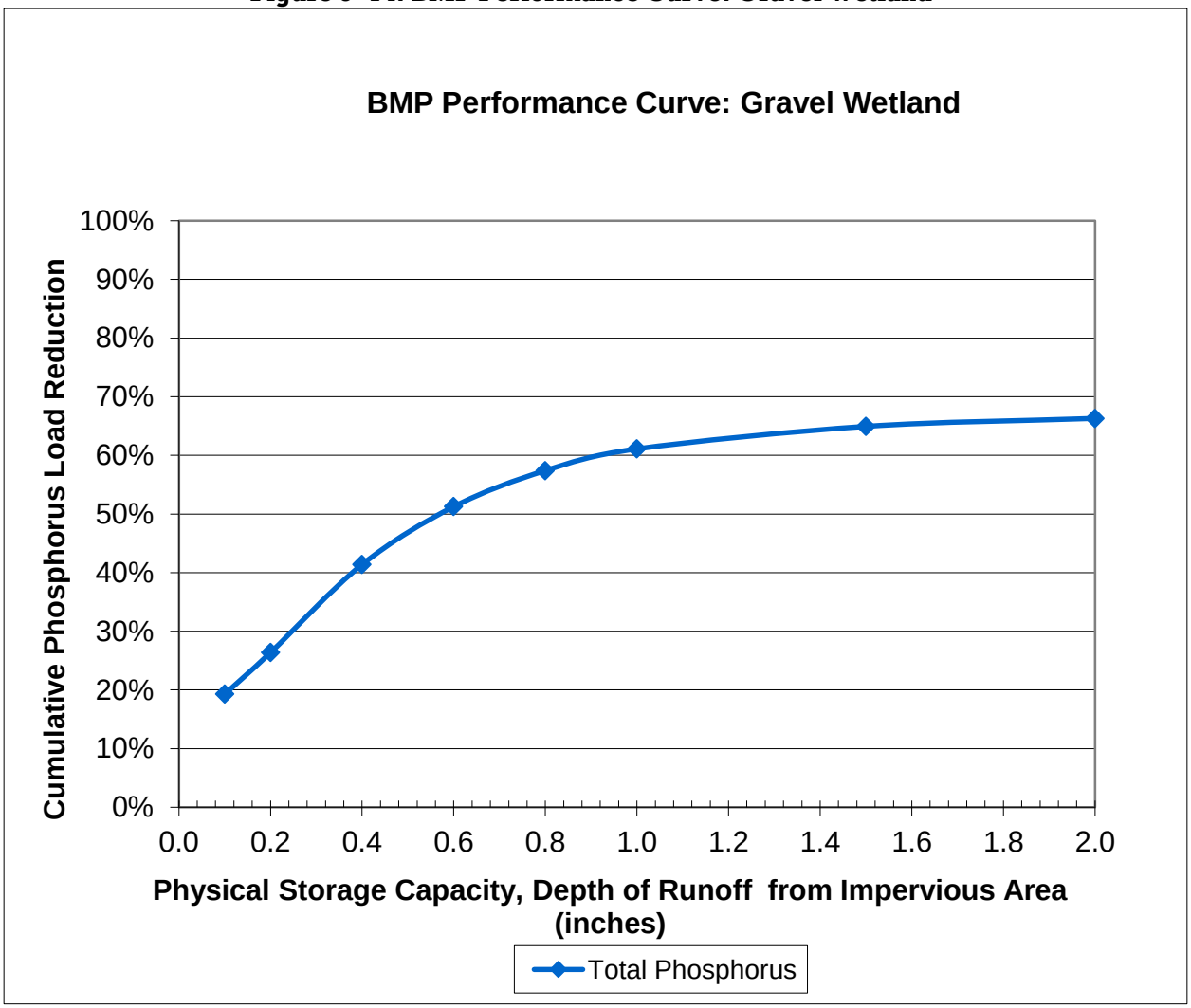


Table 3- 18: Porous Pavement BMP Performance Table

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

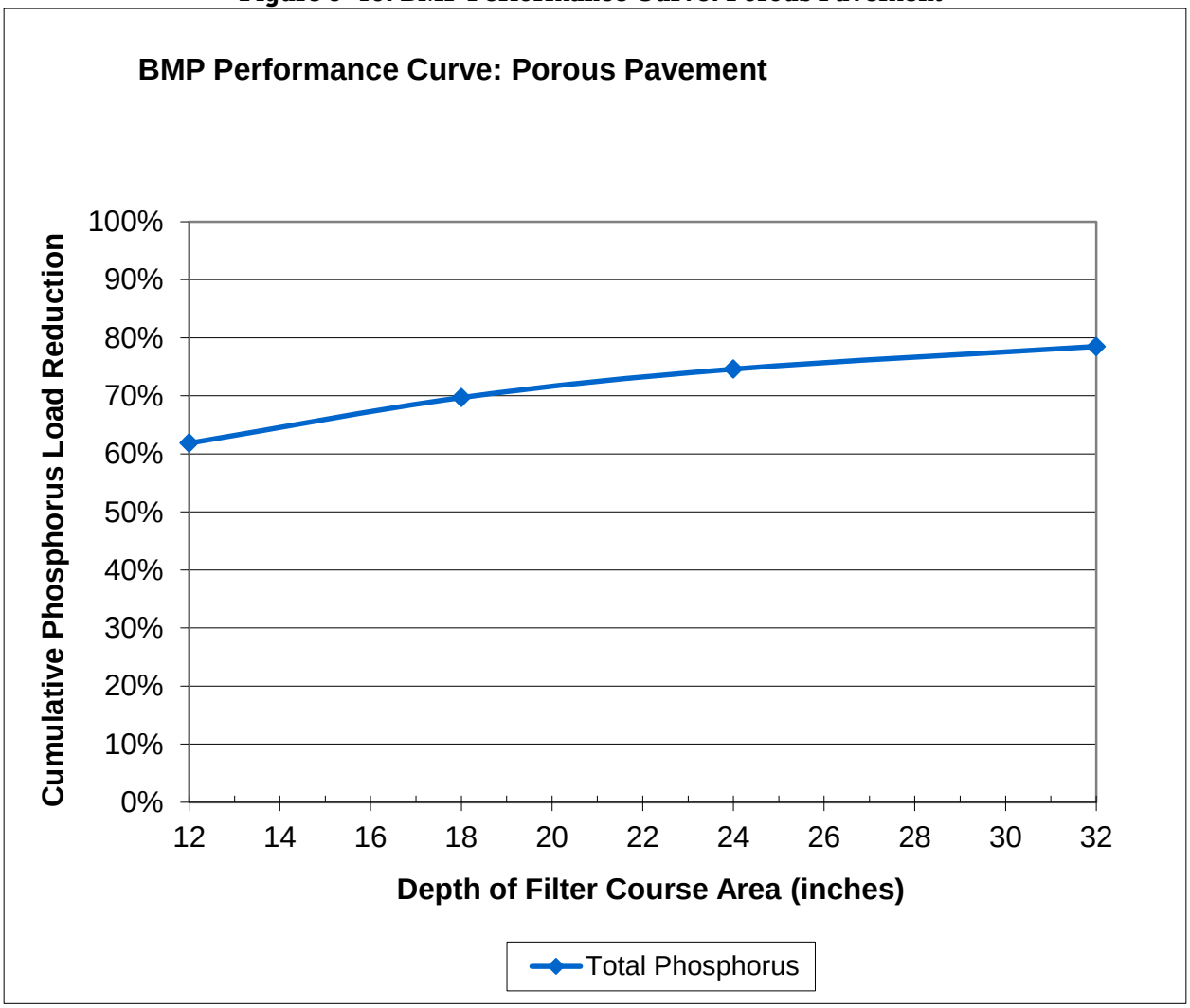


Table 3- 19: Wet Pond BMP Performance Table

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

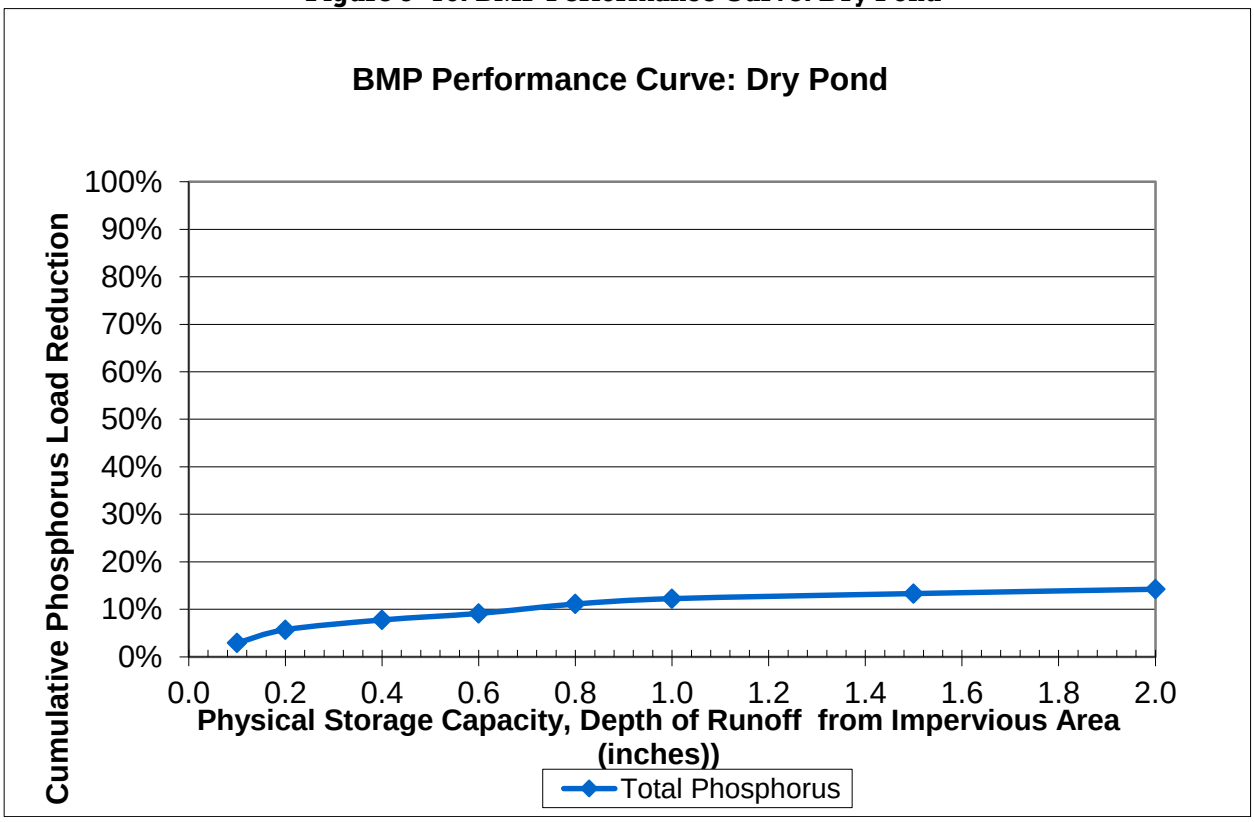


Table 3- 21: Grass Swale BMP Performance Table

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

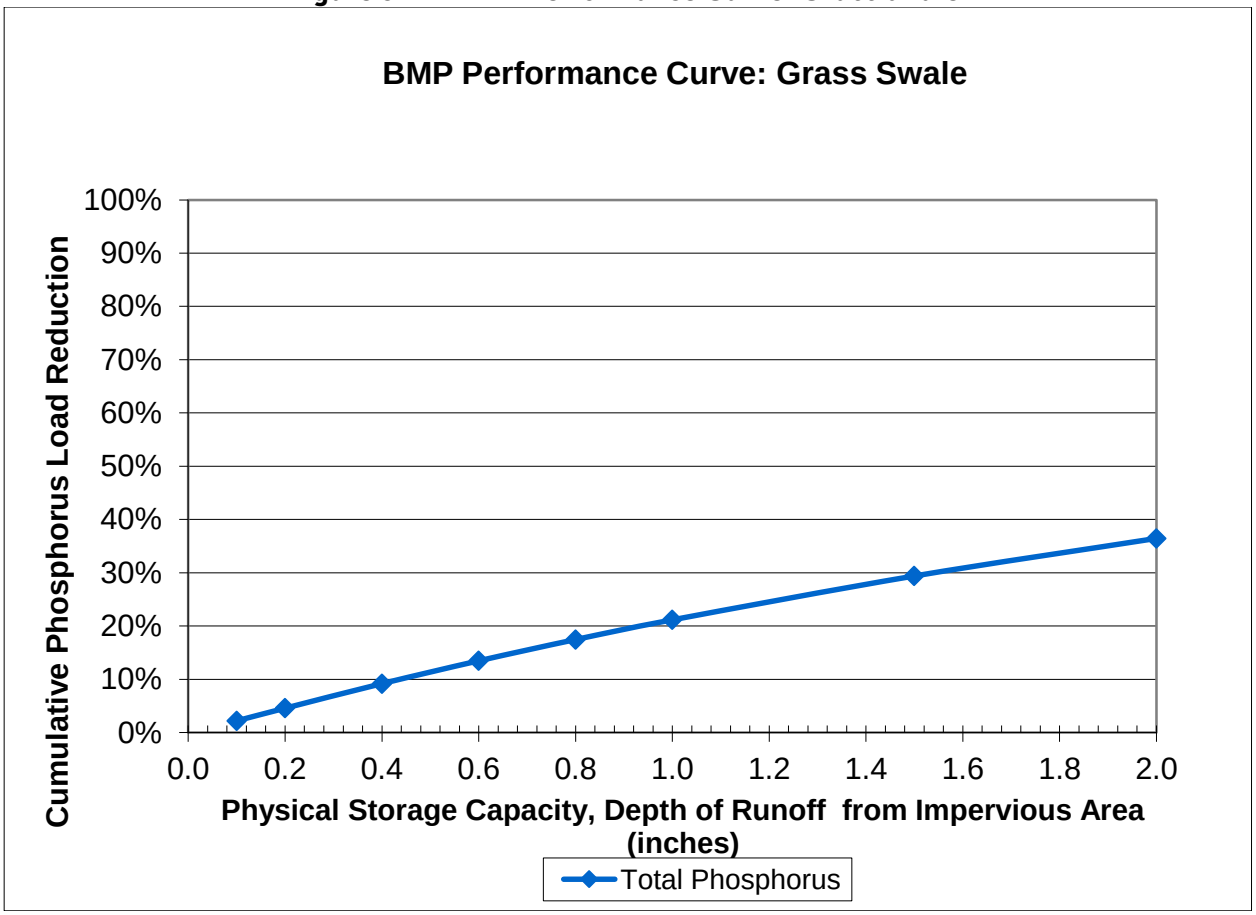


Table 3- 22: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1

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

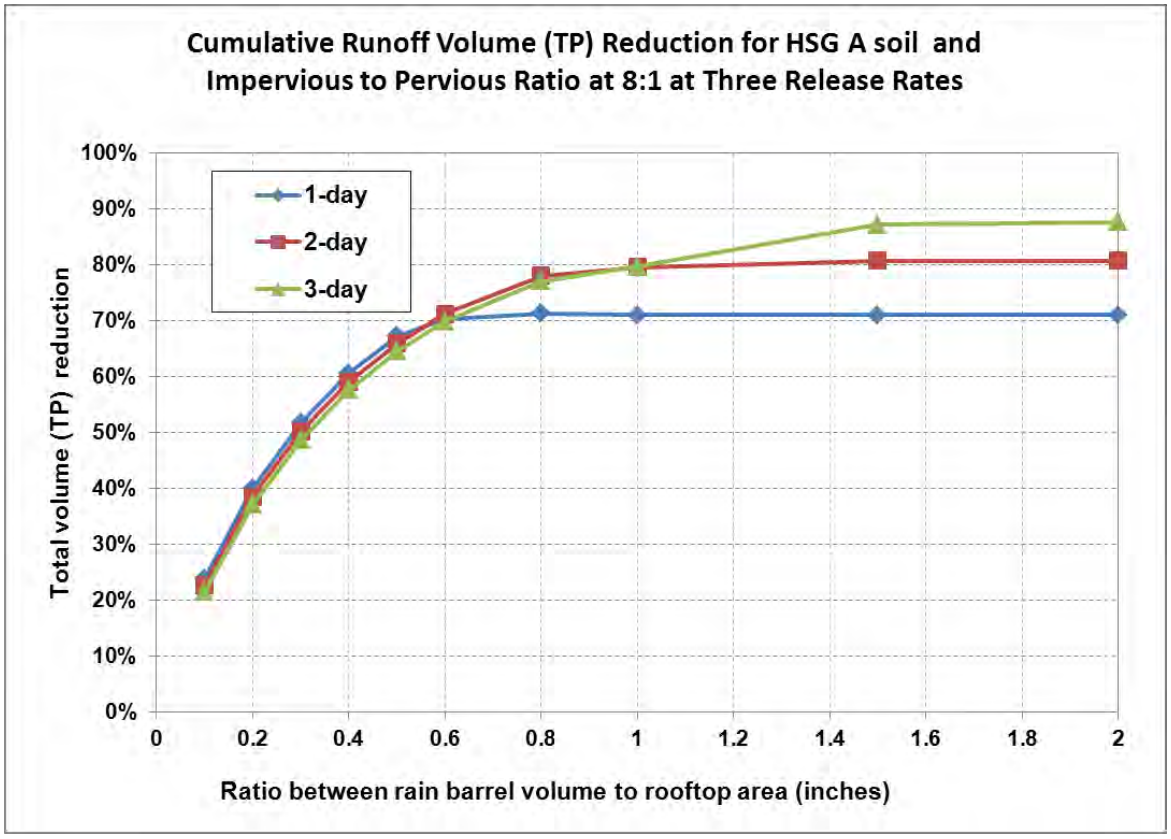


Figure 3- 19: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1 for HSG B Soils

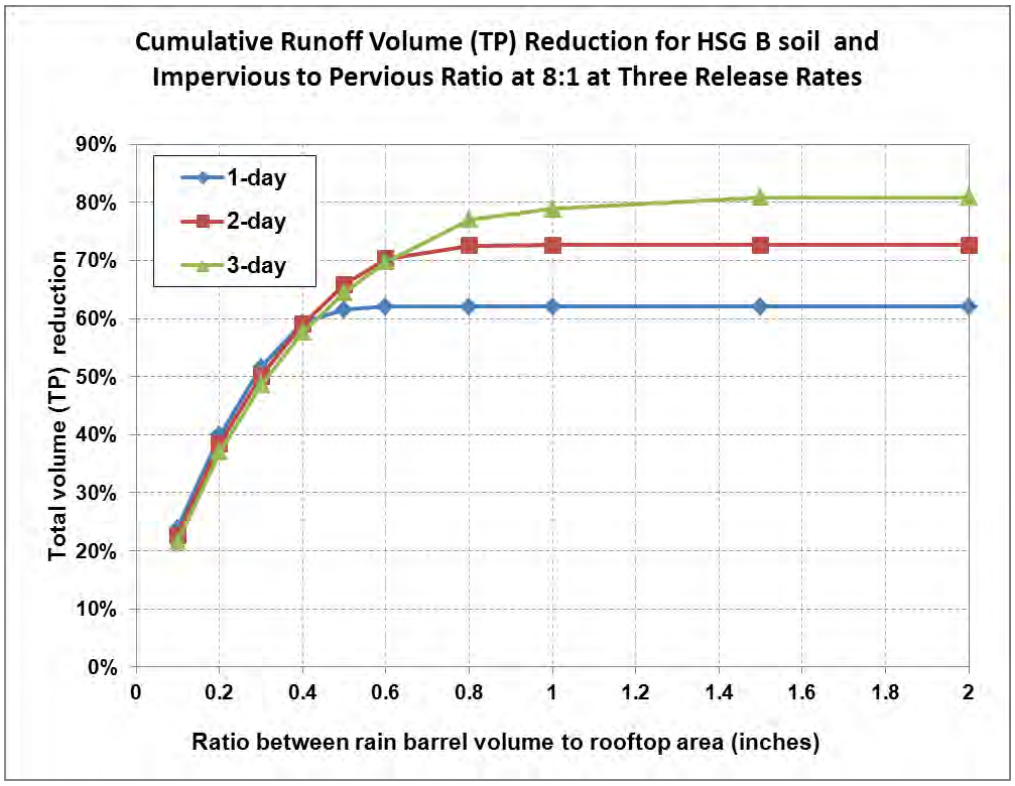


Figure 3- 20: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1 for HSG C Soils

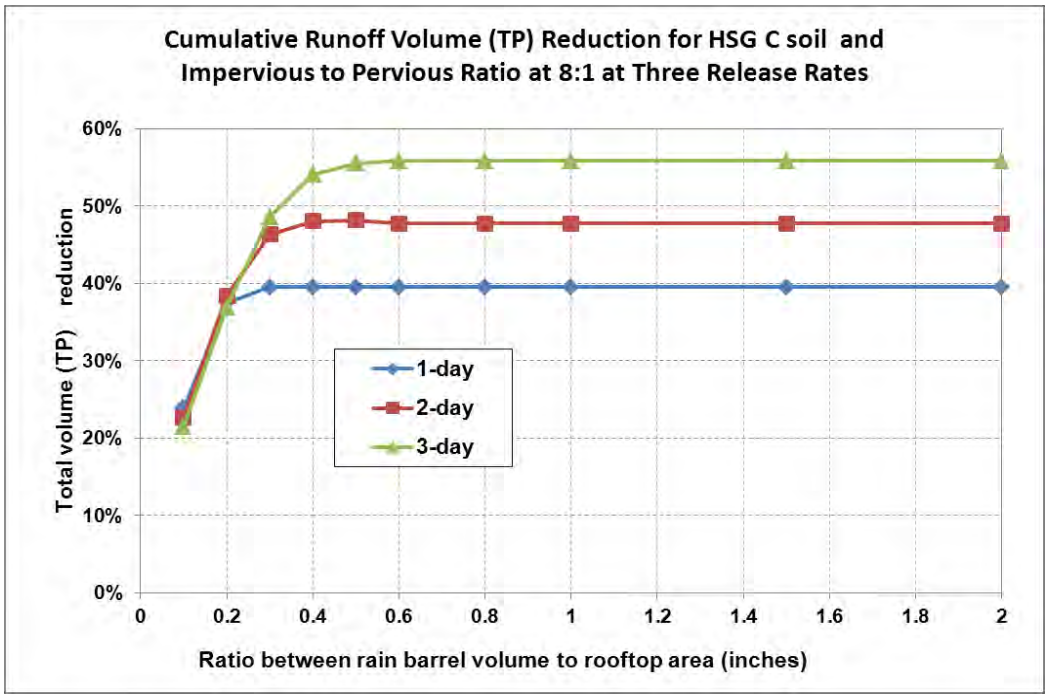


Figure 3- 21: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 8:1 for HSG D Soils

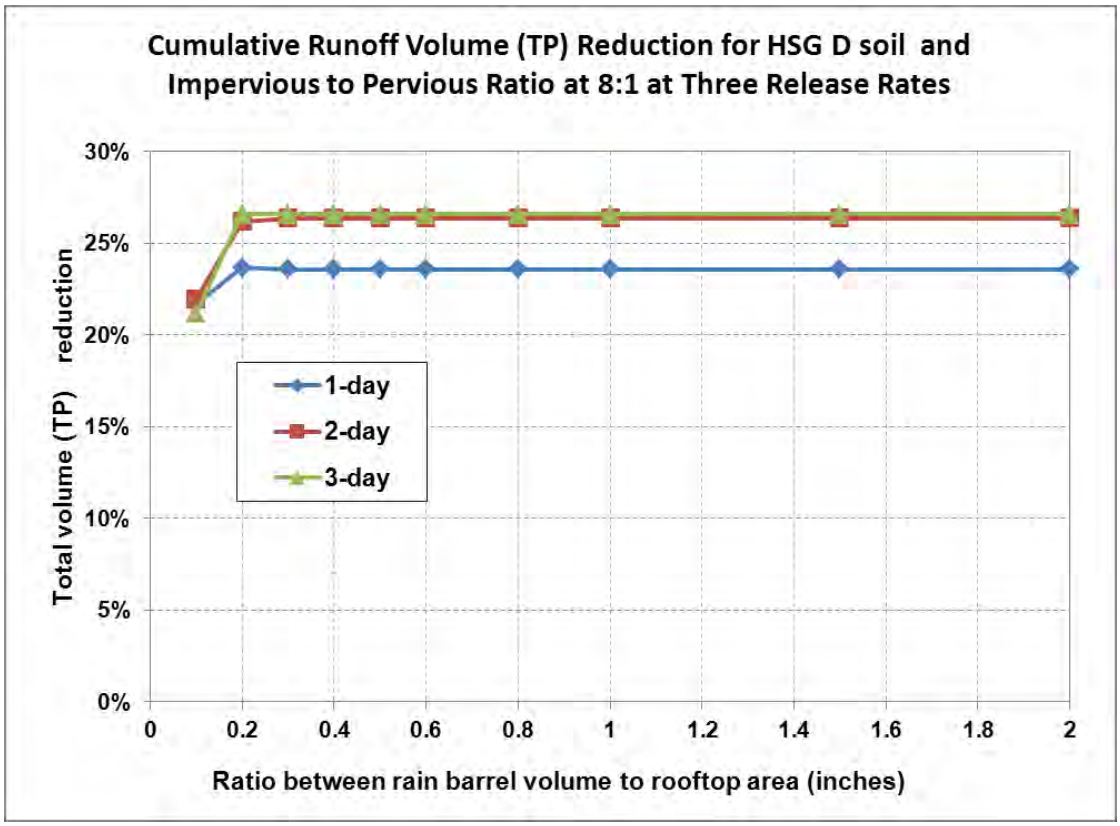


Table 3- 23: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1

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

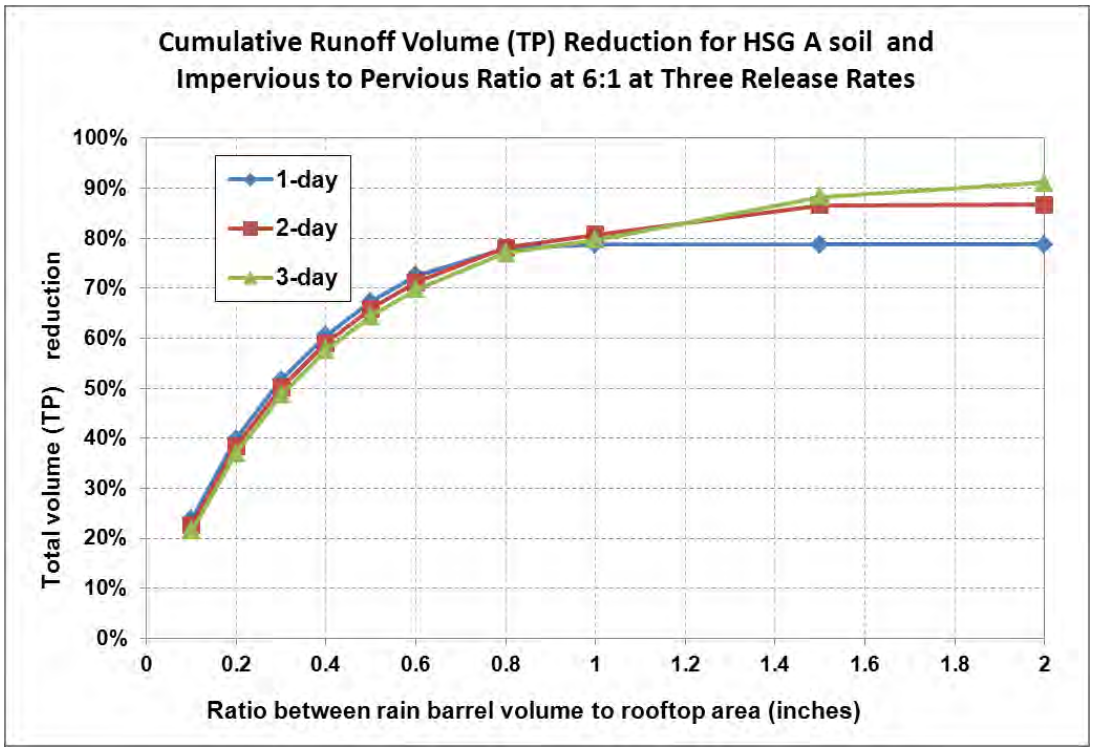


Figure 3- 23: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1 for HSG B Soils

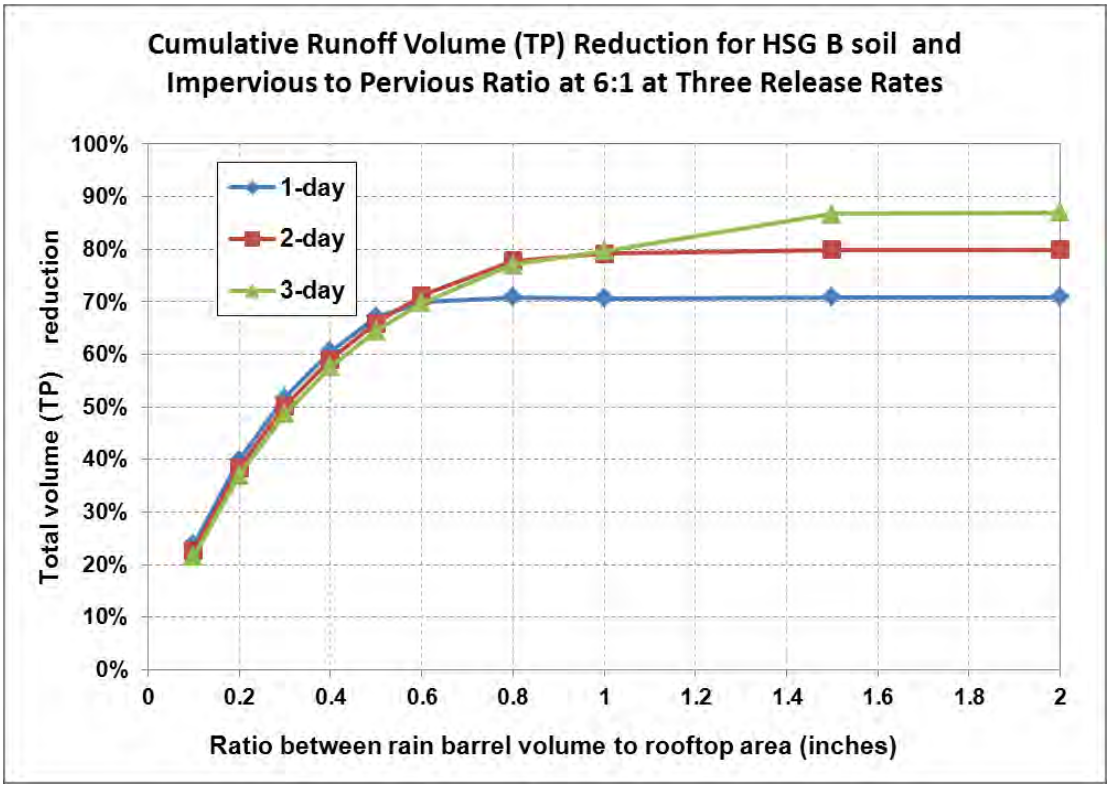


Figure 3- 24: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1 for HSG C Soils

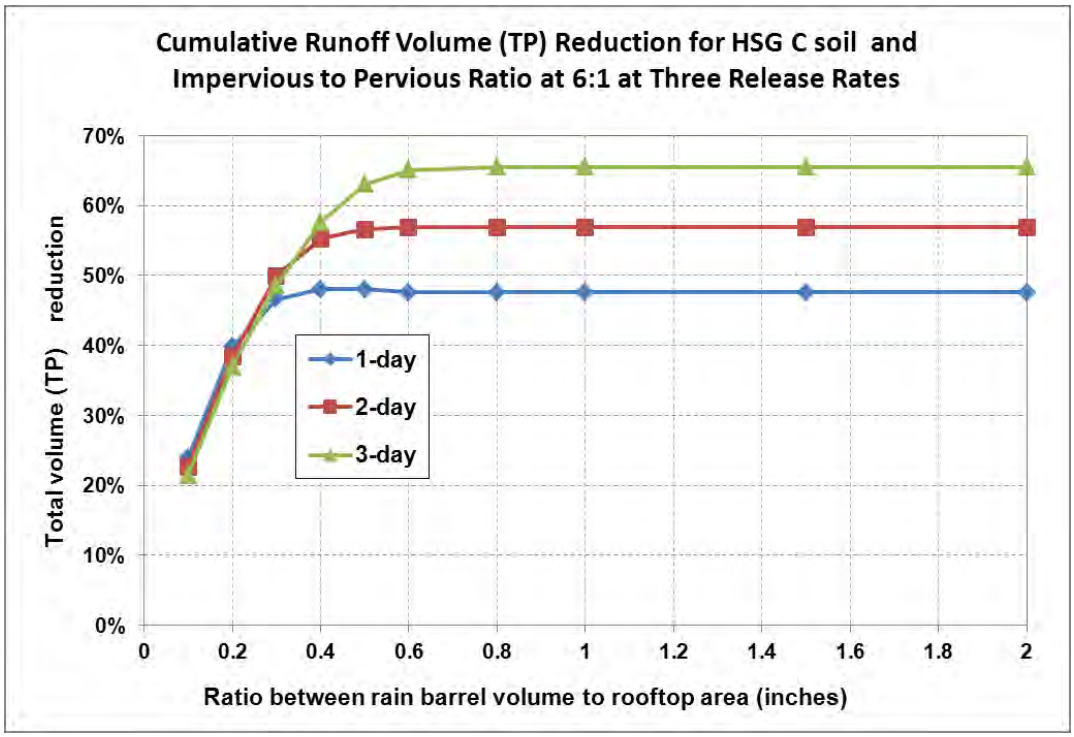


Figure 3- 25: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 6:1 for HSG D Soils

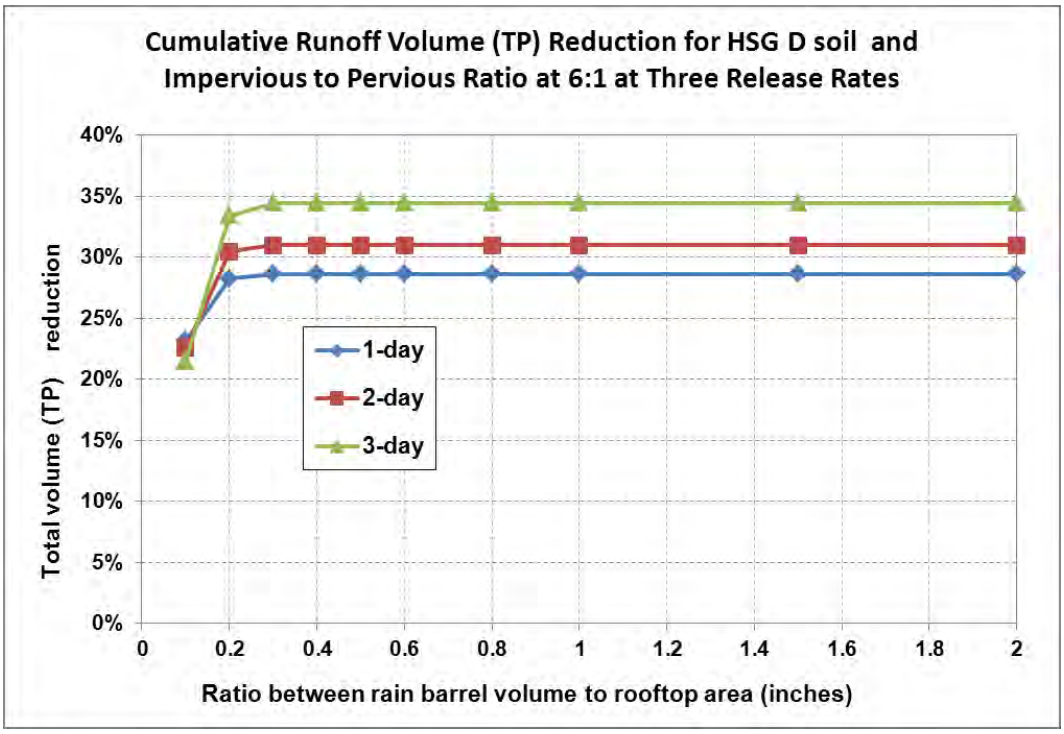


Table 3- 24: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1

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

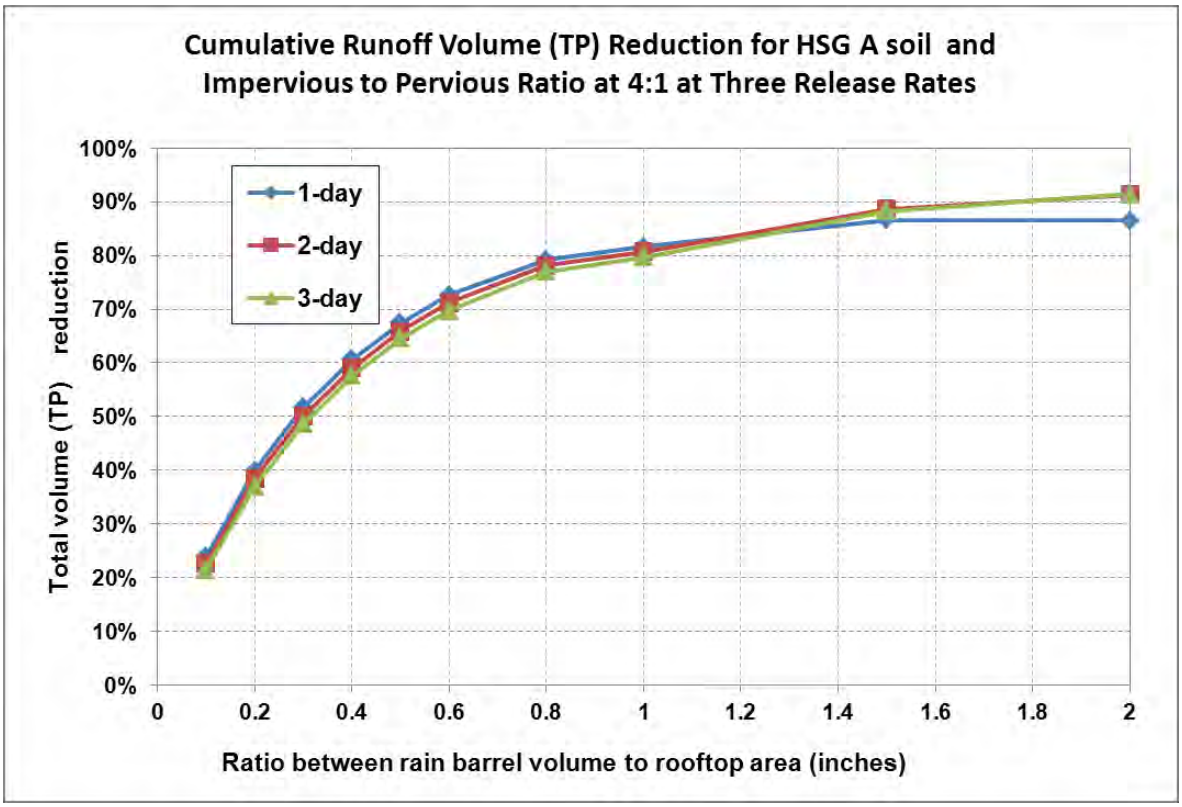


Figure 3- 27: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1 for HSG B Soils

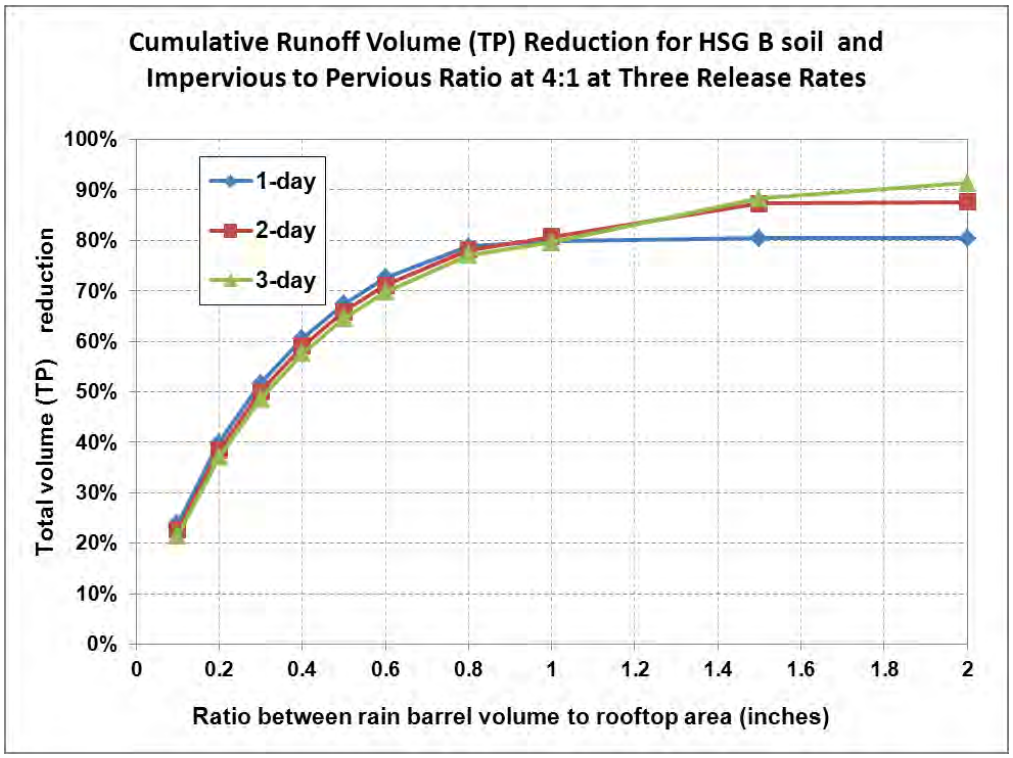


Figure 3- 28: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1 for HSG C Soils

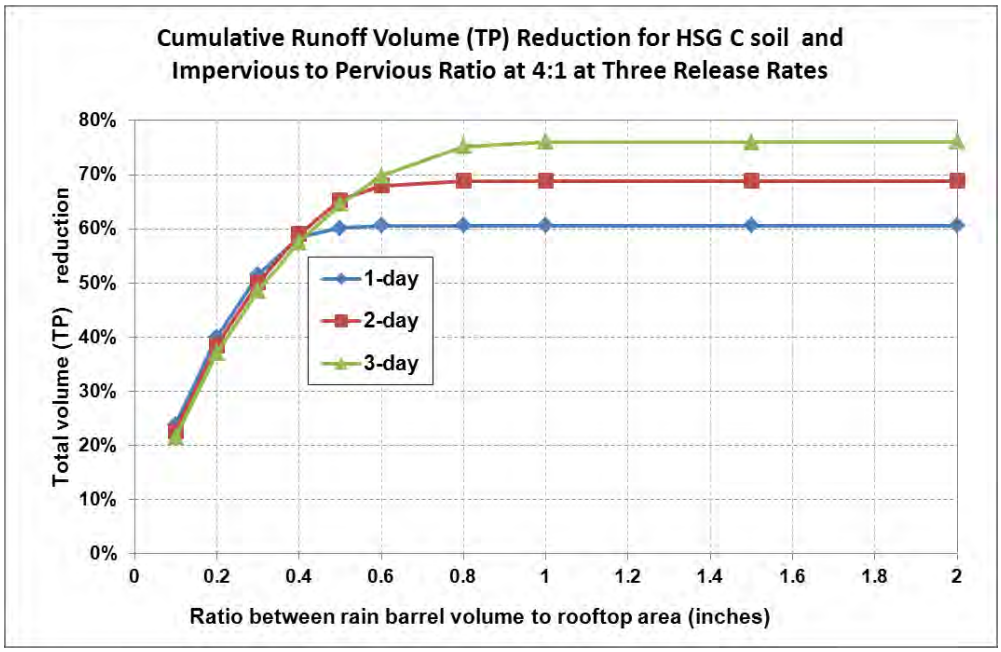


Figure 3- 29: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 4:1 for HSG D Soils

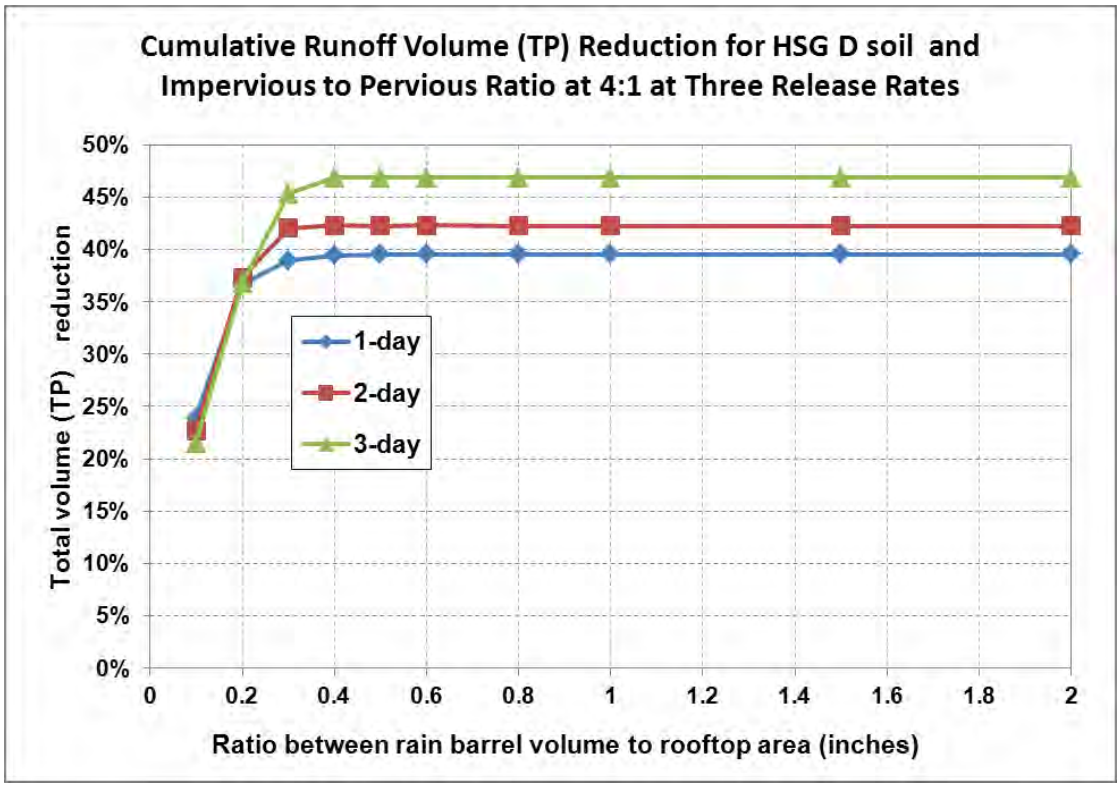


Table 3- 25: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 2:1

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

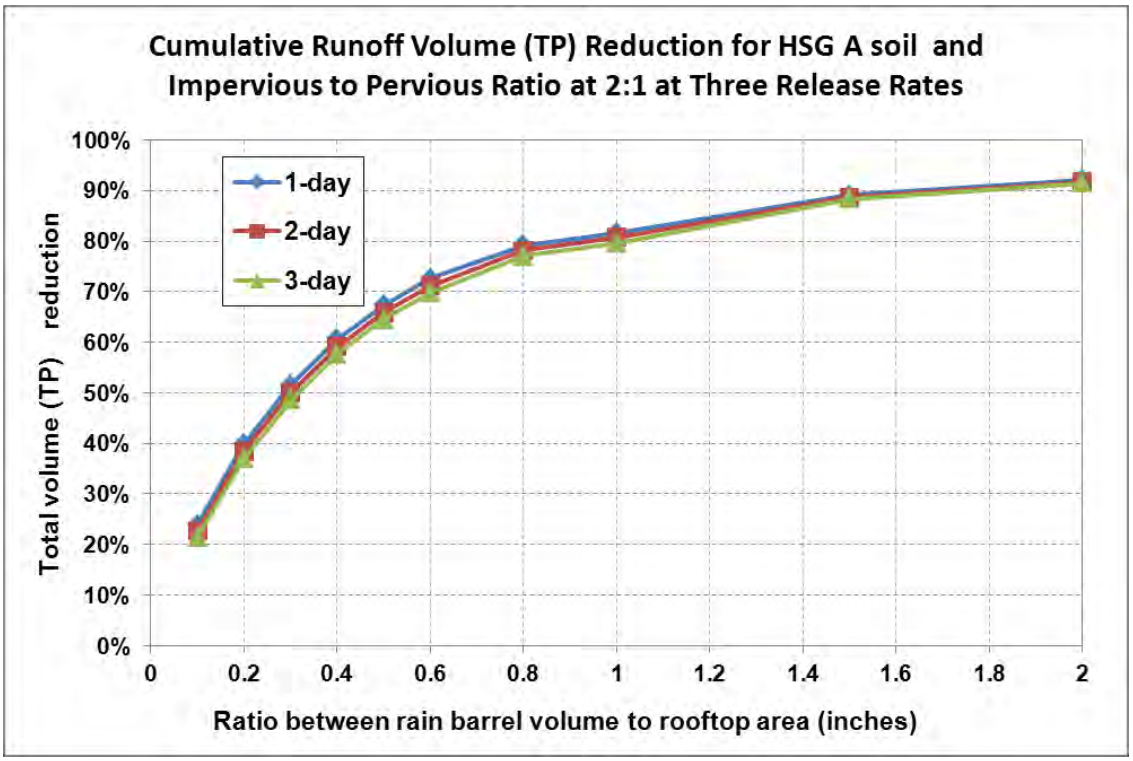


Figure 3- 31: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio= 2:1 for HSG B Soils

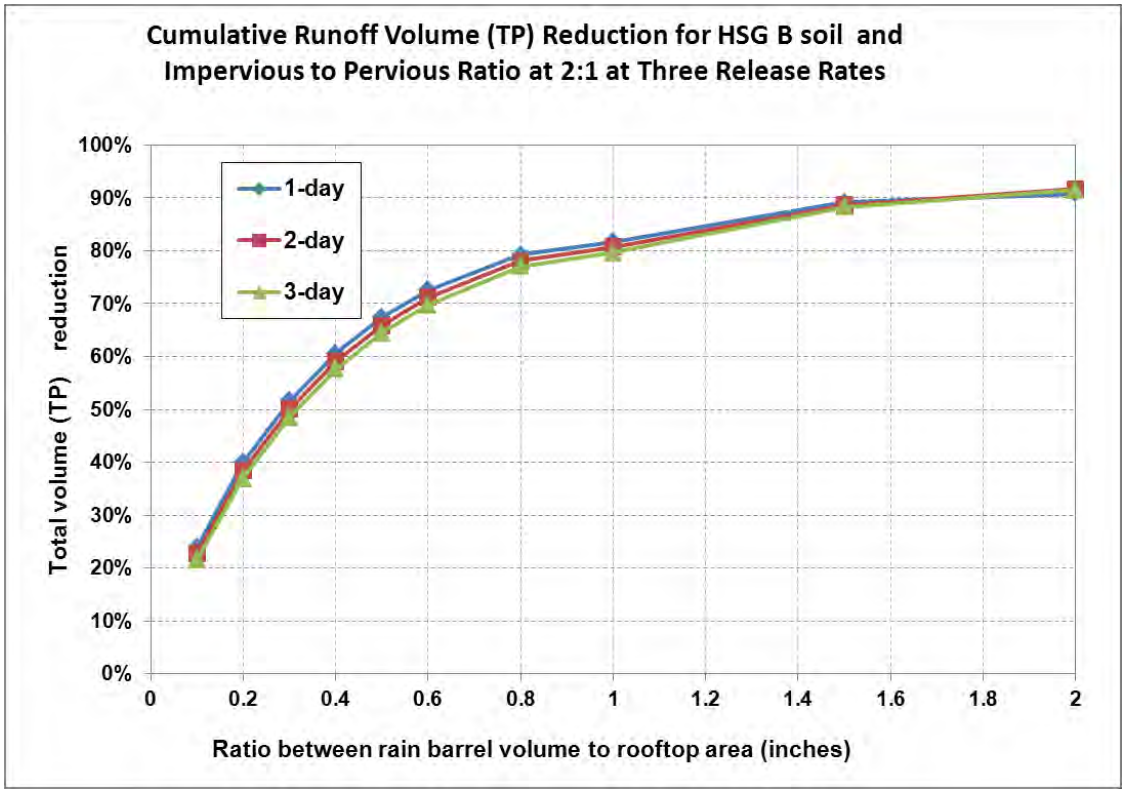


Figure 3- 32: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio= 2:1 for HSG C Soils

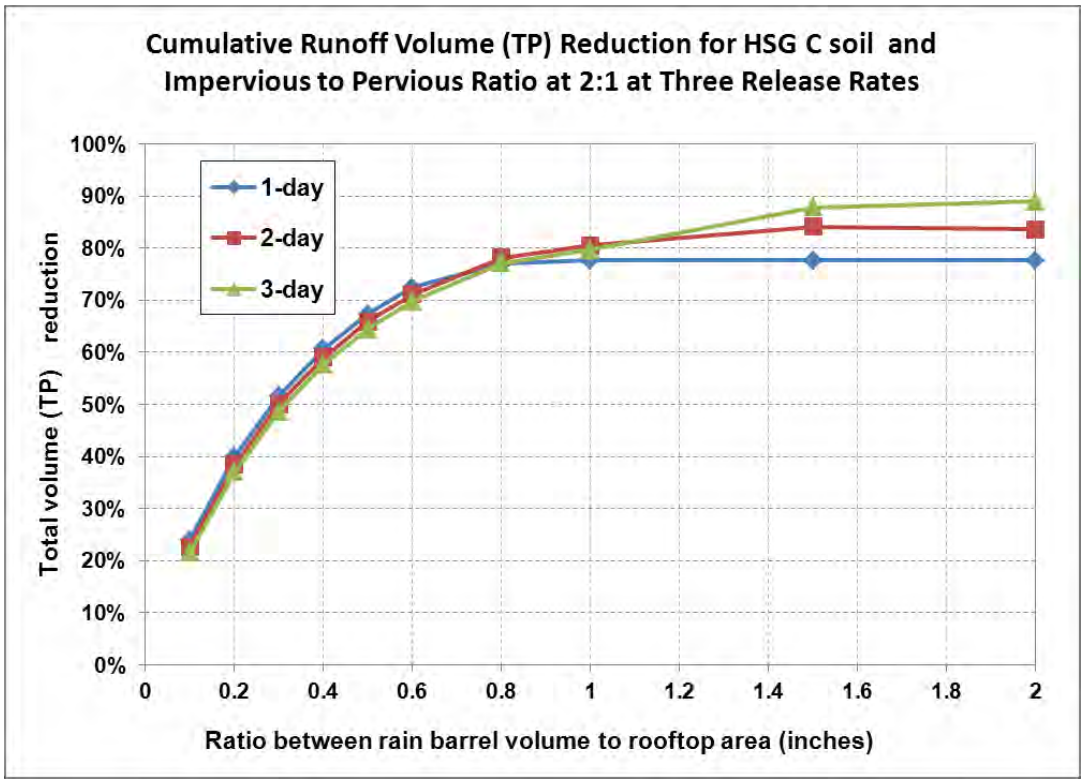


Figure 3- 33: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio= 2:1 for HSG D Soils

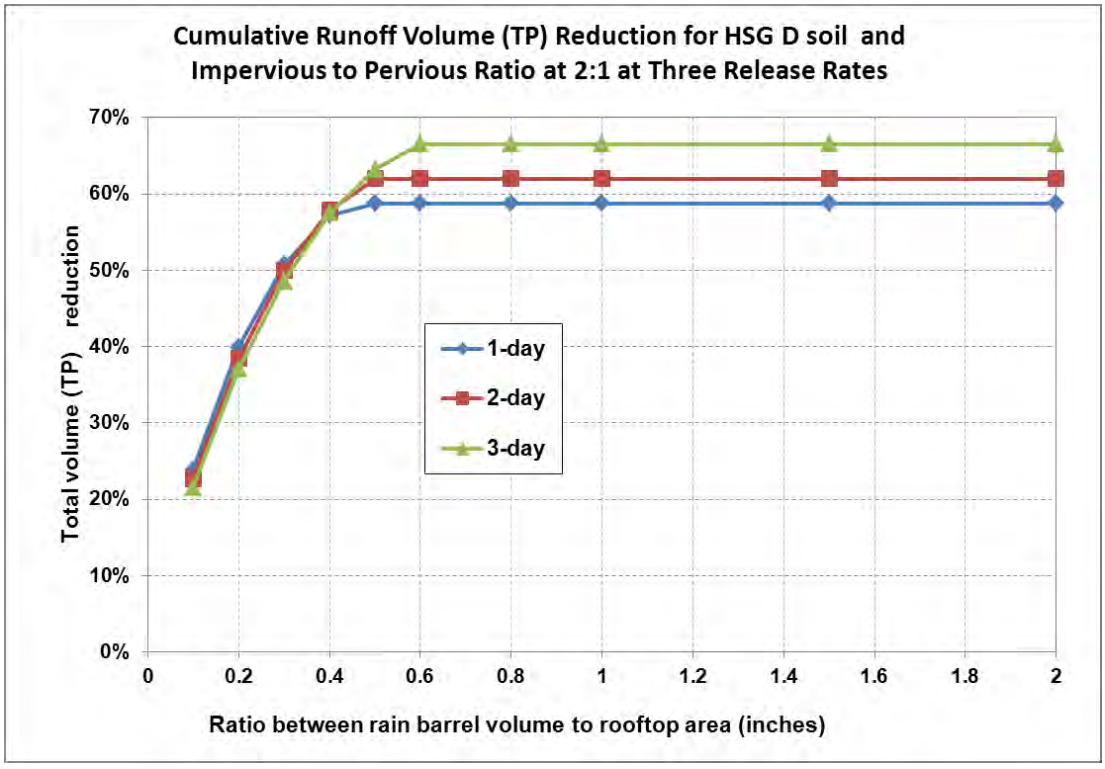


Table 3- 26: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1

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

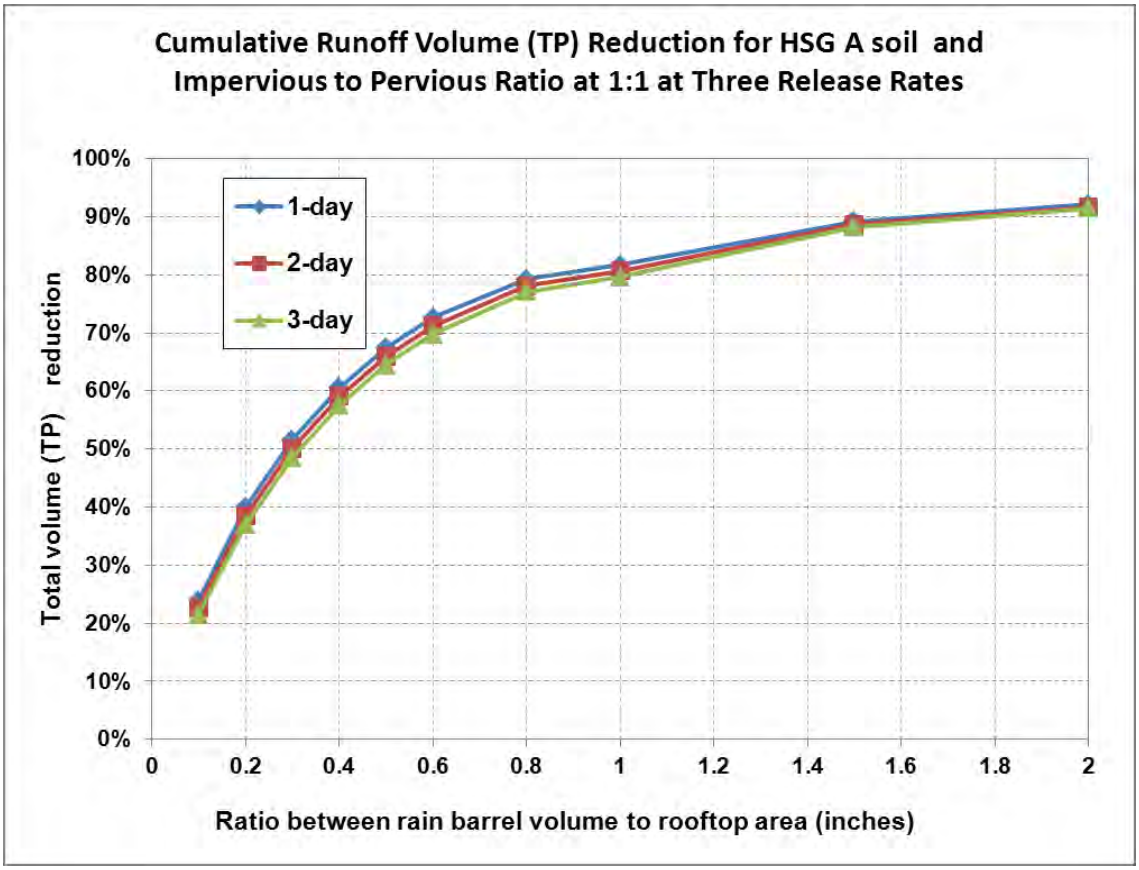


Figure 3- 35: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1 for HSG B Soils

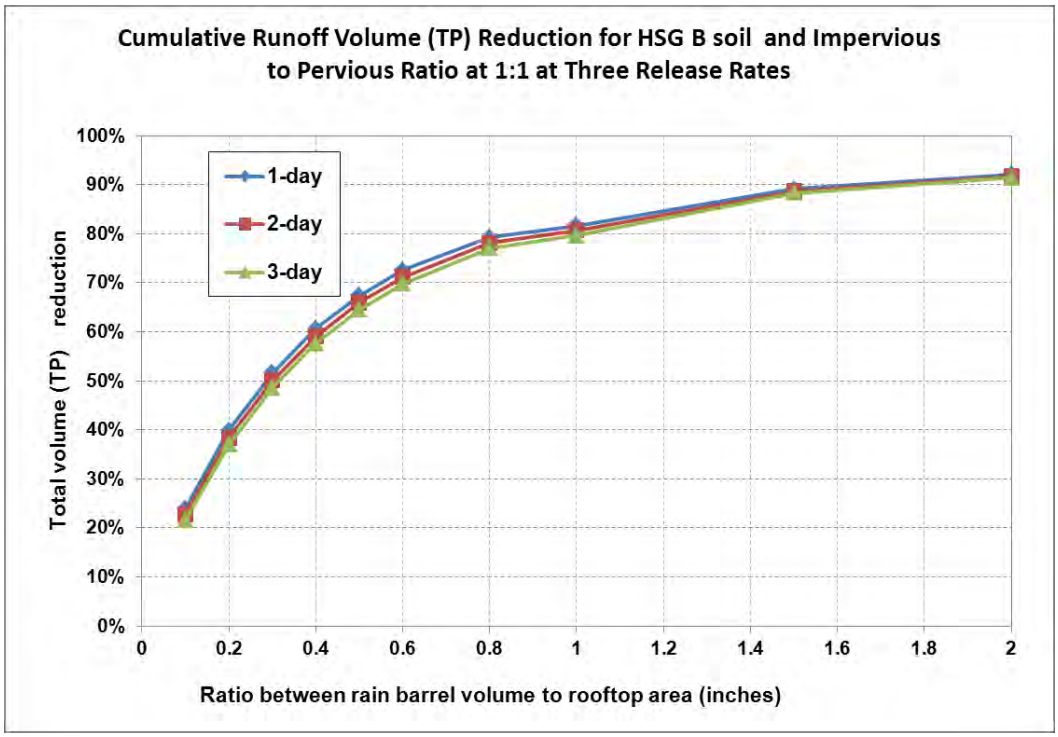


Figure 3- 36: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1 for HSG C Soils

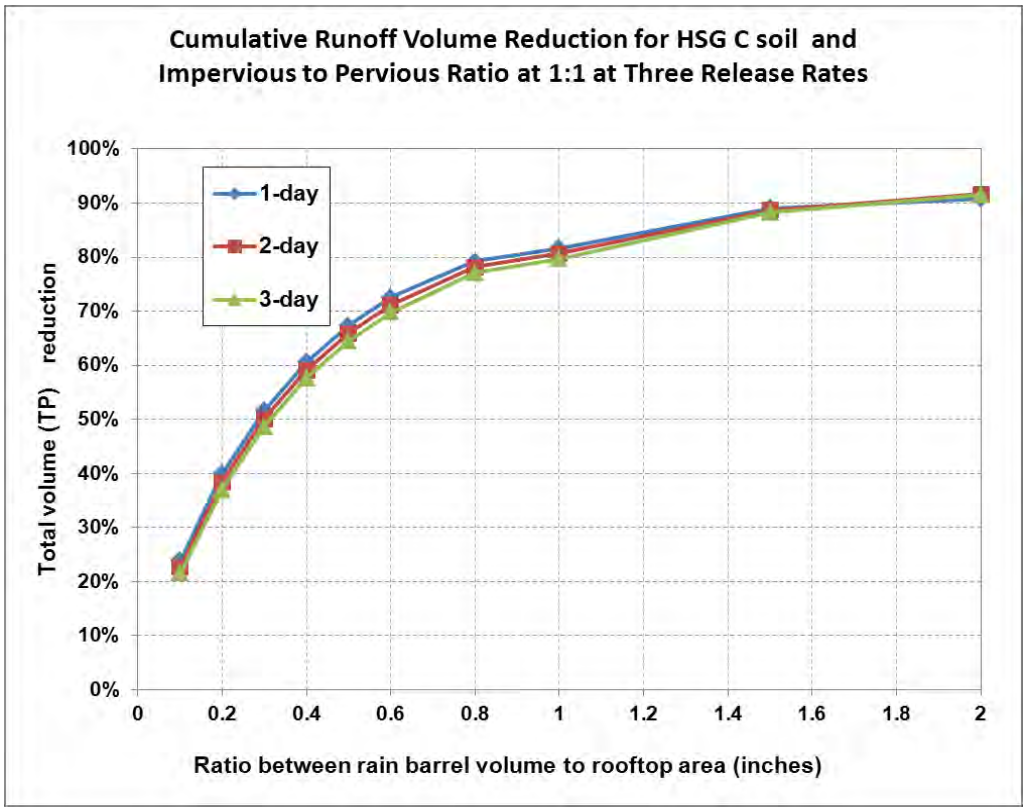


Figure 3- 37: Impervious Area Disconnection through Storage: Impervious Area to Pervious Area Ratio = 1:1 for HSG D Soils

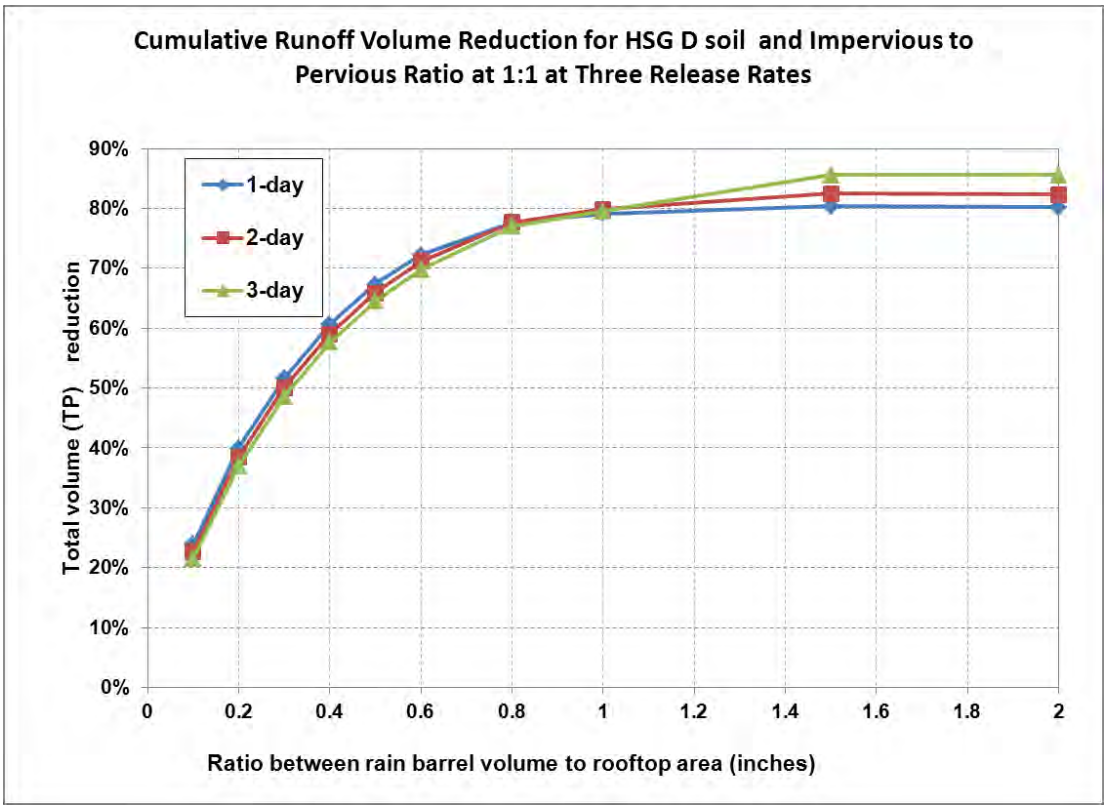


Table 3- 27: Impervious Area Disconnection Performance Table

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

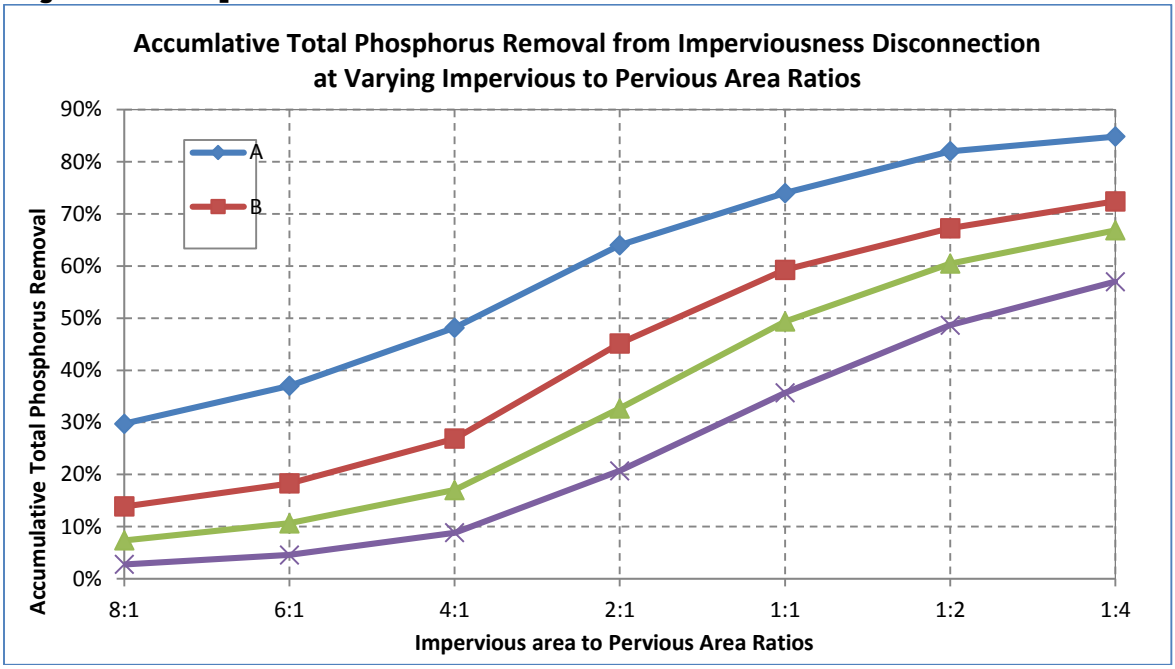


Table 3- 28: Performance Table for Conversion of Impervious Areas to Pervious Area based on Hydrological Soil Groups

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%

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 x W x D_{stone} x n_{stone})+ (L x W x D_{sand} x 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 x W x $D)_{galley}$ + (L x W x D_{stone} x 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 x ((W_{bottom}+$W_{top@Dmax}$)/2) x 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} x D_{pond}) + (A_{soil} x D_{soil} x $n_{soil\ mix}$)
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 x W x $D_{ponding}$) + (L x W x D_{soil} x $n_{soil\ mix}$)
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 under-drain 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 x W x $D_{ponding}$)+ (L x W x D_{soil} x 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 = ($A_{pretreatment}$ x $D_{preTreatment}$)+ ($A_{wetland}$ x $D_{ponding}$)+ (A_{ISR} x D_{gravel} x 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 x W x D_{stone} x 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} x 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} x 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=Lswale x Aswale
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, Myriophyllum spicatum	NMR	---
Zebra mussel, Dreissena polymorph	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. 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 Nitrogen Source Identification Report that are within the drainage area of the impaired 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 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 3 of Attachment 1 to Appendix H already existing or installed in the regulated 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.

2. At any time during the permit term the permittee may be relieved of additional requirements in Appendix H part I.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 nitrogen 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 nitrogen 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 I.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 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 criteria[1] 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*

Manual (Revised edition June 2008) 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 criteria[2] 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 determination[3]. 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 $_{\%\text{-}N}$) 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 $_{lbs\text{-}N}$)

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 (ft^3) of the bio-filtration w/ISR system (BMP-Volume $_{BMP\text{-}ft^3}$) 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:

BMP-Volume $_{BMP\text{-}ft^3}$ =Surface area x (pond maximum depth + (soil mix depth x soil mix porosity) + stone reservoir depth x gravel layer porosity))
= 520 ft^2 x (0.33 ft + (2.0ft x 0.24) + (2.5 ft x 0.42))
= 1,200 ft^3

3) The available storage volume capacity of the bio-filtration w/ISR system in inches of runoff from the contributing impervious area (BMP-Volume $_{IA\text{-}in}$) is calculated using equation 1:

BMP-Volume $_{IA\text{-}in}$ = (BMP-Volume $_{ft^3}$/ IA (acre) x 12 in/ft x 1 acre/43560 ft^2 **(Equation 1)**

Example 1 Continued:

BMP-Volume $_{IA\text{-}in}$ = (1,200 ft^3/1.49 acre) x 12 in/ft x 1 acre/43560 ft^2
= 0.22 in

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 $_{lbs\text{-}N}$) using the BMP Load calculation method shown above in Example 1 and the BMP Reduction $_{\%\text{-}N}$ determined in step 4 by using equation 2.

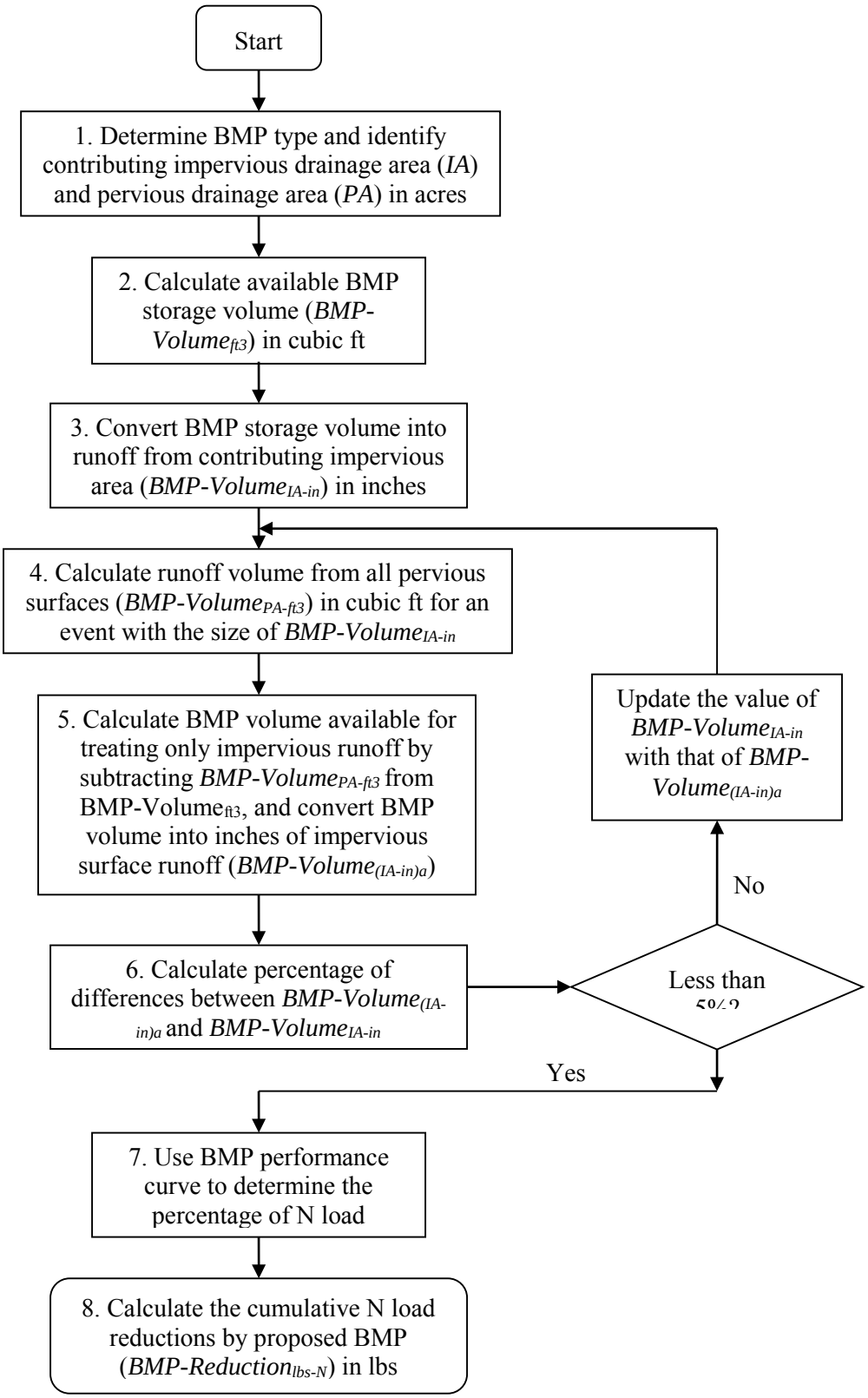
First, the BMP Load is determined as specified in Example 1:

BMP Load = IA (acre) x 14.1 lb/ac/yr
= 1.49 acres x 14.1 lbs/acre/yr
= 21.0 lbs/yr

BMP Reduction $_{lbs\text{-}N}$ = BMP Load x (BMP Reduction $_{\%\text{-}N}$/100) **(Equation 2)**

BMP Reduction $_{lbs\text{-}N}$ = 21 lbs/yr x (61/100)
= **12.8 lbs/yr**

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 (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) 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 $_{ft^3}$) 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 imperious area for the unknown rainfall depth of *i* inches (see equation 4):

$$\text{BMP-Volume}_{ft^3} = \text{BMP-Volume}_{(IA\text{-}ft^3)i} + \text{BMP-Volume}_{(PA\text{-}ft^3)i} \quad \textbf{(Equation 3)}$$

Where:

BMP-Volume $_{ft^3}$	= the available storage volume of the BMP
BMP-Volume $_{(IA\text{-}ft^3)i}$	= 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 $_{(PA\text{-}ft^3)i}$	= 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 $_{(IA\text{-}ft^3)i}$:

$$\text{BMP-Volume}_{(IA\text{-}ft^3)i} = \text{BMP-Volume}_{ft^3} - \text{BMP-Volume}_{(PA\text{-}ft^3)i} \quad \textbf{(Equation 4)}$$

To determine BMP-Volume $_{(IA\text{-}ft^3)i}$, 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 $_{ft^3}$). 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 $_{ft^3}$ determined in step 2 into inches of runoff from the contributing impervious area (BMP Volume $_{(IA\text{-}in)1}$) using equation 5.

$$\text{BMP-Volume}_{(IA\text{-}in)1} = (\text{BMP-Volume}_{ft^3} / \text{IA (acre)}) \times (12 \text{ in/ft} / 43{,}560 \text{ ft}^2/\text{acre}) \quad \textbf{(Equation 5)};$$

For iterations 2 through n (2…n), convert the BMP Volume $_{(IA\text{-}ft^3)2\ldots n}$, determined in step 5a below, into inches of runoff from the contributing impervious area (BMP Volume $_{(IA\text{-}in)2\ldots n}$) using equation 6.

$$\text{BMP-Volume}_{(IA\text{-}in)2\ldots n} = (\text{BMP-Volume}_{(IA\text{-}ft^3)2\ldots n} / \text{IA (acre)}) \times (12 \text{ in/ft} / 43{,}560 \text{ ft}^2/\text{acre}) \quad \textbf{(Equation 6)};$$

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 (ft^3) from the contributing PA (BMP Volume

$_{PA\text{-}ft^3}$) for a rainfall size equal to the sum of BMP-Volume $_{(IA\text{-}in)1}$, determined in step 3. The runoff volume for each distinct pervious area must be determined.

BMP Volume $_{(PA\text{-}ft^3)1...n}$ = ∑ ((PA x (runoff depth)$_{(PA1, PA2..PAn)}$ x (3,630 ft^3/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 $_{PA\text{-}ft^3}$, 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):

BMP-Volume $_{(IA\text{-}ft^3)2}$ = ((BMP-Volume$_{ft^3}$- BMP Volume $_{(PA\text{-}ft^3)1}$) **(Equation 8)**

BMP-Volume $_{(IA\text{-}in)2}$ = (BMP-Volume $_{(IA\text{-}ft^3)2}$/IA (acre)) x (12 in/ft x 1 acre/43,560 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 $_{(IA\text{-}in)3..n+1}$) by subtracting BMP Volume $_{(PA\text{-}ft^3)2..n}$, determined in step 4, from BMP Volume $_{(IA\text{-}ft^3)3..n+1}$, 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 $_{(IA\text{-}in)a}$ to BMP Volume $_{(IA\text{-}in)a\text{-}1}$ determined from the previous iteration (a-1). If the difference in these values is greater than 5% of BMP Volume $_{(IA\text{-}in)a}$ then repeat steps 4 and 5, using BMP Volume $_{(IA\text{-}in)a}$ as the new starting value for the next iteration (a+1). If the difference is less than or equal to 5 % of BMP Volume $_{(IA\text{-}in)a}$ then the permittee may proceed to step 7.

7) Determine the % nitrogen load reduction for the structural BMP (BMP Reduction $_{\%\text{-}N}$) using the appropriate BMP curve on Figure 1 or 2 and the BMP-Volume $_{(IA\text{-}in)n}$ 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 $_{lbs\text{-}N}$) using the BMP Load as calculated above in Example 1 and the percent nitrogen load reduction (BMP Reduction $_{\%\text{-}N}$) determined in step 7 by using equation 10:

BMP Reduction $_{lbs\text{-}N}$ = BMP Load x (BMP Reduction $_{\%\text{-}N}$/100) **(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 $_{\%\text{-}N}$) 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 $_{lbs\text{-}N}$)

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 (ft^3) of the infiltration basin (BMP-Volume $_{ft^3}$) is determined from the design details and basin dimensions; BMP-Volume $_{ft^3} = 48{,}155\ ft^3$.

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 $_{(IA\text{-}in)1}$) using equation 5.

$$\text{BMP Volume}_{(IA\text{-}in)1} = (48{,}155\ ft^2 / 11.75\ \text{acre}) \times (12\ \text{in/ft} / 43{,}560\ ft^2/\text{acre})$$
$$= 1.13\ \text{in}$$

Solution Continued:

4-1) The total volume of runoff (ft^3) from the contributing PA (BMP Volume $_{PA\text{-}ft^3}$) for a rainfall size equal to the sum of BMP Volume $_{(IA\text{-}in)1}$ 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.

BMP Volume $_{(PA\text{-}ft^3)1}$ = ((3.84 acre x (0.33 in) + (0.96 acre x (0.13 in)) x 3,630 ft^3/acre-in
= 5052 ft^3

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 $_{(PA\text{-}ft^3)1}$, determined in step 4-1, from BMP Volume$_{ft^3}$, determined in step 2, and converted to inches of runoff from IA:

BMP Volume $_{(IA\text{-}ft^3)\,2}$ = 48,155 ft^3 – 5052 ft^3
= 43,103 ft^3
BMP Volume $_{(IA\text{-}in)\,2}$ = (43,103 ft^3/11.75 acre) x (12 in/ft x 1 acre/43,560 ft^2)
= 1.01 in

6-1) The % difference between BMP Volume $_{(IA\text{-}in)\,2}$, 1.01 in, and BMP Volume $_{(IA\text{-}in)1}$, 1.13 in is determined and found to be significantly greater than 5%:

% Difference = ((1.13 in – 1.01 in)/1.01 in) x 100
= 12%

Therefore, steps 4 through 6 are repeated starting with BMP Volume $_{(IA\text{-}in)\,2}$ = 1.01 in.

Solution Iteration 2

4-2) BMP-Volume $_{(PA\text{-}ft^3)2}$ = ((3.84 acre x 0.21 in) + (0.96 acre x 0.12 in)) x 3,630 ft^3/acre-in
= 3,358 ft^3

5-2) BMP-Volume $_{(IA\text{-}ft^3)\,3}$ = 48,155 ft^3 – 3,358 ft^3
= 44,797 ft^3

BMP-Volume $_{(IA\text{-}in)\,3}$ = (44,797 ft^3/11.75 acre) x (12 in/ft x 1 acre/43,560 ft^2)
= 1.05 in

6-2) % Difference = ((1.05 in – 1.01 in)/1.05 in) x 100
= 4%

The difference of 4% is acceptable.

Solution Continued:

7) The % nitrogen load reduction for the infiltration basin (BMP Reduction $_{\%\text{-}N}$) is determined by using the RR treatment curve in Figure 2 and the treatment volume (BMP-Volume $_{\text{Net IA-in}}$ = 1.05 in) calculated in step 5-2 and is **BMP Reduction $_{\%\text{-}N}$ = 56%**.

9) The nitrogen load reduction in pounds of nitrogen (BMP-Reduction $_{\text{lbs-N}}$) 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 $_{\text{target}}$ of 56%.

$$\text{BMP-Reduction}_{\text{lbs-N}} = \text{BMP N Load} \times (N_{\text{target}}/100) \qquad \textbf{(Equation 11)}$$

Following example 1, the BMP load is calculated:

BMP N Load = (IA x impervious cover nitrogen export loading rate)
+ ($PA_{HSG\ D}$ x pervious cover nitrogen export loading rate, HSG D
+ ($PA_{HSG\ C}$ x pervious cover nitrogen export loading rate, HSG C)
= (16.55 acre x 15.4 lbs/acre/yr) + (3.84 acre x 3.7 lbs/acre/yr) +
(0.96 acre x 2.4 lbs/acre/yr)
= 271.4 lbs/yr

BMP-Reduction $_{\text{lbs-N}}$ = 275.13 lbs/yr x 56/100 = **152.0 lbs/yr**

Figure 1: Regional BMP Performance Curve for Annual Nitrogen Load Removal: System Design by the University of New Hampshire Stormwater Center (UNHSWC)

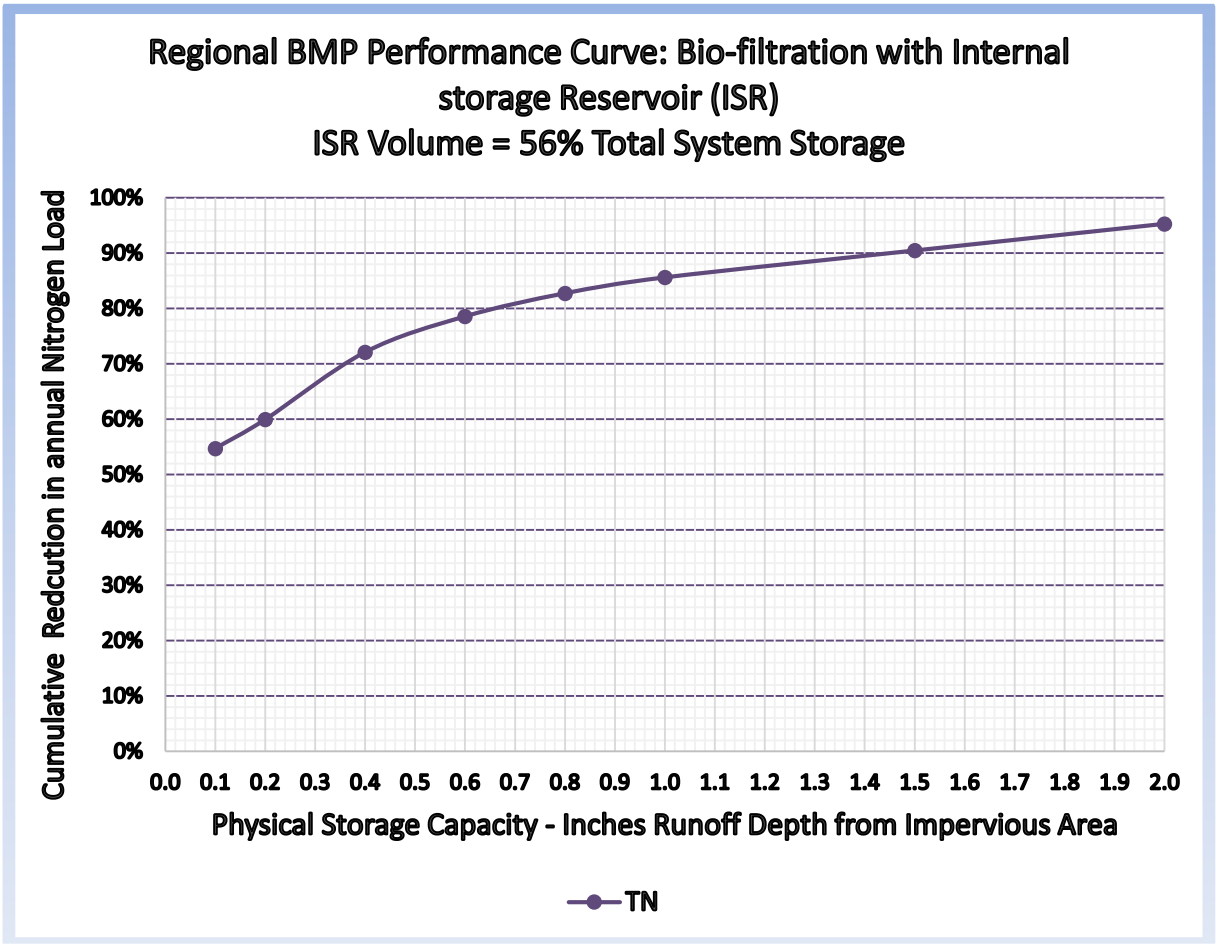
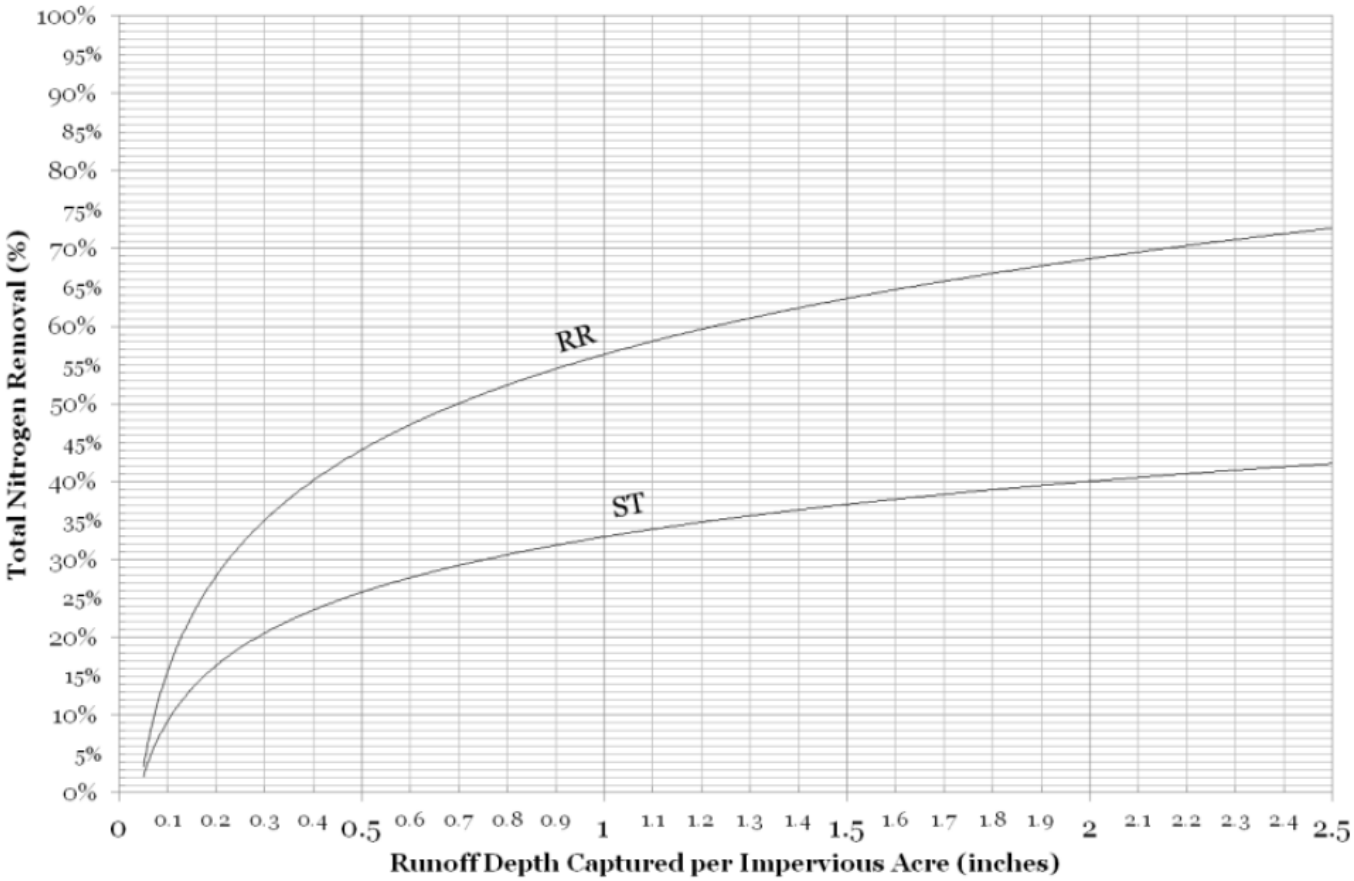


Table 3. Classification of BMP to Determine Nitrogen Reduction[1]

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)

[1]**Recommendations 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 B

NOTICE OF INTENT FOR MS4

2022 ADMINISTRATIVELY CONTINUED PERMIT COVERAGE LETTER

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part I: General Conditions

General Information

Name of Municipality or Organization: Framingham State: MA

EPA NPDES Permit Number (if applicable): MAR041116

Primary MS4 Program Manager Contact Information

Name: Kerry Reed Title: Senior Stormwater Engineer

Street Address Line 1: 100 Western Ave

Street Address Line 2:

City: Framingham State: MA Zip Code: 01702

Email: kr@framinghamma.gov Phone Number: (508) 532-6010

Fax Number: (508) 424-3428

Other Information

Stormwater Management Program (SWMP) Location (web address or physical location, if already completed): DPW Operations Center, 100 Western Ave. Framingham, MA 01702

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? Yes

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

MS4 Infrastructure (if covered under the 2003 permit)

Estimated Percent of Outfall Map Complete? *(Part II, III, IV or V, Subpart B.3.(a.) of 2003 permit)* 100%

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)

electronic version provided with NOI

Regulatory Authorities (if covered under the 2003 permit)

Illicit Discharge Detection and Elimination (IDDE) Authority Adopted? *(Part II, III, IV or V, Subpart B.3.(b.) of 2003 permit)* Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 07/01/08

Construction/Erosion and Sediment Control (ESC) Authority Adopted? *(Part II,III,IV or V, Subpart B.4.(a.) of 2003 permit)* Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 03/20/08

Post- Construction Stormwater Management Adopted? *(Part II, III, IV or V, Subpart B.5.(a.) of 2003 permit)* Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 03/20/08

Notice of Intent (NOI) for coverage under Small MS4 General Permit

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.

Massachusetts list of impaired waters: Massachusetts 2014 List of Impaired Waters- http://www.mass.gov/eea/docs/dep/water/resources/07v5/14list2.pdf

Check off relevant pollutants for discharges to impaired waterbodies (see above 303(d) lists) without an approved TMDL in accordance with part 2.2.2.a of the permit. List any other pollutants in the last column, if applicable.

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
Sudbury River	85	☐	☐	☐	☐	☐	☐	☐	☐	☐	Aquatic Macroinvertebrate Bioassessments, Mercury in Fish Tissue
Course Brook	10	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Beaver Dam Brook	56	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Lake Waushakum	11	☐	☐	☒	☐	☐	☒	☒	☐	☐	(Non-Native Aquatic Plans*), Aquatic Plants (Macrophytes)
Gleasons Pond	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Learned Pond	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Sucker Pond	3	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Framingham Reservoir #1	31	☐	☐	☐	☐	☐	☐	☐	☐	☐	(Eurasian Water Milfoil, Myriophyllum spicatum*), (Non-Native Aquatic Plans*), Mercury in Fish Tissue
Framingham Reservoir #2	9	☐	☐	☐	☐	☐	☐	☒	☐	☐	Mercury in Fish Tissue
Framingham Reservoir #3	17	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Birch Meadow Brook	13	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Willow Brook	8	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Angelica Brook	11	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Baiting Brook	42	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Dunsdell Brook	39	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Hop Brook	42	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Farm Pond	9	☐	☐	☐	☐	☐	☐	☒	☐	☐	(Eurasian Water Milfoil, Myriophyllum spicatum*), (Non-Native Aquatic Plans*), Excess Algal Growth
Eames Brook	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	(Debris/Floastables/Trash*), (Non-Native Aquatic Plans*), Aquatic Macroinvertebrate Bioassessments, Excess Algal Growth, Taste and Odor

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
Lake Cochituate (North Basin)	8	☐	☐	☒	☐	☐	☐	☐	☐	☐	(Eurasian Water Milfoil, Myriophyllum spicatum*), PCB in Fish Tissue
Cochituate Brook	20	☐	☐	☐	☐	☐	☐	☐	☐	☐	Aquatic Macroinvertebrate Bioassessments, Nutrient/Eutrophication Biological Indicators
Saxonville Pond	34	☐	☐	☐	☐	☐	☐	☐	☐	☐	(Non-Native Aquatic Plans*), Aquatic Plants (Macrophytes), Mercury in Fish Tissue
Grist Mill Pond	8	☐	☐	☒	☐	☐	☒	☐	☐	☐	(Non-Native Aquatic Plans*), Aquatic Plants (Macrophytes), Excess Algal Growth, Fecal Coliform
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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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 Imple-mentation**
Brochures/Pamphlets	"Scoop the Poop" campaign. Distribute pet waste bag dispensers to dog owners with informational flyer.	Residents	DPW	Track # distributed	2018
Displays/Posters/Kiosks	Construction BMP bulletin board at DPW permit customer service desk	Developers (construction)	Engineering	Information posted	2018
Web Page	Post pollution prevention information on City's social media	Businesses, Institutions and Commercial Facilities	DPW	Information posted, track # of views	2019
Brochures/Pamphlets	Post pollution prevention information on City's social media	Residents	DPW	Information posted, track # of views	2020
Web Page	Post pollution prevention information on City's social media	Industrial Facilities	DPW	Information posted, track # of views	2020
Web Page	Post pollution prevention information on City's social media	Businesses, Institutions and Commercial Facilities	DPW	Information posted, track # of views	2021

Web Page	Post pollution prevention information on City's social media	Industrial Facilities	DPW	Information posted, track # of views	2022
Brochures/Pamphlets	Handout with permits from DPW	Developers (construction)	DPW	Track # distributed	2022

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	SWMP Review	DPW	Allow annual review of stormwater management plan and posting of stormwater management plan on website	2018
Public Participation	Annual public participation	DPW	Track # of participants	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 Imple-mentation**
SSO inventory	Develop SSO inventory in accordance of permit conditions	DPW Operations	Complete within 1 year of effective date of permit	2018
Storm sewer system map	Create map and update during IDDE program completion	Engineering	Update map within 2 years of effective date of permit and complete full system map 10 years after effective date of permit	2018
Written IDDE program	Create written IDDE program	Engineering	Complete within 1 year of the effective date of permit and update as required	2018
Implement IDDE program	Implement catchment investigations according to program and permit conditions	DPW	Complete 10 years after effective date of permit	2020
Employee training	Train employees on IDDE implementation	DPW	Train annually	2019
Conduct dry weather screening	Conduct in accordance with outfall screening procedure and permit conditions	Engineering	Complete 3 years after effective date of permit	2018
Conduct wet weather screening	Conduct in accordance with outfall screening procedure	Engineering	Complete 10 years after effective date of permit	2018
Ongoing screening	Conduct dry weather and wet weather screening (as necessary)	Engineering	Complete ongoing outfall screening upon completion of IDDE program	2018

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**
Site inspection and enforcement of Erosion and Sediment Control (ESC) measures	Complete written procedures of site inspections and enforcement procedures	Engineering	Complete within 1 year of the effective date of permit	2018
Site plan review	Complete written procedures of site plan review and begin implementation	Engineering	Complete within 1 year of the effective date of permit	2018
Erosion and Sediment Control	Adoption of requirements for construction operators to implement a sediment and erosion control program	DPW	Complete within 1 year of the effective date of permit	2018
Waste Control	Adoption of requirements to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes	DPW	Complete within 1 year of the effective date of permit	2018
Conduct site plan reviews	Review plans for compliance with construction BMP requirements	Engineering	Track # of site plan reviews	2018

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 Imple-mentation**
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	Planning/zoning Department	Require submission of as-built plans for completed projects	2020
Target properties to reduce impervious areas	Identify at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually	Engineering	Complete 4 years after effective date of permit and report annually on retrofitted properties	2020
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	Planning/zoning Department	Complete 4 years after effective date of permit and implement recommendations of report	2022
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.	Planning/zoning Department	Complete 4 years after effective date of permit and implement recommendations of report	2022

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	Adoption, amendment, or modification of a regulatory mechanism to meet permit requirements	Planning/zoning Department	Complete 2 years after effective date of permit	2020

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 Imple-mentation**
O&M procedures	Create written O&M procedures including all requirements contained in 2.3.7.a.ii for parks and open spaces, buildings and facilities, and vehicles and equipment	Engineering	Complete and implement 2 years after effective date of permit	2020
Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Create inventory	Engineering	Complete 2 years after effective date of permit and implement annually	2020
Infrastructure O&M	Establish and implement program for repair and rehabilitation of MS4 infrastructure	DPW	Complete 2 years after effective date of permit	2020
Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPPs for maintenance garages, transfer stations, and other waste-handling facilities	DPW	Complete and implement 2 years after effective date of permit	2020
Catch basin cleaning	Establish schedule for catch basin cleaning such that each catch basin is no more than 50% full and clean catch basins on that schedule	DPW Operations	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually	2018
Street sweeping program	Sweep all streets and permitee-owned parking lots in accordance with permit conditions	DPW Operations	Sweep all streets and permitee-owned parking lots once per year in the spring	2018
Road salt use optimization program	Establish and implement a program to minimize the use of road salt	DPW Operations	Implement salt use optimization during deicing season	2018

Inspections and maitenance of stormwater treatment structures	Establish and implement inspection and maintenance procedures and frequencies	DPW Operations	Inspect and maintain treatment structures at least annually	2018

Notice of Intent (NOI) for coverage under Small MS4 General Permit

Part III: Stormwater Management Program Summary (continued)

Actions for Meeting Total Maximum Daily Load (TMDL) Requirements

Use the drop-down menus to select the applicable TMDL, action description to meet the TMDL requirements, and the responsible department/parties. If no options are applicable, or more than one, **enter your own text to override drop-down menus.**

Applicable TMDL	**Action Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)

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 (enter your own text to override the drop down menu)
Turbidity	Farm Pond (MA82035), Lake Waushakum (MA82112), Framingham Reservoir #2 (MA82045)	Adhere to requirements in part V of Appendix H	DPW
Phosphorus	Lake Waushakum (MA82112), Grist Mill Pond (MA82055)	Adhere to requirements in part II of Appendix H	DPW
Fecal Coliform	Grist Mill Pond (MA82055)	Adhere to requirements in part III of Appendix H	DPW

Part IV: Notes and additional information

Use the space below to indicate the part(s) of 2.2.1and 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.

Framingham reviewed information related to endangered species and determined eligibility regarding federal Endangered and Threatened Species Critical Habitat Protection as described in Appendix C of the MS4 Permit. Framingham's stormwater system meetings eligibility criteria under Appendix C - Criterion C. The effect of the stormwater discharge and discharge related activities on listed species and critical habitat have been evaluated and a determination is made that the stormwater discharges and discharge related activities will have 'no effect' on any federally or engendered listed species or designated critical habitat under the jurisdiction of the USFWS.

Framingham reviewed the MS4 Permit Appendix D related to Section 106 of the National Historic Preservation Act (NHPA). Framingham's stormwater system is classified as having no effect on historic properties, as described in Appendix D Criterion A – "the discharges do not have the potential to cause effects on historic properties."

Framingham is a member of the Central Massachusetts Regional Stormwater Coalition.

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:	Yvonne M. Spicer	Title:	Mayor
Signature:	Yvonne M Spicer	Date:	9/17/18

[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

DRAIN SYSTEM

SUDBURY

MARLBOROUGH

SOUTHBOROUGH

WAYLAND

NATICK

ASHLAND

SHERBORN

Legend

- CATCH BASIN
- MANHOLE
- OUTFALL
- CULVERT
- PIPE
- CHANNEL

CITY OF FRAMINGHAM
DEPARTMENT OF PUBLIC WORKS
ENGINEERING AND TRANSPORTATION DIVISION
GEOGRAPHIC INFORMATION SYSTEMS MAP

Executive Director | DPW:	Peter A. Sellers
Director | Engineering Division:	Eric V. Johnson
GIS Manager:	Geoffrey W. Kovar
Production Date:	September 14, 2018

0 0.5 1
Miles
1 inch = 1,000 feet

Memorandum

To: Kerry Reed, PE
Town of Framingham

Date: May 2, 2017

Project #: 13484.14

From: William Evans
Lauren Caputo, PE

Re: Summary Memorandum on
MA MS4 General Permit Appendix C
Endangered Species Documentation
Town of Framingham, Massachusetts

Introduction

The Town of Framingham is submitting a Notice of Intent (NOI) to renew coverage under the General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts (the "MS4 Permit") (NPDES Permit No. MAR041000). As part of the NOI process, VHB reviewed information related to endangered species and determined eligibility regarding federal Endangered and Threatened Species Critical Habitat Protection as described in Appendix C of the MS4 Permit. Upon completion of the screening process, the applicant certifies that the NOI permit coverage meets an eligibility criteria outlined in Appendix C.

Screening Process

In determining the USFWS criterion for Framingham, VHB created an Information for Planning and Consultation (IPaC) report using the USFWS IPaC online system process that indicates if a federally listed species or designated critical habitat is present. VHB entered the town boundary of Framingham as the action area and the IPaC system uses the boundary to determine the presence of threatened and endangered species within the action area. The IPaC report notes that the Northern Long-eared Bat (Myotis septentrionalis), a threatened species, is potentially affected by activities in Framingham but the report indicates there is no designated critical habitat for the bat within the town. See the attached IPaC report for more details.

Framingham does not qualify for eligibility under Criterion A because a threatened species is present within the town, and Framingham does not qualify for eligibility under Criterion B because certain listed species for this criterion are not present within the town. As listed in Appendix C guidance, the town qualifies under Criterion C because they can answer "yes" to the questions 1 or 2 and "yes" to question 3 below.

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?*

Answer – Yes, the Northern Long-eared Bat is present in the Town of Framingham but none of the other species listed.

Question 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?*

Answer – Yes, regular maintenance and inspections on existing stormwater infrastructure owned by the town should not affect the Northern Long-eared Bat or its habitat.

Question 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.*

Answer – Yes. The Town of Framingham agrees that if a structural BMP not identified in the NOI is planning to be installed, an additional endangered species screening will be conducted. If the results of the new screening indicate that the project "may affect" or "not likely to adversely affect" the Northern Long-eared Bat, then the town will contact USFWS with the results of the screening.

Certification

The screening process certifies that Framingham's stormwater system meetings eligibility criteria under Appendix C Criterion C – "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 the applicant and affirmed by EPA that the stormwater discharges and discharge related activities will have 'no effect' on any federally or engendered listed species or designated critical habitat under the jurisdiction of the USFWS."

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: April 13, 2017
Consultation Code: 05E1NE00-2017-SLI-1312
Event Code: 05E1NE00-2017-E-02550
Project Name: Framingham MS4 permitting

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

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2017-SLI-1312

Event Code: 05E1NE00-2017-E-02550

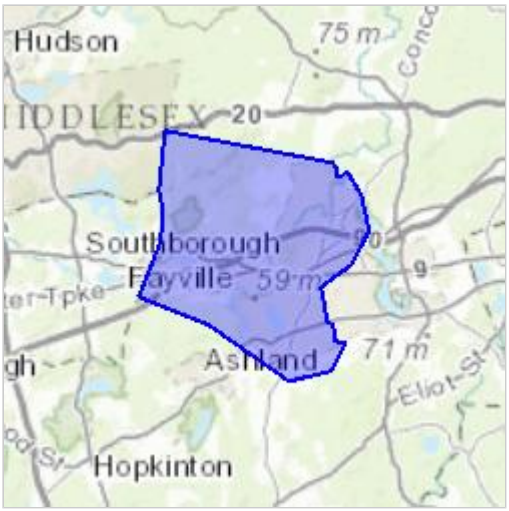
Project Name: Framingham MS4 permitting

Project Type: Guidance

Project Description: Town of Framingham MA MS4 permitting

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.305197001195964N71.43709765547881W



Counties: Middlesex, MA | Worcester, MA

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on your 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. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Northern Long-eared Bat *(Myotis septentrionalis)*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9045

Critical habitats

There are no critical habitats within your project area.

Memorandum

To: Kerry Reed, PE
Town of Framingham

Date: April 27, 2017

Project #: 13484.14

From: William Evans
Lauren Caputo, PE

Re: Summary Memorandum on
MA MS4 General Permit Appendix D
National Historic Preservation Act Eligibility Documentation
Town of Framingham, Massachusetts

Introduction

The Town of Framingham is submitting a Notice of Intent (NOI) to renew coverage under the General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts (the "MS4 Permit") (NPDES Permit No. MAR041000). As part of the NOI process, VHB reviewed the MS4 Permit Appendix D related to Section 106 of the National Historic Preservation Act (NHPA) review of the undertaking. Appendix D outlines a screening process for applicants to identify whether properties listed or eligible for listing in the National Register of Historic Places could be impacted by a proposed project. Upon completion of the screening process, the applicant certifies that the NOI permit coverage meets an eligibility criteria outlined in Appendix D.

Screening Process

Appendix D of the MS4 Permit notes that "existing discharges should have already addressed NHPA issues in the previous general permit…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." Question 1 of the screening process asks:

> *Is the facility an existing facility authorized by the previous permit or a new facility and the applicant is not undertaking an activity involving subsurface land disturbance less than an acre?*

Answer – Yes, the Town of Framingham has no relevant changes to stormwater operations. The town's stormwater system is authorized by the previous MS4 permit and the town seeks renewal of the previous MS4 permit coverage. The town is not planning to undertake subsurface land disturbance activities. The Town of Framingham has indicated to VHB that if the installation of a structural BMP or other stormwater control measure could cause subsurface land disturbance, a review of National Register-listed or eligible sites and districts in the project area will be conducted and results reported accordingly.

Certification

The screening process certifies that Framingham's stormwater system is classified as having no effect on historic properties, as described in Appendix D Criterion A – "the discharges do not have the potential to cause effects on historic properties."

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square – Suite 100
BOSTON, MA 02109-3912

VIA EMAIL

May 16, 2022

Re: 2016 Massachusetts Small Municipal Separate Storm Sewer System General Permit - Administratively Continued Permit Coverage

Dear Permit Holder:

You are receiving this letter because stormwater discharges from your municipal separate storm sewer system (MS4) are currently authorized under the 2016 Massachusetts Small MS4 Permit (MA MS4 permit), which will expire on July 1, 2022. In accordance with Part 1.6 of the MA MS4 Permit, the MA MS4 Permit will be administratively continued on July 1, 2022. The MA MS4 Permit will remain in force and effect for discharges that were authorized prior to July 1, 2022 until such discharges are authorized under a reissued general permit, an individual permit, or other alternative general permit. No action is required at this time to remain covered under the MA MS4 Permit.

If you have any questions regarding this matter, please contact Newton Tedder (tedder.newton@epa.gov) at USEPA or Laura Schifman (laura.schifman@mass.gov) at MassDEP.

Sincerely,

Lynne Jennings, Chief
Water Permits Branch
Water Division
USEPA



Lealdon Langley, Director
Division of Watershed Management
MassDEP

APPENDIX C

MS4 ANNUAL REPORTS

Year 1 Annual Report
Massachusetts Small MS4 General Permit
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: City of Framingham

EPA NPDES Permit Number: MAR041116

Primary MS4 Program Manager Contact Information

Name: Kerry Reed Title: Senior Stormwater Engineer

Street Address Line 1: 100 Western Ave

Street Address Line 2:

City: Framingham State: MA Zip Code: 01702

Email: kr@framinghamma.gov Phone Number: (508) 532-6010

Fax Number: (508) 424-3428

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.framinghamma.gov/1133/Stormwater-Management

Date SWMP was Last Updated: Jun 21, 2019

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

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 1 Requirements

- ☒ Develop and begin public education and outreach program
- ☒ Identify and develop 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:
- ☒ Develop written IDDE plan including a procedure for screening and sampling outfalls
- ☒ IDDE ordinance complete
- ☒ Identify each outfall and interconnection discharging from MS4, classify into the relevant category, and priority rank 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:
- ☒ Construction/ Erosion and Sediment Control (ESC) ordinance complete
- ☒ Develop written procedures for site inspections and enforcement of sediment and erosion control measures
- ☒ Develop written procedures for site plan review
- ☒ Keep a log of catch basins cleaned or inspected
- ☐ Complete inspection of all stormwater treatment structures

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

☒ Annual training to employees involved in IDDE program

☒ All curbed roadways have been swept a minimum of one time per year

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

☐ Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Permittee or its agents disseminate educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time

☐ Provide 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)*

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

Annual Requirements

*Public Education and Outreach**

☒ Distribute 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

☐ Distribute an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Distribute 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

☒ 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 (spring and fall)

Potential structural BMPs

☐ Any structural BMPs listed in Table 3 of Attachment 1 to Appendix H already existing or 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 1 to Appendix H. 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 each annual report

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☒ Increase street sweeping frequency of all municipal owned streets and parking lots to a schedule to target areas with potential for high pollutant loads

☒ 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

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:

For Year 1 Requirements:
The City is continuously updating the inventory of City-owned stormwater treatment structures. The City was able to inspect all stormwater treatment structures within public roadways. Some structures, especially those located within public easements on private property, were inaccessible and the structures could not be inspected.

For Bacteria/Pathogens Annual Requirements:
The City shared many messages on proper management of pet waste, but did not include a note regarding existing ordinances. Town bylaws are being reviewed and updated to City ordinances as part of the transition from a Town to a City and to comply with the new NPDES requirements. To avoid any public confusion, the City decided to focus messaging on the topic without noting the ordinance.
The City did not provide information to septic system owners. The City is working on an accurate inventory and mapping of existing septic systems in order to develop an effective outreach campaign for bacteria/ pathogen-impaired catchment areas.

For Phosphorus Annual Requirements:
The City is not currently aware of structural BMPs installed within the phosphorus-impaired catchment areas.

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:

During year 1, outfall verification and initial catchment delineation resulted in locating additional outfalls as well as adjusting the total numbers of outfalls associated with some receiving waters. In addition, two receiving waters (Wash Brook and Cowassock Brook) were added as receiving waters, neither of which have any established impairments.

Part IV: Minimum Control Measures

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

MCM1: Public Education

Number of educational messages completed during the reporting period: 12

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: Resident message 1 - Stormwater pollution is trash, oil, cigarette butts, & dog waste.

Message Description and Distribution Method:

Think Blue Massachusetts "Fowl Water" video (https://www.thinkbluemassachusetts.org/)
Advertisement on Facebook, Instagram, & YouTube

Targeted Audience: Residents

Responsible Department/Parties: Engineering

Measurable Goal(s):

56,589 social media impressions from residents of Framingham
Over 400,000 impressions for the Central Massachusetts Regional Stormwater Coalition

Message Date(s): June 23, 2019 - June 30, 2019

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:

This message was in addition to the ones proposed in the NOI

BMP: Annual pet waste message - Scoop the Poop

Message Description and Distribution Method:

The City continued the "Scoop the Poop" public education campaign to inform residents about how pet waste impacts water quality. The City distributes pet waste bag dispensers shaped like fire hydrants with an information flyer to dog owners at the time of issuance or renewal of dog licenses.

Targeted Audience: Residents

Responsible Department/Parties: DPW, Engineering, City Clerk, Parks & Recreation, Conservation Commissic

Measurable Goal(s):

Over 200 dispensers with flyers have been distributed through the City Clerk's office when residents obtain or update dog licenses. Over 100 have been distributed at public events, like the Earth Day festival and the

Callahan Dog Owners Group annual park clean-up. Over 50 have been distributed at school programs. There have also been six requests through the City's online Scoop the Poop pledge.

Message Date(s): June 1, 2018 - June 30, 2019

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: Developer message 1 - Stormwater & the Construction Industry: Maintain Your BMPs

Message Description and Distribution Method:

Engineering posted the EPA's "Stormwater & the Construction Industry" poster with Dos & Don'ts for maintaining construction BMPs at the DPW Operations Center at the customer service desk for permits. The DPW also incorporated erosion & sediment control guidance into annual drain layers training which is locally required in order to get construction permits from the City. Drain layers training was held at Framingham DPW on March 14, 2019 & March 21, 2019.

Targeted Audience: Developers (construction)

Responsible Department/Parties: DPW, Engineering

Measurable Goal(s):

20-25 persons per month who obtain permits at the DPW customer service desk can view the poster
45 construction professionals who work locally attended the drain layers training.

Message Date(s): July 1, 2018 - June 30, 2019

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: Business message 1/Annual landscape message - Leave grass clippings to fertilize lawn naturally;

Message Description and Distribution Method:

Social media posts shared on the Framingham Public Works facebook page in the Spring timeframe encouraging the proper use and disposal of grass clippings and encourages the proper use of slow-release fertilizers. Original post from Think Blue Massachusetts.

Targeted Audience: Businesses, institutions and commercial facilities; Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

3,549 people reached through Think Blue Massachusetts Facebook post;
966 people reached on Framingham's Facebook page with 57 engagements

Message Date(s): April 19, 2019

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:Resident message - Do your Doody for Clean Water

Message Description and Distribution Method:

Social media posts shared on the Framingham DPW's Facebook page encouraging the proper management of pet waste. Original post from Think Blue Massachusetts.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

7,170 people reached through Think Blue Massachusetts Facebook post.
161 people reached through Framingham DPW Facebook post.

Message Date(s): November 5, 2018

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: Resident message - How water pollution impacts your watershed

Message Description and Distribution Method:

The DPW and Conservation Commission have used an Enviroscape, a hands-on, interactive model, to demonstrate the sources and effects of water pollution and ways to prevent pollution. The City borrows the model from the Central Massachusetts Regional Stormwater Coalition (CMRSWC). CMRSWC also uses the model at regional public events at which City residents participate.

Targeted Audience: Residents

Responsible Department/Parties: CMRSWC, DPW, Conservation

Measurable Goal(s):

The Enviroscape was used for stormwater education at the following public events:
• Back-to-School Family Picnic at Farm Pond Park (August 30, 2018)
• MA Science, Technology, Engineering, & Math (STEM) Week (October 2018)
• Keefe Technical High School STEM Week program (October 24, 2018)
• Framingham Public Works Open House (Dec 2018)
• Girl Scouts of Eastern Massachusetts STEM Conference held at Framingham State University (March 24, 2019)
• Framingham Community Conversation on Sustainability (April 28, 2019)
• Framingham Earth Day Festival (April 27, 2019)
• Framingham Open Space & Recreation Plan – Public Visioning Workshop (May 22, 2019)

Message Date(s): Various

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:

This message was in addition to the ones proposed in the NOI

BMP:Resident message - Clean Water Begins with You.

Message Description and Distribution Method:

CMRSWC purchased Think Blue print ads in newspapers with distribution areas including Framingham.

Targeted Audience: Residents

Responsible Department/Parties: CMRSWC

Measurable Goal(s):

The ad was published in Wicked Local and Framingham is within Wicked Local's coverage area. Wicked Local has a print circulation of 1.4 million and 2.2 million monthly unique visitors

Message Date(s): Oct 3, 2018

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:

This message was in addition to the ones proposed in the NOI

BMP:Resident message - What is a watershed? What are sources of water pollution?

Message Description and Distribution Method:

Classroom programs at Framingham Public Schools

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

The Framingham DPW presented classroom programs at three public schools in Framingham including Keefe Technical High School (November 9, 2018), Framingham High School (March 25, 2019), and Walsh Middle School (April 25, 2019).

Message Date(s): Nov 9, 2018; March 25, 2019; & April 25, 2019

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:

This message was in addition to the ones proposed in the NOI

BMP:Resident message - The Drain is just for Rain

Message Description and Distribution Method:

Facebook & Twitter posts from Framingham DPW: "Remember that rain entering the storm drain is exiting into nearby rivers and streams--that means anything else that's dumped into the drain ends up in those same bodies of water. Keep Framingham waterways clean by making sure only rain goes down the drain!"

Targeted Audience: All

Responsible Department/Parties: DPW

Measurable Goal(s):

964 people reached; 54 engagements on Framingham DPW's Facebook page
1,743 people reached; 59 engagements of Framingham DPW's Twitter feed

Message Date(s): August 7, 2019

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:

This message was in addition to the ones proposed in the NOI

BMP:Resident message - Street Sweeping is vital to keeping waterways clean

Message Description and Distribution Method:

Facebook post with reminder about Annual Street Sweeping Program & Urban Street Sweeping Program, with emphasis on keeping streets & waterways clean

Targeted Audience: Residents

Responsible Department/Parties: DPW Highway

Measurable Goal(s):

559 people reached, 21 engagements on Framingham DPW's Facebook page

Message Date(s): September 4, 2018

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:

This message was in addition to the ones proposed in the NOI

BMP:Resident message - Motor oil, pet waste, & litter contributes to waterway pollution

Message Description and Distribution Method:

Facebook & Twitter posts from Framingham DPW: "Did you know motor oil dripping from your car, pet waste left on the lawn, and litter are things that contribute to the pollution of our waterways? Remember that when it rains, waste left on the ground will go down the storm drain and ultimately affect our water.This is a problem we can all help fix. Learn more at FraminghamMA.gov/Stormwater."

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

651 people reached, 46 engagements on Framingham DPW's Facebook page for September post
780 people reached; 18 engagements of Framingham DPW's Twitter feed for September post
1,889 people reached; 82 engagements of Framingham DPW's Twitter feed for January post

Message Date(s): September 21, 2018; January 2, 2019

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:

This message was in addition to the ones proposed in the NOI

BMP: Annual leaf litter message - Leaf litter & brush collection

Message Description and Distribution Method:

Facebook reminders about curbside leaf & brush collection in Fall to encourage proper disposal of leaf litter

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

2,277 people reached, 164 engagements on Framingham DPW's Facebook page
971 people reached; 11 engagements of Framingham DPW's Twitter feed

Message Date(s): October 18, 2018; October 26, 2018

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 Department of Public Works presented on the City's stormwater program at a public meeting called "Community Conversation on Recycling and Stormwater" on October 25, 2018, which was hosted by the Mayor and held at City Hall. Following that, the DPW provided a presentation to the City Council during one of their public meetings on November 20, 2018. Input provided by the public was incorporated into the Stormwater Management Plan and the SWMP was posted on the City's website.

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:

DPW hosted Household Hazardous Waste Days on May 19, 2018; October 27, 2018; and May 11, 2019. Over 570 residents participated.

DPW hosted a Rain Barrel event in June 2018. 62 rain barrels were distributed.

The City participated in the following public events to educate and involve the public on the City's stormwater management:
o Arbor Day (May 2018) - local event involving DPW, local tree companies & landscaping companies, Keefe Technical High School, and other local non-profit organizations
o BOSE Day of Service (May 11, 2018) - Volunteers from the Framingham-based BOSE Corporation helped plant a rain garden at a City park.
o RiverFest (June 17, 2018) - Annual festival hosted by the Concord, Assabet, & Sudbury Wild & Scenic

River Stewardship Council included an informational trail walk in the Wild & Scenic portion of the Sudbury River in Framingham.
o Community Conversation on Open Space & Environment (June 21, 2018) hosted by the Mayor
o Truck Day at McAuliffe Library (June 23, 2018)
o Back-to-School Picnic (August 30, 2018) – over 800 attendees
o River clean-up (Sep 2018) hosted by OARS watershed group
o River Stewardship Council 50th Anniversary (Oct 14, 2018) Framingham's Conservation Agent provided a demonstration on nutrient loading and invasive aquatic vegetation
o DPW Open House (December 8, 2018)
o Presentation at Massachusetts Association of Conservation Commissions (MACC) Annual Conference (Mar 2, 2019)
o Mass Audubon Low Impact Development (LID) Workshop presentations (March 11, 2019 & May 8, 2019) - the second workshop included a walking tour at Cushing & Farm Pond Parks in Framingham
o Girl Scouts of Eastern Massachusetts STEM conference at Framingham State University (March 24, 2018) - DPW partnered with New England Water Environment Association to give a workshop on "Pollution Police"
o Earth Day (April 27, 2019) - The Conservation Commission had a booth at the Framingham Earth Day festival on the Centre Common, which included demonstrations using the Enviroscape model to demonstrate sources of water pollution and describe ways citizens can prevent pollution
o RiverFest (June 22, 2019) - Annual festival hosted by the Concord, Assabet, & Sudbury Wild & Scenic River Stewardship Council included a river cleanup, paddle, & informational trail walk in the Wild & Scenic portion of the Sudbury River in Framingham.

Our municipality participated in the Central Massachusetts Regional Stormwater Coalition (CMRSWC) and the Massachusetts Statewide Municipal Stormwater Coalition (Statewide Coalition). The CMRSWC & Statewide Coalition presented on the Think Blue Massachusetts public awareness campaign and regional collaboration on stormwater at the following public events:
• Metrowest/495 Partnership (October 4, 2018)
• MetroWest Stormwater Roundtable hosted by MetroWest Regional Collaborative (MWRC) of the Metropolitan Area Planning Council (MAPC) (November 20, 2018)
• Massachusetts Municipal Association (MMA) Meeting & Trade Show (Jan 18-19 2019)
• New England Water Environment Association Annual Conference (Jan 28 2019)
• Massachusetts Association of Conservation Commissions Annual Conference (March 2, 2019)
• Massachusetts Congress of Lake and Pond Associations Annual Workshop (April 12, 2019)
• New England American Public Works Association Spring Conference (April 17, 2019)
• Ecotarium Earth Day activities (April 16 – 19, 2019)
• New England Water Environment Association Spring Meeting (June 4, 2019)

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: 1

Number of SSOs removed: 0

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: 12

Total number of SSOs removed: 11

MS4 System Mapping

Describe the status of your MS4 map, including any progress made during the reporting period:

Framingham's municipal GIS system includes pipes, culverts, swales, catch basins, manholes and outfalls, with unique identifiers and attribute data including ownership. Ongoing research was conducted in Year 1 to identify and map stormwater BMPs.

During Year 1, Framingham worked with a consultant to establish city-wide initial catchment delineations and interconnection points, with plans to finalize these after field verification and review.

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:

https://www.epa.gov/npdes-permits/2003-small-ms4-general-permit-archives-massachusetts-new-hampshire

Framingham conducted screening under the MS4-2003 permit. The results were submitted with annual reports and are available at the EPA's website. The City is in the process of converting the data from paper forms (which were attached to annual reports) into a GIS database that can be used to incorporate results from future screening.

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

Number of outfalls screened: 239

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

Percent of total outfalls screened: 48%

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: 0

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

Percent of total catchments investigated: 0%

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.

- ○ The illicit discharge removal report is attached to the email submission
- ◉ The illicit discharge removal report can be found at the following website:

https://www.epa.gov/npdes-permits/2003-small-ms4-general-permit-archives-massachusetts-new-hampshire

No illicit discharges were identified during this reporting period.
Framingham tracked illicit discharges under the MS4-2003 permit. Previous IDDE tracking was submitted with annual reports and are available at the EPA's 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: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: N/A [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: 0

Total number of illicit discharges removed: 0

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 conducted during the reporting period:

Framingham employees involved in the IDDE program participated in IDDE training. One employee participated in training provided by Needham DPW on December 18, 2018. Eight employees attended a workshop on April 24, 2019 at the Framingham DPW sponsored by CMRSWC. The workshops trained participants on important aspects of the IDDE program, including how to recognize illicit discharges and SSOs. The workshops emphasized a hands-on approach and targeted municipal employees who will be performing or involved in outfall sampling and investigation. Participants were provided an IDDE plan and inspection report templates.

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: 42

Number of inspections completed: 96

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 in year 2 of the permit term:

Framingham developed a working group including Engineering, Conservation Commission, and Planning staff and citizen members. The working group drafted a stormwater ordinance and regulations. The ordinance will be submitted to the City Solicitor for review. The working group intends to present the ordinance for review and approval by the City Council and Mayor to meet the Year 2 deadline.

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:

These requirements are included in the draft ordinance.
The Framingham Subdivision Rules & Regulation reference the Framingham Construction Standards. The Framingham Construction Standards (https://www.framinghamma.gov/1116/Construction-Standards) require that "The Contractor shall be responsible for the preparation and submittal of record drawings to the

DPW when construction is complete." The Standards also state, "The owner of any property on which a drainage system is located is responsible for the maintenance and upkeep of the system. Prior to construction of said drainage system, the owner shall provide documents describe the long term operation and maintenance of all permanent erosion control and stormwater management measures. The inspection and maintenance of the drainage systems shall be performed at minimum on an annual basis, and more frequently depending on the circumstances."

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:

The City will complete the Street Design and Parking Lots Report by Year 4.

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:

The green infrastructure report is complete. Mass Audubon prepared a report for the City titled “Encouraging Low Impact Development in Framingham, MA: A bylaw review analysis” which is included as an attachment to the City's SWMP. The report evaluates Framingham’s land use regulations in relation to models and examples from the Commonwealth of Massachusetts’ Smart Growth/Smart Energy Toolkit and other sources in relation to the use of LID and Green Infrastructure (GI) techniques in development. According to the report, "Overall, Framingham’s commitment to the protection of its natural resources and for ensuring sustainable development that maintains the historic and cultural character of the town is inspiring." Framingham's best management practices were given high ratings.

The following recommendations were made in the report:
 Ensure sufficient funding for DPW to perform maintenance of public stormwater management facilities, whether conventional or LID. Most of Framingham’s regulations require homeowner associations to cover this cost for private facilities, which will ensure maintenance in perpetuity.
 Create mechanisms for enforcement of maintenance agreements; establish regulations/fines for property owners who fail to maintain stormwater facilities.
 Provide opportunities for and encourage municipal staff and committee/board members to participate in LID workshops or conferences.
 Local plumbing codes should allow the use of clean (e.g. rooftop) rainwater for landscape irrigation and interior non-potable uses such as toilet flushing.
 Implement LID demonstration programs at city or town hall, schools, DPW, etc.

The City has made the following progress towards the recommendations:
 In October 2018, the City hired its first sustainability coordinator.
 In 2019, the City partnered with Mass Audubon for a series of workshops as part of their Shaping Your Future: Greening Your Community program. The first workshop “Put a LID on it: Managing Your Community’s Stormwater in a Changing Climate” was held on March 11, 2019 in Framingham. The second workshop, “A walking tour of Framingham’s spaces that manage stormwater with nature”, was held on May 8, 2019 and included a site visit to the City's new skatepark which incorporates green infrastructure. One more workshop is planned.

 The City is evaluating funding needs and exploring funding options for management of the public stormwater system. The City is considering a stormwater enterprise as a potential option.
 The drafted stormwater ordinance includes mechanisms for enforcement of maintenance agreements and establishes required actions and potential fines for property owners who fail to maintain private stormwater facilities.

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:

An inventory of at least five (5) City-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 are identified in the City's SWMP. The inventory identifies if the properties are located in a drainage area for a water quality limited waterbody with additional requirements for pollutant removal. The list includes the following properties: new Fuller Middle School (currently under construction with expected completion in 2022); Framingham High School junior parking lot (currently being renovated in conjunction with the City's new fire station); Little Farm Road cul-de-sac (currently being renovated in conjunction with sewer pump station upgrades); Fountain Street & Dudley Road intersection (FY21 capital improvement request); and Cushing Memorial Park.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

The City's catch basin cleaning optimization plan is included in the City's SWMP.

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:

https://www.framinghamma.gov/1133/Stormwater-Management

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: 6,114

Number of catch basins cleaned: 6,114

Total volume or mass of material removed from all catch basins: 1,697 tons

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

Total number of catch basins: 7,583

If applicable:

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

Year 1 was used as the first routine inspection. Two consecutive routine inspections will not take place until Year 2 of the permit. The City will report on actions, if applicable, on the next annual report.

Street Sweeping

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

Framingham's Highway Department is responsible for the municipal street sweeping program. The City's Highway Street Sweeping Policy and Procedures are included in the City's SWMP.

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

- (●) Number of miles cleaned: 3,721
- ( ) Volume of material removed: [UNITS]
- ( ) Weight of material removed: [UNITS]

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

N/A

Winter Road Maintenance

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

The Highway Department develops an annual Winter Operations Guide, which is included in the City's SWMP, which includes a comprehensive plan for snow plowing, sanding and salting. Storage of salt is also addressed by the SWPPP for the DPW's Henry Street facility.

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:

As required by the permit, the City maintains an inventory of parks and open space, buildings and facilities where pollutants are exposed to stormwater, and storage areas for vehicles and equipment in our GIS. This includes public schools, operation centers, City offices, police stations, fire stations, City-owned parking lots and garages and other permittee-owned or operated buildings or facilities.

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:

Framingham will modify the SOP templates available from CMRSWC.

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:

Under the 2003 permit, the DPW operated under a comprehensive Stormwater Pollution Prevention Plan (SWPPP) that addressed all Public Works facilities in one document. To meet 2016 permit requirements, Framingham will make revisions using the SWPPP template provided by CMRSWC. Framingham will develop individual SWPPPs for the following facilities: DPW Operations Center, DPW Henry Street Facility, DPW Arthur Street Facility, Recycling Drop-off Center & Yard Waste Center, and the Park Maintenance & Operations Facility.

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

Number of site inspections completed: 0

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:

The City's DPW cataloged publicly-owned stormwater treatment structures based on available mapping and institutional knowledge. The DPW created a directory of available operations & maintenance manuals for the stormwater treatment structures. The DPW performed annual inspections on identified and accessible stormwater treatment structures within the City's rights-of-way and created a log of proposed short- and long-term maintenance needs.

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:

N/A

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:

In FY19 & FY20, the City of Framingham installed BMPs (a raingarden, bioswale, and two Stormceptor water quality units) within the Farm Pond watershed under the 319 grant program.

The City is an active member of the Central Massachusetts Regional Stormwater Coalition and the Statewide Municipal Stormwater Coalition. The City supports the Think Blue Massachusetts statewide stormwater awareness & education campaign.

The City continues to support incorporating stormwater into STEM (Science, Technology, Engineering, & Math) initiatives. The City's senior stormwater engineer serves on the Advisory Committee for the MetroWest STEM Network, which spearheaded activities in MetroWest for Massachusetts STEM Week in October 2018. The City's senior stormwater engineer also served as a project sponsor (along with MassDEP) and coalition liaison for the Water Resource Outreach Center (WROC) at Worcester Polytechnic Institute (WPI) 2019 project “Increasing Watershed Awareness in Education: Development of Educational Curricula,” focused on developing curriculum to educate elementary school students on the importance of protecting waterbodies and building connections between municipal offices and public schools. The project evaluated ways to incorporate stormwater education into the new Massachusetts Next Generation Science Standards.

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 ☒

- Complete system mapping Phase I
- Begin investigations of catchments associated with Problem Outfalls
- Develop or modify an ordinance or other regulatory mechanism for post-construction stormwater runoff from new development and redevelopment
- Establish and implement written procedures to require the submission of as-built drawings no later than two years after the completion of construction projects
- Develop, if not already developed, written operations and maintenance procedures
- Develop an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; review annually and update as necessary
- Establish a written program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner
- Develop and implement a written SWPPP for 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
- Develop, if not already developed, written procedures for sweeping streets and municipal-owned lots
- Develop, if not already developed, written procedures for winter road maintenance including storage of salt and sand
- Develop, if not already developed, a schedule for catch basin cleaning
- Develop, if not already developed, a written procedure for stormwater treatment structure maintenance
- Develop a written catchment investigation procedure *(18 months)*

<u>Annual Requirements</u>

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

Provide any additional details on activities planned for permit year 2 below:

Planned activities are listed in the City's SWMP.

Part V: 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: YVONNE M. SPICER Title: MAYOR

Signature: Yvonne M. Spicer Date: 9/24/19

[Signatory may be a duly authorized representative]

Year 2 Annual Report
Massachusetts Small MS4 General Permit
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: City of Framingham

EPA NPDES Permit Number: MAR041116

Primary MS4 Program Manager Contact Information

Name: Kerry Reed Title: Senior Stormwater Engineer

Street Address Line 1: 100 Western Ave

Street Address Line 2:

City: Framingham State: MA Zip Code: 01702

Email: kr@framinghamma.gov Phone Number: (508) 532-6010

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.framinghamma.gov/1133/Stormwater-Management

Date SWMP was Last Updated: June 30, 2020

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

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

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 2 Requirements

☒ Completed Phase I of system mapping

☒ Developed a written catchment investigation procedure and added the procedure to the SWMP

☒ 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

☒ Enclosed or covered storage piles of salt or piles containing salt used for deicing or other purposes

☒ 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

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 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:

MS4 infrastructure maintenance is addressed in the City's SWMP, with a focus on roadway drainage maintained by DPW. The City had intended on creating a stormwater enterprise but, due to budget impacts resulting from COVID-19, has decided not to pursue an enterprise at this time. A more comprehensive master

plan with additional focus on maintenance and enhancements of stormwater infrastructure for all municipal properties (i.e. schools, parks, municipal buildings & parking lots) would have been prepared had a stormwater enterprise been approved.

Annual Requirements

- ☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements
- ☒ Kept records relating to the permit available for 5 years and made available to the public
- ☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented
  - ○ This is not applicable because we do not have sanitary sewer
  - ○ This is not applicable because we did not find any new SSOs
  - ○ The updated SSO inventory is attached to the email submission
  - ◉ The updated SSO inventory can be found at the following website:

    https://www.framinghamma.gov/1133/Stormwater-Management. The inventory is included as an appendix of the SWMP.
- ☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters
- ☒ Provided training to employees involved in IDDE program within the reporting period
- ☐ All curbed roadways were swept at least once within the reporting period
- ☒ Updated outfall and interconnection inventory and priority ranking as needed

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:

The City's street sweeping was put on hold as a result of COVID-19 from mid-March through early June 2020 due to work force adjustments to help mitigate the pandemic and focus on essential services. Additionally, more on-street parking occurred because of "stay at home" directives making it more difficult to conduct street sweeping effectively. As a result, although the City completed a significant amount of street sweeping throughout the year, the City could not complete sweeping of all curbed roadways before the end of the permit year.

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:

The entire City has access to public sewer. Very few properties have septic and the City has limited records of which properties have septic systems. The Health Department began working on developing an inventory of properties with septic systems, but their resources have been completely refocused on the COVID-19 pandemic so they were not able to complete the inventory. Therefore, the City was unable to conduct targeted outreach regarding proper maintenance.

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

Annual Requirements

*Public Education and Outreach**

☒ Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers

☒ Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

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

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

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

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:

Appendix F does not apply to Framingham since there are no TMDLs within the City limits No structural water quality BMPs have been installed in the catchments for phosphorus impaired waterbodies in the regulated area by the City of Framingham or its agents.

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

As noted above, the City was unable to complete increased street sweeping as a result of COVID-19.

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☐ Increased street sweeping frequency of all municipal owned streets and parking lots to a schedule that targets areas with potential for high pollutant loads

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

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

As noted above, the City was unable to complete increased street sweeping as a result of COVID-19.
The catch basin cleaning program was also impacted by COVID-19, but the areas that discharged to impaired waters were prioritized.

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

Part III: Receiving Waters/Impaired Waters/TMDL

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

- (●) Yes
- ( ) No

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

Based on the Massachusetts' 2016 303(d) list of water quality limited segments (WQLS), approved on January 2, 2020, the City updated the following based on changes to Category 5 - "Waters requiring a TMDL":
Added E.Coli as an impairment cause for Cochituate Brook (MA82A-22), described as "Unnamed tributary to the Sudbury River locally known as Cochituate Brook, headwaters outlet north basin of Lake Cochituate. Framingham to mouth at confluence with Sudbury River"
Added E.Coli as an impairment cause for Sudbury River (MA82A-03), described as "Outlet Saxonville Pond, Framingham to confluence with Hop Brook (the lower portion of Hop Brook was identified as Wash Brook on USGS quads prior to 1987), Wayland"

Part IV: Minimum Control Measures

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

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 8

*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: Resident message 2 - Stormwater pollution is trash, oil, cigarette butts, & dog waste.

Message Description and Distribution Method:

Think Blue Massachusetts "Fowl Water" video (https://www.thinkbluemassachusetts.org/) Advertisement on Facebook & YouTube. Also broadcast on Access Framingham TV.

Targeted Audience: Residents

Responsible Department/Parties: Massachusetts Statewide Municipal Stormwater Coalition

Measurable Goal(s):

Over 300,000 social media impressions from residents of Framingham (107,222 in July 2019; 197,160 in June 2020). Also shared on Access Framingham public access television.
Over 13 Million impressions across Massachusetts

Message Date(s): July 2019; June 2020

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:Annual pet waste message - Scoop the Poop

Message Description and Distribution Method:

The City continued the "Scoop the Poop" public education campaign to inform residents about how pet waste impacts water quality. Social media posts shared on the Framingham DPW's Facebook, twitter, and instagram encouraged the proper management of pet waste. The City also distributed pet waste bag dispensers shaped like fire hydrants with an information flyer to dog owners at the time of issuance or renewal of dog licenses. The City also has signs and pet waste stations at many public parks.

Targeted Audience: Residents

Responsible Department/Parties: DPW, Engineering, City Clerk, Parks & Recreation, Conservation Commissic

Measurable Goal(s):

Over 6,000 impressions on social media.

Message Date(s): July 29, 2019; February 19, 2020; June 24, 2020

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:Business message 2/Annual message - Proper lawn maintenance

Message Description and Distribution Method:

Social media posts shared on the Framingham Public Works facebook, twitter, and instagram in the Spring timeframe encouraging the proper use and disposal of grass clippings and encouraged the proper use of slow-release fertilizers.

Targeted Audience: Businesses, institutions and commercial facilities; Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Over 3,000 impressions on social media

Message Date(s): May 11, 2020

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:Annual leaf litter message - Leaf litter & brush collection

Message Description and Distribution Method:

Social media posts shared on the Framingham Public Works facebook, twitter, and instagram in Fall to encourage proper disposal of leaf litter.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Over 10,000 impressions on social media

Message Date(s): Oct 1, 2019; Oct 9, 2019; Dec 13, 2019

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: Developer message 2 - Stormwater & the Construction Industry: Maintain Your BMPs

Message Description and Distribution Method:

Framingham's Engineering Depatment maintains the EPA's "Stormwater & the Construction Industry" poster with Dos & Don'ts for maintaining construction BMPs at the DPW Operations Center at the customer service desk for permits. The DPW also incorporated erosion & sediment control guidance into annual drain layers training which is locally required in order to get construction permits from the City. Drain layers training was held at Framingham DPW on June 30, 2020 and virtual online training was conducted on June 23, 2020.

Targeted Audience: Developers (construction)

Responsible Department/Parties: DPW, Engineering

Measurable Goal(s):

Approximately 10-20 persons per month who obtain permits at the DPW customer service desk can view the poster. Due to COVID-19, the customer service desk was closed from March 2020 - June 2020 so Year 2 metrics are less than Year 1.
Due to COVID-19, the drain layers training was rescheduled to June 2020 with significantly less participation than previous years. 2 new construction professionals who work locally attended the drain layers training.

Message Date(s): July 1, 2019 - June 30, 2020

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:

This message was provided in Year 2 (2020). Our NOI had this message being presented in 2022.

BMP: Resident message - How water pollution impacts your watershed

Message Description and Distribution Method:

The DPW and Conservation Commission have used an Enviroscape, a hands-on, interactive model, to demonstrate the sources and effects of water pollution and ways to prevent pollution. The City is a member of Central Massachusetts Regional Stormwater Coalition (CMRSWC), which also uses the model at regional

public events at which City residents participate.

Targeted Audience: Residents

Responsible Department/Parties: CMRSWC, DPW, Conservation

Measurable Goal(s):

The Enviroscape was used for stormwater education at the following public events:
• Massachusetts Science, Technology, Engineering, & Math (STEM) Week (October 2019)
• Keefe Technical High School STEM Week program (October 23, 2019)
• Framingham Public Works Open House (Dec 7, 2019)

Message Date(s): Oct 22, 2019; Oct 23, 2019; Dec 7, 2019

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:

This message was in addition to the ones proposed in the NOI

BMP:Resident message - What is a watershed? What are sources of water pollution?

Message Description and Distribution Method:

Classroom programs at Framingham Public Schools

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

The Framingham DPW presented classroom programs at two public schools in Framingham (Potter Road Elementary School and King Elementary School).

Message Date(s): Oct 30, 2019; Nov 6, 2019

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:

This message was in addition to the ones proposed in the NOI.

BMP: Think Blue Massachusetts

Message Description and Distribution Method:

City staff presented at an EPA New England Soak up the Rain webinar on December 5, 2019. The webinar

was titled “Working Together: Collaborative Stormwater Management in Central Massachusetts”. The webinar showcased how CMRSWC works with participating towns using creative and cost-effective techniques to address Small Municipal Separate Storm Sewer Systems (MS4) permit requirements. The recording is available on the EPA’s website and the slides are posted on CMRSWC’s website.

City staff also presented at a NEIWPCC non-point source pollution national webinar on January 9, 2020 on Think Blue Massachusetts. The recording is available on NEIWPCC’s website https://neiwpcc.org/our-programs/pollution-control/tmdl/303d-tmdl-webinars/#Social_Jan20.

Targeted Audience: Businesses, institutions and commercial facilities; Residents; Developers; Industrial

Responsible Department/Parties: DPW

Measurable Goal(s):

There were 136 attendees for the Soak up the Rain webinar and over 50 attendees for the NEIWPCC webinar.

Message Date(s): Dec 5, 2019; Jan 9, 2020

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:

This message was in addition to the ones proposed in the NOI.

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 Department of Public Works presented on the City's stormwater program at a public City Council meeting on February 4, 2020 held at City Hall. The Stormwater Management Plan is posted on the City's website at https://www.framinghamma.gov/1133/Stormwater-Management.

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**:

DPW hosted Household Hazardous Waste Days on Sep 14, 2019. 326 residents participated.
DPW also hosted an Open House on December 7, 2019.

The City planned to participate in many public events to educate and involve the public on the City's stormwater management which were canceled due to COVID-19, such as: annual rain barrel program, Girl Scouts of Eastern Massachusetts STEM conference at Framingham State University (March), Earth Day (April), 2020 Massachusetts STEM Summit (April), Arbor Day (May), BOSE Day of Service and other volunteer events (May), and RiverFest (June).

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: 8

Number of SSOs removed: 8

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

Optional: Describe any additional progress you made on your map during this reporting period or provide additional status information regarding your map:

Interconnections with MassDOT-owned infrastructure have been the most difficult to map.

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:

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

Number of outfalls screened: 25

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: 0

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

Percent of total catchments investigated: 0

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

The City does not have any Problem Outfalls and therefore did not start catchment investigations.

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: 1

Number of illicit discharges removed: 1

Estimated volume of sewage removed: 5 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: 1

Total number of illicit discharges removed: 1

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

See attached IDDE log

Employee Training

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

Framingham employees involved in the IDDE program participated in annual IDDE training. Three employees attended training workshops sponsored by CMRSWC on May 5, 2020 and May 7, 2020 remotely via GoTo Meeting. The workshops were originally intended to be in-person but were adapted to virtual workshops due to COVID-19. The workshops trained participants on important aspects of the IDDE program, including how to recognize illicit discharges and SSOs.

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: 34

Number of inspections completed: 64

Number of enforcement actions taken: 0

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

Ordinance or Regulatory Mechanism

Below, select the option that describes your ordinance or regulatory mechanism progress.

- ○ Bylaw, ordinance, or regulations are updated and adopted consistent with permit requirements

- (•) Bylaw, ordinance, or regulations are updated consistent with permit requirements but are not yet adopted
- ( ) Bylaw, ordinance, or regulations have not been updated or adopted

As-built Drawings

Describe 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:

These requirements are included in the draft ordinance/regulations.
The Framingham Subdivision Rules & Regulation and Framingham Construction Standards (https://www.framinghamma.gov/1116/Construction-Standards) require that "The Contractor shall be responsible for the preparation and submittal of record drawings to the DPW when construction is complete." The Standards also state, "The owner of any property on which a drainage system is located is responsible for the maintenance and upkeep of the system. Prior to construction of said drainage system, the owner shall provide documents describe the long term operation and maintenance of all permanent erosion control and stormwater management measures. The inspection and maintenance of the drainage systems shall be performed at minimum on an annual basis, and more frequently depending on the circumstances."

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:

The City will complete the Street Design and Parking Lots Report by Year 4.

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:

The green infrastructure report is complete. Mass Audubon prepared a report for the City titled “Encouraging Low Impact Development in Framingham, MA: A bylaw review analysis” which is included as an attachment to the City's SWMP. The report evaluates Framingham’s land use regulations in relation to models and examples from the Commonwealth of Massachusetts’ Smart Growth/Smart Energy Toolkit and other sources in relation to the use of LID and Green Infrastructure (GI) techniques in development. According to the report, "Overall, Framingham’s commitment to the protection of its natural resources and for ensuring sustainable development that maintains the historic and cultural character of the town is inspiring." Framingham's best management practices were given high ratings.

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:

An inventory of at least five (5) City-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 are identified in the City's SWMP. The inventory identifies if the properties are located in a drainage area for a water quality limited waterbody with additional requirements for pollutant removal.

Two projects (High School junior parking lot and Little Farm Road cul-de-sac) were completed in FY20, since submittal of the previous Annual Report. One project (Fuller Middle School) is under construction. Two new potential projects (Mary Dennison Park and Walnut Street flood mitigation) were added to the inventory.

MCM6: Good Housekeeping

Catch Basin Cleaning

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

Number of catch basins inspected: 6,696

Number of catch basins cleaned: 6,696

Total volume or mass of material removed from all catch basins: 976 tons

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

Total number of catch basins: 8,287

If applicable:

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

Street Sweeping

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

- ◉ Number of miles cleaned: 2,255
- ○ Volume of material removed: [Select Units]
- ○ Weight of material removed: 1,972 tons

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

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: 0

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

No corrective actions have occurred. SWPPP inspections will begin the first quarter of FY2021 (i.e. July - Sep 2020).

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:

With funding, input, and collaboration from the Massachusetts Department of Environmental Protection (MassDEP), Geosyntec Consultants developed a Watershed-Based Plan (WBP) for Farm Pond (MA82035). Farm Pond is an impaired waterbody listed under Category 5 on the Massachusetts Year 2016 Integrated List of Waters (303(d) list) for non-native aquatic plants, Eurasian Water Milfoil (EWM), excess algal growth, and turbidity. The purpose of the WBP is to organize information about the watershed, and present it in a format that will enhance the development and implementation of projects that will restore water quality and beneficial uses. The WBP follows USEPA's recommended format for “nine-element” watershed plans. The primary goal of this WBP is to reduce Total Suspended Solids (TSS) and TP loading to Farm Pond.

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:

The City is an active member of the Central Massachusetts Regional Stormwater Coalition (CMRSWC) and

the Statewide Municipal Stormwater Coalition. The City supports the Think Blue Massachusetts statewide stormwater awareness & education campaign. CMRSWC presented on the Think Blue Massachusetts public awareness campaign and regional collaboration on stormwater at the following events:
• New England Water Environment Association Annual Conference (Jan 2020)
• Massachusetts Association of Conservation Commissions Annual Conference (February 28, 2020)

CMRSWC was awarded an Environmental Merit Award from EPA Region 1. Each participating community, including Framingham, was recognized as part of the award. The award was presented in September 2019.

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:

As noted earlier in this report, the City made adjustments to its work force to help mitigate the pandemic and was only able to provide essential direct services as a result of the COVID-19 pandemic from mid-March through early June 2020. Many stormwater services were reduced or put on hold such as street sweeping, catch basin cleaning, outfall screening, outfall sampling, and BMP inspections. As reopening expanded, the City increased its work load and continued street sweeping and catch basin cleaning. Outfall screening and sampling has been deferred and the City still intends to complete the activities by the Year 3 deadline.

Additionally, the City has been evaluating the feasibility of implementing a stormwater utility and enterprise to provide sustainable stormwater management and funding. Initially, there was hope that a stormwater enterprise could be implemented in FY21. City leadership has decided to defer a potential new user fee associated with stormwater enterprise as a result of COVID-19's significant impact on the City's revenue and budget.

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 ☒

- Inspect all outfalls/ interconnections (excluding Problem and Excluded outfalls) for the presence of dry weather flow
- Complete follow-up ranking as dry weather screening becomes available

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program

- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all uncurbed streets at least annually
- Continue investigations of catchments associated with Problem Outfalls
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary

Provide any additional details on activities planned for permit year 3 below:

Part V: 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:	Dr. Yvonne M. Spicer	Title:	Mayor
Signature:	Yvonne M. Spicer	Date:	9/11/2020

[Signatory may be a duly authorized representative]

Year 3 Annual Report
Massachusetts Small MS4 General Permit
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: City of Framingham

EPA NPDES Permit Number: MAR041116

Primary MS4 Program Manager Contact Information

Name: Kerry Reed Title: Senior Stormwater Engineer

Street Address Line 1: 100 Western Ave

Street Address Line 2:

City: Framingham State: MA Zip Code: 01702

Email: kr@framinghamma.gov Phone Number: (508) 532-6010

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.framinghamma.gov/1133/Stormwater-Management

Date SWMP was Last Updated: June 30, 2021

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

Available on website above or at DPW Operations Center at 100 Western Ave, Framingham, MA

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

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

☒ Inspected and screened all outfalls/interconnections (excluding Problem and Excluded outfalls)

☒ Updated outfall/interconnection priority ranking based on the information collected during the dry weather inspections as necessary

☒ Post-construction bylaw, ordinance, or other regulatory mechanism was updated and adopted consistent with permit requirements

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:

Annual Requirements

☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements

☒ Kept records relating to the permit available for 5 years and made available to the public

☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented

- ○ This is not applicable because we do not have sanitary sewer
- ○ This is not applicable because we did not find any new SSOs

◉ The updated SSO inventory is attached to the email submission

○ The updated SSO inventory can be found at the following website:

☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters

☒ Provided training to employees involved in IDDE program within the reporting period

☐ All curbed roadways were swept at least once within the reporting period

☒ Updated system map due in year 2 as necessary

☒ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt

☒ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities

☒ Updated inventory of all permittee owned facilities as necessary

☒ O&M programs for all permittee owned facilities have been completed and updated as necessary

☒ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs

☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants

☐ Inspected all permittee owned treatment structures (excluding catch basins)

Optional: If you would like to describe progress made on any incomplete requirements listed above, 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:

The City's street sweeping and inspection programs were impacted by COVID-19. The City's work force and budget were adjusted to help mitigate the pandemic so less labor, equipment, and subcontracted services were available for stormwater management. More on-street parking occurred because residents were staying home making it more difficult to conduct street sweeping effectively or access some treatment structures. The City reduced our routine frequency of street sweeping in more urbanized areas (which is more often than required by the permit) to accommodate the increased need for parking. Many City facilities were closed during the pandemic making it more challenging to inspect, operate, and maintain the treatment BMPs at those facilities (e.g. libraries, schools, etc.). As a result, although the City completed a significant amount of street sweeping and operations and maintenance throughout the year, the City could not complete sweeping of ALL curbed roadways and inspections of ALL permittee owned treatment structures this permit year.

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:

Very few properties in Framingham have septic and the City has limited records. The Health Department began working on developing an inventory of properties with septic systems, but their resources were completely refocused on the COVID-19 pandemic in Year 2 & 3 of the permit.

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

Annual Requirements

*Public Education and Outreach**

☒ Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers

☒ Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

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

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

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

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:

Appendix F does not apply to Framingham since there are no TMDLs within the City limits No structural water quality BMPs have been installed in the catchments for phosphorus impaired waterbodies in the regulated area by the City of Framingham or its agents.

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

As noted above, the City was unable to complete increased street sweeping as a result of COVID-19. Many municipal facilities were closed and less people were commuting because of the COVID-19 pandemic so there was significantly less use of municipal parking lots.

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☐ Increased street sweeping frequency of all municipal owned streets and parking lots to a schedule that targets areas with potential for high pollutant loads

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

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

As noted above, the City was unable to complete increased street sweeping as a result of COVID-19. Many municipal facilities were closed and less people were commuting because of the COVID-19 pandemic so there was significantly less use of municipal parking lots.

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

Part III: Receiving Waters/Impaired Waters/TMDL

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

- (●) Yes
- ( ) No

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

Field work for outfall screening confirmed that no City-owned outfalls discharge directly to Grist Mill Pond. Therefore, Grist Mill Pond was removed from Framingham's list of receiving waters in our SWMP.

Part IV: Minimum Control Measures

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

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 6

*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:Annual pet waste message - Scoop the Poop

Message Description and Distribution Method:

The City continued the "Scoop the Poop" public education campaign to inform residents about how pet waste impacts water quality. Social media posts shared on the Framingham DPW's Facebook, twitter, and instagram encouraged the proper management of pet waste. The City also distributed pet waste bag dispensers shaped like fire hydrants with an information flyer to dog owners, although less were distributed this year because of COVID-19. The City also has signs and pet waste stations at many public parks.

Targeted Audience: Residents

Responsible Department/Parties: DPW, Engineering, City Clerk, Parks & Recreation, Conservation Commissic

Measurable Goal(s):

Distributed approximately 50 pet waste bag dispensers

Message Date(s): June 2021

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:Annual message - Proper lawn maintenance

Message Description and Distribution Method:

Social media post about establishing a new lawn and utilizing fertilizer and best practices including soil testing was shared on the Framingham Public Works facebook page in the spring encouraging the proper use and disposal of grass clippings and encouraged the proper use of slow-release fertilizers.

Targeted Audience: Businesses, institutions and commercial facilities; Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

646 people reached over Facebook

Message Date(s): April 23, 2021

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:Annual leaf litter message - Leaf litter & brush collection

Message Description and Distribution Method:

Social media posts shared on the Framingham Public Works facebook, twitter, and instagram in Fall to encourage proper disposal of leaf litter.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

2,406 people reached.

Message Date(s): Nov 4, 2021

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:Think Blue Massachusetts

Message Description and Distribution Method:

Think Blue Massachusetts "Fowl Water" video (https://www.thinkbluemassachusetts.org/)
Advertisement on Facebook & YouTube. Video available on the Think Blue Massachusetts website.

Targeted Audience: Businesses, institutions and commercial facilities; Residents; Developers; Industrial

Responsible Department/Parties: Massachusetts Statewide Municipal Stormwater Coalition

Measurable Goal(s):

Over 117,000 social media impressions from residents of Framingham, including approximately 12,700 impressions for the Spanish language video.

Message Date(s): May 17, 2021 - June 4, 2021

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:

This message was in addition to the ones proposed in the NOI.

BMP:Annual septic message

Message Description and Distribution Method:

Social media posts shared on the Framingham Public Works facebook, twitter, and instagram providing information to owners of septic systems about proper maintenance. Information was from EPA's Septic Smart Week program.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

911 impressions on social media

Message Date(s): Sep 15, 2021

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: Central Massachusetts Regional Stormwater Coalition - social media messaging

Message Description and Distribution Method:

In November 2020, the Central Massachusetts Regional Stormwater Coalition (CMRSWC) contracted Capital Strategic Solutions (CSS) to assist with messaging requirements for MCM 1. A CMRSWC Facebook page and Instagram account were created, to supplement CMRSWC's existing Twitter account. Weekly messages were distributed through social media to target audiences consisting of residents, developers, businesses, institutions, commercial and industrial facilities located in Framingham and other CMRSWC communities. Topics on ways to reduce water pollution included: proper disposal of hazardous wastes, how to prepare for winter conditions, proper car washing techniques, septic system maintenance, yard maintenance, pet waste disposal, etc.

Targeted Audience: residents, developers, businesses, institutions, commercial facilities and other surrounding

Responsible Department/Parties: CMRSWC

Measurable Goal(s):

By June 2021, 220 posts had been added to the CMRSWC Facebook and Instagram pages with over 2,500 impressions on Facebook and over 2,200 impression on Instagram with over 1,000 engagements. CMRSWC's twitter account had over 3,000 posts with 492,400 impressions. CMRSWC's tweets had over 2,000 engagements. CMRSWC's social media posts were shared by numerous municipalities, organizations, and the EPA.

Message Date(s): Nov 2020 - June 2021

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:

Social media messaging is a new service being provided to CMRSWC member communities in Year 3 and, therefore, would not have previously been identified on municipality's NOIs.

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 City's Stormwater Management Plan is posted on the City's website at https://www.framinghamma.gov/1133/Stormwater-Management.

The City's stormwater program and revisions to local ordinances and regulations were discussed at the following (virtual) public meetings during this reporting period (FY21)
• City Council Finance subcommittee – Oct 13, 2020
• City Council – Nov 17, 2020
• City Council's Planning and Zoning subcommittee – Nov 30, 2020
• Planning Board – Dec 17, 2020
• City Council's Planning and Zoning subcommittee – Jan 11, 2021
• Planning Board – Jan 21, 2021
• City Council's Planning and Zoning subcommittee – Jan 25, 2021
• City Council's Planning and Zoning subcommittee – Feb 8, 2021
• City Council's Planning and Zoning subcommittee – Feb 22, 2021
• City Council – April 6, 2021 – public hearing for first reading for ordinance
• Planning Board – April 22, 2021
• City Council – April 27, 2021 – public hearing for second reading for ordinance

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**:

DPW hosted Household Hazardous Waste Day on May 1, 2021. 439 residents participated.

The City planned to participate in many public events to educate and involve the public on the City's stormwater management which were canceled due to COVID-19.

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: 6

Number of SSOs removed: 6

MS4 System Mapping

Optional: Provide additional status information regarding your map:

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: 385

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

Percent of outfalls screened: 100

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: 0

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

Percent of total catchments investigated: 0

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: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 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: 1

Total number of illicit discharges removed: 1

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

See attached IDDE log

Employee Training

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

Framingham employees involved in the IDDE program participated in annual IDDE training. The City's Senior Stormwater Engineer participated in virtual training sponsored by Central Massachusetts Regional Stormwater Coalition. Two additional employees were trained by the City's Senior Stormwater Engineer. The training focused on aspects of the IDDE program, including how to recognize illicit discharges and SSOs.

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: 56

Number of inspections completed: 405

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

The City conducts numerous site plan reviews, construction inspections, and enforcement actions that involve water quality and stormwater controls. These are conducted by the Department of Public Works, the Planning Board, the Conservation Commission, the Health Department, and the Building Department for compliance with numerous City rules and regulations. Many of the sites are less than an acre and therefore not covered under the MS4 permit. If the project had a stormwater management component, whether or not the site was over 1 acre of disturbance, the City considered it for the metrics above. As a result of the recently adopted updates to the Land Disturbance and Stormwater Management ordinance, the City will be able track more efficiently and provide more accurate metrics in the Year 4 report.

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

As-built Drawings

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

Number of as-built drawings received: 29

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

If the project had a stormwater management component and the DPW received an as-built plan, whether or not the site was over 1 acre of disturbance, the City considered it for the metrics above. The City will be able track more efficiently and provide more accurate metrics in the Year 4 report as a result of the recently adopted updates to the Land Disturbance and Stormwater Management ordinance.

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:

The City will complete the Street Design and Parking Lots Report by Year 4.

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:

The green infrastructure report is complete. Mass Audubon prepared a report for the City titled “Encouraging Low Impact Development in Framingham, MA: A bylaw review analysis” which is included as an attachment to the City's SWMP. The report evaluates Framingham’s land use regulations in relation to models and examples from the Commonwealth of Massachusetts’ Smart Growth/Smart Energy Toolkit and other sources in relation to the use of LID and Green Infrastructure (GI) techniques in development. According to the report, "Overall, Framingham’s commitment to the protection of its natural resources and for ensuring sustainable development that maintains the historic and cultural character of the town is inspiring." Framingham's best management practices were given high ratings.

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:

An inventory of at least five (5) City-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 are identified in the City's SWMP. The inventory identifies if the properties are located in a drainage area for a water quality limited waterbody with additional requirements

for pollutant removal.

MCM6: Good Housekeeping

Catch Basin Cleaning

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

Number of catch basins inspected: 6,552

Number of catch basins cleaned: 6,552

Total volume or mass of material removed from all catch basins: 606 tons

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

Total number of catch basins: 8,422

If applicable:

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

Street Sweeping

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

- (●) Number of miles cleaned: 1,817
- ( ) Volume of material removed: [Select Units]
- ( ) Weight of material removed: 746 tons

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: 20

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

At the DPW Annex – Arthur Street Facility, an area that was eroding near the property fence was stabilized. At the DPW Annex - Henry Street Facility, housekeeping was improved following snow & ice activities to reduce runoff of salt.

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:

1) Lake Waushakum Outfall Screening and Sampling Memorandum, dated February 5, 2021, prepared by Weston & Sampson for the City of Framingham.

Lake Waushakum is impaired for phosphorus. This technical memo summarizes work completed to assist the City in conducting dry and wet-weather outfall screening and sampling at Lake Waushakum to support the development of a Phosphorus Source Identification Report (PSIR), as required by Appendix H (in Year 4).

2) Framingham Ponds Year End Report, prepared by SOLitude Lake Management for the City of Framingham.

This report summarized herbicide treatment for nuisance vegetation and water quality monitoring conducted by SOLitude at the following ponds: Learned Pond, Norton Pond, Gleason Pond, Lake Waushakum, and Farm Pond. Lake Waushakum, and Farm Pond have water quality impairments with additional permit requirements under Appendix H. A single round of water quality samples was collected from each of the ponds and analyzed for the following water quality parameters: pH, Turbidity, Alkalinity, Nitrate-Nitrogen, Total Phosphorus, True and Apparent Color, and E. coli.

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:

The City is an active member of the Central Massachusetts Regional Stormwater Coalition (CMRSWC), the Massachusetts Statewide Municipal Stormwater Coalition, and the Massachusetts Coalition for Water Resources Stewardship (MCWRS). The City supports the Think Blue Massachusetts statewide stormwater awareness & education campaign.

The Metropolitan Area Planning Council (MAPC) awarded the City a FY21/22 Accelerating Climate Resilience grant to support design efforts for green infrastructure, solar, and/or other climate resilient improvements at Waushakum Beach.

The Federal Emergency Management Agency (FEMA) awarded the City a Flood Mitigation Assistance grant and the Massachusetts Executive Office for Energy and Environmental Affairs (EEA) awarded the City a

FY20/21 Municipal Vulnerability Preparedness (MVP) grant to support flood mitigation analyses and preliminary design for a vulnerable neighborhood in Framingham (the Walnut Street neighborhood). The MVP grant also supported a feasibility study for a potential stormwater enterprise.

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 ☒

- Develop a report assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover
- Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist
- Identify a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious areas

Annual Requirements

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

transfer stations, and other waste handling facilities
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary
- Review O&M programs for all permittee owned facilities; update if necessary
- Implement all maintenance procedures for permittee owned facilities in accordance with O&M programs
- Implement program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- Enclose all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- Review as-built drawings for new and redevelopment to ensure compliance with post construction bylaws, regulations, or regulatory mechanism consistent with permit requirements
- Inspect all permittee owned treatment structures (excluding catch basins)

Provide any additional details on activities planned for permit year 4 below:

Part V: Certification of Small MS4 Annual Report 2021

40 CFR 144.32(d) Certification

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

Name: YVONNE M. SPICER Title: MAYOR

Signature: [signature] Date: 9/2/21

[Signatory may be a duly authorized representative]

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

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

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

Part I: Contact Information

Name of Municipality or Organization: City of Framingham

EPA NPDES Permit Number: MAR041116

Primary MS4 Program Manager Contact Information

Name: Alison Eliot Title: Senior Stormwater Engineer

Street Address Line 1: 110 Western Ave

Street Address Line 2: NA

City: Framingham State: MA Zip Code: 01702

Email: AEliot@framinghamma.gov Phone Number: (508) 532-6010

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.framinghamma.gov/3443/MS4-Permit

Date SWMP was Last Updated: 6/21/2022

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

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

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

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

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

2025

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

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

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

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

Annual Requirements

- ☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements
- ☒ Kept records relating to the permit available for 5 years and made available to the public
- ☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented
  - ○ This is not applicable because we do not have sanitary sewer
  - ○ This is not applicable because we did not find any new SSOs
  - ○ The updated SSO inventory is attached to the email submission
  - ◉ The updated SSO inventory can be found at the following website:

    The SSO inventory is included as Appendix F of the City's Stormwater Management Plan and can be found at the following website: https://www.framinghamma.gov/1133/Stormwater-Management
- ☒ Updated system map due in year 2 as necessary
- ☒ Provided training to employees involved in IDDE program within the reporting period
- ☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters
- ☒ All curbed roadways were swept at least once within the reporting period
- ☒ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- ☒ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- ☒ Updated inventory of all permittee owned facilities as necessary
- ☒ O&M programs for all permittee owned facilities have been completed and updated as necessary
- ☒ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs
- ☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- ☒ Inspected all permittee owned treatment structures (excluding catch basins)

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

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

☒ Annual message was distributed encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Permittee or its agents disseminated educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time

☒ Provided information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

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

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

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

Annual Requirements

*Public Education and Outreach**

☒ Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers

☒ Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

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

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

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

Phosphorus Source Identification Report

☒ Completed the Phosphorus Source Identification Report

○ The Phosphorus Sourchace Identification Report is attached to the email submission

◉ The Phosphorus Source Identification Report can be found at the following website:

The Lake Waushakum Phosphorus Source Identification Report is included as Appendix D of the City's Stormwater Management Plan and can be found at the following website: https://www.framinghamma.gov/1133/Stormwater-Management

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:

Appendix F does not apply to Framingham since there are no TMDLs within the City limits. No structural water quality BMPs have been installed in the catchments for phosphorus impaired waterbodies in the regulated area by the City of Framingham or its agents.

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:

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☒ Increased street sweeping frequency of all municipal owned streets and parking lots to a schedule that targets areas with potential for high pollutant loads

- ○ The street sweeping schedule is attached to the email submission
- ◉ The street sweeping schedule can be found at the following website:

https://www.framinghamma.gov/2074/Urban-Street-Sweeping-Program

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

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

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

The City completed a traffic calming project along Grant Street which included "bumps outs" which added approximately 5,490 square feet of green space (grass area between sidewalk and roadway).

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:

The Sudbury River is listed on the 2018/2020 303d list (which became effective during this permit cycle - Year 4) as having an e.coli impairment.

Part IV: Minimum Control Measures

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

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 8

*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:(1) Clear a Drain

Message Description and Distribution Method:

"Clear a drain" -reminder to check the drains before heavy rain. Message distributed via City of Framingham Instagram/Facebook/Twitter, DPW Facebook/Twitter.

Targeted Audience: All

Responsible Department/Parties: DPW

Measurable Goal(s):

City of Framingham Facebook - 489 people reached, 4 engagements, 5 likes, 11 shares
City of Framingham Instagram - 1097 accounts reached, 19 content interactions.
DPW Facebook - 3072 people reached, 66 engagements, 22 likes, 16 shares
DPW Twitter - 7038 impressions, 142 engagements, 13 retweets, 1 quote retweet, 13 likes, 2 shares
City of Framingham Twitter - retweets

Message Date(s): 7/8/21, 8/4/21, 8/18/21, 8/21/21, 9/1/21, 10/25/21, 2/24/22, 3/11/22, 5/25/22

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:

This message was in addition to the ones proposed in the NOI.

BMP:(2) Think Blue Massachusetts

Message Description and Distribution Method:

Think Blue Massachusetts "Fowl Water" video (https://www.thinkbluemassachusetts.org)
Advertisement on Facebook/Instagram and YouTube. Video available on the Think Blue Massachusetts website.

Targeted Audience: Businesses, institutions and commercial facilities; Residents; Developers; Industrial

Responsible Department/Parties: Massachusetts Statewide Municipal Stormwater Coalition

Measurable Goal(s):

Over 104,000 social media impressions from residents of Framingham, including over 10,200 impressions for the Spanish language video.

Message Date(s): May 31, 2022- June 17, 2022

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:

This message was in addition to the ones proposed in the NOI.

BMP:(3) Septic System Maintenance

Message Description and Distribution Method:

Septic System Tips and Maintenance message distributed via DPW Twitter, City of Framingham Twitter and DPW Facebook

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

DPW Facebook - 697 people reached, 8 engagements, 2 likes, 1 share
DPW Twitter - 292 Impressions, 5 engagements, and 1 retweet

Message Date(s): 6/2/22

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:(4) Leaf Litter

Message Description and Distribution Method:

Leaf litter post - guidance to residents about how to properly dispose of leaves and to take advantage of the City's curbside collection via social media

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

DPW Twitter-237 Impressions and 9 engagements
DPW Facebook-517 people reached, 8 engagements, and 3 likes
City of Framingham Facebook-share

Message Date(s): 11/6/2021

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:(5) Nutrients in Lawn Fertilizers

Message Description and Distribution Method:

Did you know nutrients in lawn fertilizers can wash off into nearby waterways encouraging algae, and invasive plants to grow? This type of growth is harmful to fish and aquatic life and can also limit recreational use such as swimming and boating. Information about conducting soil testing. via social media

Targeted Audience: residents, businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

City of Framingham Instagram-180 accounts reached and 1 content interaction
City of Framingham Facebook-share
DPW Facebook-1,768 people reached, 83 engagements, 26 likes, and 4 shares
DPW Twitter-608 impressions, 15 engagements, and 1 retweet
City of Framingham Twitter - retweet

Message Date(s): 5/3/22

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:(6) Ice Melt Post

Message Description and Distribution Method:

Ice melt post - select an enviromentally-friendly de-icing material so when the snow melts it does not cause stormwater pollution via social media

Targeted Audience: residents, businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

City of Framingham Instagram 237 accounts reached and 3 content interactions
DPW Facebook 520 people reached, 19 engagements, 11 likes, and 1 share
DPW Twitter 763 impressions, 11 engagements, 2 likes, and 2 retweets
City of Framingham Twitter N/A - Retweet

Message Date(s): 3/10/22

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:(7) Scoop the Poop!

Message Description and Distribution Method:

The City continued the "Scoop the Poop" public education campaign to inform residents about how pet waste impacts water quality. Social media posts shared on the City of Framingham Facebook, Instagram and Twitter, as well as DPW Facebook and Twitter to encourage proper management of pet waste. The City also distributed pet waste bag dispensers shaped like fire hydrants and informational postcards, although less were distributed this year due to lingering COVID concerns. Pet waste bags, postcards and stormwater coloring books, and doggy coloring contest were distributed at community events include Earth Day, Lake Association meetings and the grand opening celebration of Framingham's first Dog Park.

Targeted Audience: Residents

Responsible Department/Parties: DPW, Engineering, Conservation, City Clerk, Parks & Rec

Measurable Goal(s):

City of Framingham Instagram 168 accounts reached and 4 content interactions
City of Framingham Facebook N/A - Share
DPW Facebook 2,875 people reached, 110 engagements, 8 likes, and 12 shares
DPW Twitter 518 impressions, 7 engagements, 3 likes, and 3 retweets
City of Framingham Twitter N/A Retweet
Earth Day celebration - 300+ booth visitors, distributed 100 pet waste dispensers/rubby duckies & coloring books.

Lake Association/neighborhood meetings - distributed 20 postcards

Message Date(s): 5/10/22 (social media), Earth Day 4/23/22, meetings - 5/1/22 & 5/18/22

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:(8) Central Massachusetts Regional Stormwater Coalition- social media messaging

Message Description and Distribution Method:

Our Community is a member of the Central MA Regional Stormwater Coalition (CMRSWC). In November 2020, CMRSWC contracted Capital Strategic Solutions (CSS) to assist with messaging requirements for MCM1. A CMRSWC Facebook page and Instagram account were created to supplement the existing Twitter account. Weekly messages were distributed through social media to target audiences consisting of residents, developers, businesses, institutions, commercial and industrial facilities located in CMRSWC communities. Topics on way to reduce water pollution included: proper disposal of hazardous wastes, how to prepare for winter conditions, proper car washing techniques, septic system maintenance, yard maintenance and pet waste disposal.

Targeted Audience: residents, developers, businesses, institutions, commercial and industrial facilities

Responsible Department/Parties: CMRSWC

Measurable Goal(s):

Facebook - 462 posts, 289 reactions, 253 shares, 2 comments
Instagram - 442 posts, 740 reactions, 370 shares, 21 comments
Twitter - 6529 posts, 9406 reactions, 894 shares

Message Date(s): July 1, 2021- June 30, 2022

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:

Social media messaging was a new service being provided to CMRSWC member communities starting in Year 3, and would not have previously been identified in our NOI.

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 City's Stormwater Management Plan is posted on the City's website at https://www.framinghamma.gov/1133/Stormwater-Management.

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**:

DPW hosted Household Hazardous Waste Day on July 31, 2021 (245 residents participated) and May 14, 2022 (335 residents participated).

The City's participation in public events to educate and involve the public on the City's stormwater management were limited due to COVID.
-DPW presented to the FHS Environmental Awareness Club, approximately 25 students on September 23, 2021.
-DPW presented to the Fuller Middle School STEAM "Go Getters" after-school program, approximately 40 students on October 18, 2021. Distributed Dwayne coloring books.
-DPW presented to Potter Road 5th grade science classes with the Enviroscape watershed and Ward's floodplain models. Approximately 90 students participated. Distributed Dwayne coloring books. November 29, 2021 and December 1, 2021.
-DPW hosted City Councilor from District 7 to tour DPW facility and discuss importance of stormwater management.
-DPW presented "April Showers bring May flowers....and flooding in Framingham" at the Framingham Senior Center on April 22, 2022. Approximately 20 attendees.
-DPW and Conservation Departments co-staffed a booth at Framingham Earth Day Festival (April 23, 2022) on the Centre Common, which included demonstrations using the Enviroscape model to demonstrate sources of water pollution and describe ways citizens can prevent pollution. 300+ booth visitors. Distributed coloring books, ThinkBlue Ducks, dog waste bag dispensers, and informational bookmarks & postcards.
-DPW, Conservation, Health Department and Parks & Rec participated in a Lake Waushakum Association member meeting to present information on water quality and stormwater systems. Approximately 40 participants on May 2, 2022.
-Conservation participated in a Learned Pond neighborhood meeting which included discussions about water quality. Approximately 30 participants on May 18, 2022.
-DPW supports local litter cleanup group (Keep Framingham Beautiful) by disposing of collected debris/trash and sharing stormwater messages.
-Lake Waushakum Association neighborhood members installed over 100 drain placards in June 2022.
Our municipality participated in the Central Massachusetts Regional Stormwater Coalition (CMRSWC) and the Massachusetts Statewide Municipal Stormwater Coalition (Statewide Coalition).
During Year 4 the City's Stormwater website was updated to provide more educational information, reorganized and highlighting community outreach/engagement.

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: 4

Number of SSOs removed: 4

MS4 System Mapping

Optional: Provide additional status information regarding your map:

Framingham's municipal GIS system is a robust mapping system. As catchment investigation and other field work continue to be performed, updates are made to the GIS system to more accurately reflect system connections. As a result, adjustments and modifications occur on an on-going basis.

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: 0

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

Percent of outfalls screened: 100

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: 7

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

Percent of total catchments investigated: 1

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

Catchment investigations commenced this permit year. Numbers above only reflect catchments where investigations are considered complete. 32 inspections in 10 catchments were initiated but additional follow up work is required in some catchments (i.e. CCTV, etc.)

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: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 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: 0

Total number of illicit discharges removed: 0

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 conducted **during this reporting period**:

Framingham employees involved in the IDDE program participated in annual IDDE training. Two employees participated in virtual self paced training sponsored by Central Massachusetts Regional Stormwater Coalition. An additional employee was trained by the City's Senior Stormwater Engineer. The training focused on aspects of the IDDE program, including how to recognize illicit discharges and SSOs.

MS4 Year 4 Senior Stormwater & Environmental Engineer Training
-October 27, 2021 Green & Nature Based Infrastructure Solutions for Economic Recovery in New England (AAAS EPI)
-October 28, 2021 EPA MS4 Nutrient Source ID Webinar
-January 11, 2022 MA Coalition for Water Resources Stewardship MS4 Permit Compliance Challenges & Opportunities (1.5 credit hours)
-February 16, 2022 SNEP - Is your Community Climate Resilient? Bylaws and Best Practices (1.5 hrs)
-May 25, 2022 US EPA Soak up the Rain Webinar Series: Green Infrastructure & MS4 permit (1.5 credit hours)

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: 212

Number of inspections completed: 859

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

The City conducts numerous site plan reviews, construction inspections, and enforcement actions that involve water quality and stormwater controls. These are conducted by the Department of Public Works, the Planning Board, the Conservation Commission, the Health Department, and the Building Department for compliance with numerous City rules and regulations. Many of the sites are less than an acre and therefore not covered under the MS4 permit. If the project had a stormwater management component, whether or not the site was over 1 acre of disturbance, the City considered it for the metrics above.

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

Ordinance or Regulatory Mechanism

Date update was completed (due in year 3): April 27, 2021

As-built Drawings

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

Number of as-built drawings received: 92

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

If the project had a stormwater management component and the DPW received an as-built plan, whether or not the site was over 1 acre of disturbance, the City considered it for the metrics above.

Retrofit Properties Inventory

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

An inventory of at least five (5) City-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 are identified in the City's SWMP. The inventory identifies if the properties are located in a drainage area for a water quality limited waterbody with additional requirements for pollutant removal.

MCM6: Good Housekeeping

Catch Basin Cleaning

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

Number of catch basins inspected: 6,426

Number of catch basins cleaned: 6,220

Total volume or mass of material removed from all catch basins: 1,750 tons

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

Total number of catch basins: 8,497

If applicable:

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

The City collects and records % full sump data during catch basin inspections and continues to evaluate incorporating conclusions from this data into the inspection and service schedule. Total volume of material removed from catch basins was unavailable at the time of reporting, however is estimated above.

Street Sweeping

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

- ○ Number of miles cleaned: 3,825
- ○ Volume of material removed: [Select Units]
- ◉ Weight of material removed: 656.25 tons

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: 20

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

At the DPW Annex - Arthur St facility an area that was eroding near the property fence was monitored and stabilized.
At the DPW Annex- Henry St facility, straw waddles were installed along the fence line to reduce runoff of salt from snow & ice activities.

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:

Framingham Ponds Year End Report 2021, prepared by SOLitude Lake Management for the City of Framingham.
This report summarized herbicide & algaecide treatment for nuisance vegetation and water quality monitoring conducted by SOLitude at the following ponds: Learned Pond, Norton Pond, Gleason Pond, Lake Waushakum, Mohawk Pond and Farm Pond. Lake Waushakum and Farm Pond have water quality impairments with additional permit requirements under Appendix H. Two rounds of water quality samples were collected from each of the ponds and analyzed for the following water quality parameters: pH, turbidity, alkalinity, nitrate-nitrogen, total phosphorus, true and apparent color and e.coli. Samples were also taken for algae and cyanobacteria species identification and counts.

Framingham Sudbury River Year End Report 2021, prepared by SOLitude Lake Management for the City of Framingham.
This report summarizes water chestnut control efforts for the ponded section of the Sudbury River.

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:

The City is an active member of the Central Massachusetts Regional Stormwater Coalition (CMRSWC), the Massachusetts Statewide Municipal Stormwater Coalition, and the Massachusetts Coalition for Water Resources Stewardship (MCWRS). The City supports the Think Blue Massachusetts statewide stormwater awareness & education campaign.

The Metropolitan Area Planning Council (MAPC) awarded the City a FY21/22 Accelerating Climate Resilience grant to support design efforts for green infrastructure, solar and/or other climate resilient improvements at Waushakum Beach.

The Baker-Polito Administration announced Framingham as a recipient of an Environmental Protection Agency (EPA) 319 Clean Water Act grant which is administered by Massachusetts Department of Environmental Protection (DEP) to continue the design and construction of BMPs to reduce pollution from stormwater runoff discharging into Lake Waushakum.

The Massachusetts Executive Office for Energy and Environmental Affairs (EEA) awarded the City an FY'22 Municipal Vunerability Preparedness (MVP) grant to support design of stream restoration and flood mitigation for a vulnerable neighborhood in Framingham (the Walnut Street neighborhood).

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:

The City continues to feel the effects from the COVID-19 pandemic. Focus has remained on essential direct services, while many stormwater related tasks aim to progress towards pre-pandemic service levels. The City has increased work loads, however has suffered significant turnover and staff shortages.

Activities Planned for Next Reporting Period

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

Yes, I agree ☒

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all curbed streets at least annually
- Continue investigations of catchments associated with Problem Outfalls
- Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary
- Review O&M programs for all permittee owned facilities; update if necessary
- Implement all maintenance procedures for permittee owned facilities in accordance with O&M programs
- Implement program for MS4 infrastructure maintenance to reduce the discharge of pollutants

- Enclose all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- Review as-built drawings for new and redevelopment to ensure compliance with post construction bylaws, regulations, or regulatory mechanism consistent with permit requirements
- Inspect all permittee owned treatment structures (excluding catch basins)
- Identify additional permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious areas so that the permittee maintains a minimum of 5 sites in their inventory, until such a time when the permittee has less than 5 sites remaining

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

Part V: Certification of Small MS4 Annual Report 2021

40 CFR 144.32(d) Certification

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

Name:	Charlie Sisitsky	Title:	Mayor of Framingham
Signature:		Date:	5/19/22

[Signatory may be a duly authorized representative]

Year 5 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: July 1, 2022-June 30, 2023

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form. Also ensure any websites included on this form are to publicly accessible sites

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, 2022 and June 30, 2023 unless otherwise requested.

Part I: Contact Information

Name of Municipality or Organization: City of Framingham

EPA NPDES Permit Number: MAR041116

Primary MS4 Program Manager Contact Information

Name: Alison Eliot Title: Senior Stormwater Engineer

Street Address Line 1: 110 Western Ave

Street Address Line 2: n/a

City: Framingham State: MA Zip Code: 01702

Email: AEliot@framinghamMA.gov Phone Number: (508) 532-6010

Stormwater Management Program (SWMP) Information

SWMP Location (publicly available web address): https://www.framinghamma.gov/3443/MS4-Permit

Date SWMP was Last Updated: Jun 30, 2023

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

n/a

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

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.*

Annual Requirements

☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements

☒ Kept records relating to the permit available for 5 years and made available to the public

☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented

- ○ This is not applicable because we do not have sanitary sewer
- ○ This is not applicable because we did not find any new SSOs
- ○ The updated SSO inventory is attached to the email submission
- ◉ The updated SSO inventory can be found at the following publicly available website:

The SSO inventory is included as Appendix F of the City's Stormwater Management Plan and can be found at the following website: https://www.framinghamma.gov/1133/Stormwater-management

☒ Updated system map due in year 2 as necessary

☒ Provided training to employees involved in IDDE program within the reporting period

☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters

☒ All curbed roadways were swept at least once within the reporting period

☒ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt

☒ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities

☒ Updated inventory of all permittee owned facilities as necessary

☒ O&M programs for all permittee owned facilities have been completed and updated as necessary

☒ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs

☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants

☒ Inspected all permittee owned treatment structures (excluding catch basins)

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

n/a

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

☐ This is not applicable because there are no septic systems present

** 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:

n/a

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

Annual Requirements

*Public Education and Outreach**

☒ Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers

☒ Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

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

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

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

Structural BMPs

☒ Completed the evaluation of all permittee owned properties identified as presenting retrofit opportunities or areas for structural BMP installation under permit part 2.3.6.d or identified in the Phosphorus Source Identification Report, including: *(select the items of the evaluation that have been completed below)*

- ☒ Next planned infrastructure, resurfacing, or redevelopment activity planned for the property (if applicable) OR planned retrofit date
- ☒ Estimated cost of redevelopment or retrofit BMPs
- ☒ Engineering and regulatory feasibility of redevelopment or retrofit BMPs

☒ Completed a listing of planned structural BMPs and a plan and schedule for implementation

- ○ The BMP list and implementation schedule is attached to the email submission
- ◉ The BMP list and implementation schedule can be found at the following publicly available website:

The City's Stormwater Management Plan and can be found at the following website:
https://www.framinghamma.gov/1133/Stormwater-Management
Please reference the following appendices of the Stormwater Management Plan:
Appendix D - Lake Waushakum Phosphorus Source Identification Report 2022 & Phase II PSIR 2023
Appendix J - Inventory of Potential City-Owned Property Retrofits

☐ 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.

- ◉ No BMPs were installed
- ○ The above referenced BMP information is attached to the email submission
- ○ The above referenced BMP information can be found at the following publicly available website:

Total estimated phosphorus removed in **lbs/year** from the installed BMPs: 0

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:

Appendix F does not apply to Framingham since there are no TMDLs within the City limits.
No structural water quality BMPs have been installed in the catchments for phosphorus impaired waterbodies in the regulated area by the City of Framingham or its agents.

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☒ Increased street sweeping frequency of all municipal owned streets and parking lots to a schedule that targets areas with potential for high pollutant loads

- ○ The street sweeping schedule is attached to the email submission
- ◉ The street sweeping schedule can be found at the following publicly available website:

https://www.framinghamma.gov/2074/Urban-Street-Sweeping-Program

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

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

The City has a robust street sweeping schedule which includes sweeping all curbed roadways annually, urban and main roadways monthly, and downtown areas weekly. We continue to collect data to analyze and create a prioritization of catch basin cleanings. Currently, all catch basins are scheduled for annual inspections and/or cleaning.

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

n/a

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:

The Sudbury River is listed on the 2018/2020 303d list (which became effective during Permit Year 4) as having an e.coli impairment.

Part IV: Minimum Control Measures

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

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 16

*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:(1) Critical Drought Alert

Message Description and Distribution Method:

With critical drought conditions persistent during the Summer of 2022, messages were distributed via DPW Facebook to include tips on conserving water.

Targeted Audience: All

Responsible Department/Parties: DPW

Measurable Goal(s):

DPW Facebook - 6 reactions, 4 comments. We were unable to obtain metrics for total people reached.

Message Date(s): August 1, 2022

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:

This message was in addition to the ones proposed in the NOI.

BMP:(2) Household Hazardous Waste Day

Message Description and Distribution Method:

The City hosts bi-annual Household Hazardous Waste Day events to encourage proper waste disposal. Messages were posted via prominent traffic message boards in multiple locations in the City as well as distributed via City and DPW Facebook pages. A message is also distributed to participants enrolled in our "Notify Me" messaging (listserv) system.

Targeted Audience: Residents

Responsible Department/Parties: City/DPW

Measurable Goal(s):

DPW Facebook - 33 reactions, 6 comments, 8 shares.
City Facebook - 22 reactions, 13 shares
We were unable to obtain metrics for total people reached on social media.
DPW Notify Me messaging system. - 2446 people enrolled

Message Date(s): 8/11/22-8/17/22, 6/1/23, 6/12/23

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:

This message was in addition to the ones proposed in the NOI.

BMP:(3) SSO Notification System

Message Description and Distribution Method:

The City recently adopted new messaging protocols in accordance with State regulations if an SSO occurs. Part of the effort to keep the public aware of overflows, and to ensure public safety, the DPW and City have put together a notification system for anyone that would like to join. Facebook posts shares how audiences could learn more about SSOs and receive notifications during an SSO event.

Targeted Audience: All

Responsible Department/Parties: DPW/City

Measurable Goal(s):

DPW Facebook - 8 reactions, 6 comments, 1 share
City Facebook - 5 reactions, 1 comment, 1 share
We were unable to obtain metrics for total people reached.

Message Date(s): 9/20/22, 4/4/23

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:

This message was in addition to the ones proposed in the NOI.

BMP:(4) Leaf Collection & Disposal

Message Description and Distribution Method:

Facebook messages provide guidance on how to properly dispose of leaves and take advantage of the City's seasonal curbside leaf collection services.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

DPW Facebook - 20 reactions, 2 comments, 14 shares
We were unable to obtain metrics for total people reached.

Message Date(s): 10/19/22, 11/10/22, 12/8/22

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: (5) Septic Maintenance

Message Description and Distribution Method:

Top 10 Ways to be a Good Septic Owner (graphic from EPA Septic Smart) shared via social media.

Targeted Audience: Homeowners

Responsible Department/Parties: Health Dept, DPW

Measurable Goal(s):

DPW Facebook - 2 reactions
We were unable to obtain metrics for total people reached.

Message Date(s): 11/1/22

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:(6) Targeted Septic Maintenance Message

Message Description and Distribution Method:

Targeted mailers were mailed to 23 septic homeowners within the phosphorus impaired Lake Waushakum watershed. The mailers were shared with the Ashland Conservation Department as they are also located within the Lake Waushakum watershed.

Targeted Audience: homeowners

Responsible Department/Parties: Health Dept

Measurable Goal(s):

Lake Waushakum watershed targeted messaging: 23 mailers

Message Date(s): May 2023 mailers

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:

This message was in addition to the ones proposed in the NOI.

BMP:(7) Nutrients in Lawn Fertilizers

Message Description and Distribution Method:

Message - Did you know nutrients in lawn fertilizers can wash off into nearby waterways encouraging algae, and invasive plants to grow? This type of growth is harmful to fish and aquatic life and can also limit recreational use such as swimming and boating. via Facebook

Targeted Audience: All

Responsible Department/Parties: DPW

Measurable Goal(s):

DPW Facebook - 4 reactions, 1 share
We were unable to obtain metrics for total people reached.

Message Date(s): 5/24/23

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:(8) Deicing activities

Message Description and Distribution Method:

From November 1, 2022 through February 28, 2023, the Central MA Regional Stormwater Coalition distributed daily messages through social media to target deicing activities that have the potential to impact water quality.

Targeted Audience: all

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

13 Facebook Posts - 46 reactions, 26 shares, 18 comments
13 Instagram Posts - 102 impressions, 13 reactions, 3 shares
61 Twitter Posts - 3,624 impressions, 101 reactions, 46 shares, 27 comments

Message Date(s): daily November 1, 2022 through February 28, 2023

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:

This message was in addition to the ones proposed in the NOI.

BMP:(9) Ice Melt

Message Description and Distribution Method:

Select environmentally friendly de-icing so when snow melts it does not cause stormwater pollution via Facebook

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

DPW Facebook - 7 reactions, 1 share

Message Date(s): 2/23/2023

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:(10) Lawn Care

Message Description and Distribution Method:

From March 1, 2023 through May 31, 2023, the Central MA Regional Stormwater Coalition distributed daily messages through social media to target lawn care activities that have the potential to impact water quality.

Targeted Audience: All

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

9 Facebook Posts - 470 impressions, 16 reactions, 7 shares, 6 comments
8 Instagram Posts - 89 impressions, 4 reactions
61 Twitter Posts - 3,939 impressions, 79 reactions, 26 shares, 10 comments

Message Date(s): daily March 1, 2023 through May 31, 2023

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:

This message was in addition to the ones proposed in the NOI.

BMP: (11) Pet Waste

Message Description and Distribution Method:

From June 1, 2023 through June 30, 2023, the Central MA Regional Stormwater Coalition distributed daily messages through social media to target pet waste activities that have the potential to impact water quality.

Targeted Audience: All

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

5 Facebook Posts - 11 impressions, 998 reactions, 7 shares, 1 comments
7 Instagram Posts - 62 impressions, 1 reactions
12 Twitter Posts - 225 impressions, 5 reactions, 3 shares, 2 comments

Message Date(s): daily June 1, 2023 through June 30, 2023

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:

This message was in addition to the ones proposed in the NOI.

BMP:(12) Residential Water Quality Impacts

Message Description and Distribution Method:

From October 1, 2022, through June 30, 2023, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target residential activities that have the potential to impact the quality of water quality.

Targeted Audience: Residential

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

179 Facebook Posts - 8,297 impressions, 5,340 reactions, 181 shares, 119 comments
178 Instagram Posts - 1,727 impressions, 166 reactions, 37 shares, 8 comments
1,593 Twitter Posts - 73,111 impressions, 738 reactions, 408 shares, 6 comments

Message Date(s): October 1, 2022, through June 30, 2023

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:

This message was in addition to the ones proposed in the NOI.

BMP:(13) Commercial Water Quality Impacts

Message Description and Distribution Method:

From October 1, 2022, through June 30, 2023, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target the activities of the commercial businesses and employees that have the potential to impact the quality of water quality.

Targeted Audience: Commercial

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

5 Facebook Posts - 67 impressions, 4 reactions, 2 shares
4 Instagram Posts - 41 impressions, 4 reactions, 2 shares
47 Twitter Posts - 760 impressions, 5 reactions, 2 shares

Message Date(s): October 1, 2022, through June 30, 2023

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:

This message was in addition to the ones proposed in the NOI.

BMP:(14) Industrial Water Quality Impacts

Message Description and Distribution Method:

From October 1, 2022, through June 30, 2023, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target the activities of the industrial industry and employees that have the potential to impact the quality of water quality.

Targeted Audience: Industrial

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

3 Facebook Posts - 129 impressions, 2 reactions, 1 shares
3 Instagram Posts - 16 impressions, 13 reactions, 1 comment
68 Twitter Posts - 1,420 impressions, 11 reactions, 3 shares

Message Date(s): October 1, 2022, through June 30, 2023

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:

This message was in addition to the ones proposed in the NOI.

BMP:(15) Developers & Contractors Water Quality Impacts

Message Description and Distribution Method:

From October 1, 2022, through June 30, 2023, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target the activities of the developers and contractors and employees that have the potential to impact the quality of water quality.

Targeted Audience: Developers & Contractors

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

9 Facebook Posts - 292 impressions, 11 reactions, 7 shares, 3 comments
8 Instagram Posts - 76 impressions, 7 reactions
139 Twitter Posts - 5,015 impressions, 54 reactions, 21 shares, 3 comments

Message Date(s): October 1, 2022, through June 30, 2023

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:

This message was in addition to the ones proposed in the NOI.

BMP:(16) Pet Waste @ Licensing

Message Description and Distribution Method:

Educational messages are distributed to dog owners via postcards at the City Clerk's office which can be obtained when owners are renewing or obtaining a dog license.

Targeted Audience: All

Responsible Department/Parties: DPW/City Clerk

Measurable Goal(s):

100 postcards distribued

Message Date(s): July 1, 2022 - June 30, 2023

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 City's Stormwater Management Plan is posted on the City's website at https://www.framinghamma.gov/1133/Stormwater-Management.

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**:

-DPW participated in the much anticipated Grand Opening of our First Dog Park celebration on July 5, 2022. Distributed Dwayne coloring books, pet waste dispensers, informational postcards & doggie coloring sheets.
-DPW hosted Household Hazardous Waste Day on August 20, 2022 (162 residents participated) and June 10, 2023 (288 residents participated).
-The City's participation in public events to educate and involve the public on the City's stormwater management were limited due to staff shortages.
-DPW presented to the FHS Environmental Awareness Club, approximately 10 students on April 27, 2023.
-DPW presented to Potter Road 5th grade science classes with the Enviroscape watershed and Ward's floodplain models. Approximately 80 students participated. Distributed Dwayne coloring books. February 9 & 10, 2023.
-Framingham Conservation Assistant agent and Commission members staffed a booth at Framingham Earth Day Festival, April 22, 2023 on the Centre Common, which included demonstrations using the Enviroscape model to demonstrate sources of water pollution and describe ways citizens can prevent pollution. Distributed coloring books, ThinkBlue Ducks, dog waste bag dispensers, and informational bookmarks & postcards.
-DPW, Conservation, Health Department and Parks & Rec provide regular updates and participate in communication with Lake Waushakum Association members to present information on water quality and

stormwater systems.
-City staff participated in a Learned Pond neighborhood meeting which included discussions about water quality June 7, 2023.
-DPW supports local litter cleanup group (Keep Framingham Beautiful) by disposing of collected debris/trash and sharing stormwater messages. Keep Framingham Beautiful members have installed drain placards.
-Lake Waushakum Association neighborhood members continue to monitor and replace as needed the drain placards installed during Permit Year 4.
-Our municipality participated in the Central Massachusetts Regional Stormwater Coalition (CMRSWC) and the Massachusetts Statewide Municipal Stormwater Coalition (Statewide Coalition).
-During Year 5 the City's Stormwater website was updated to provide updated educational information, reorganized and highlighting community outreach/engagement.
-DPW hosted an Open House in which Enviroscape watershed and Ward's floodplain models were used to engage visitors. Pet waste bags, Dwayne coloring books and other educational materials were distributed. Over 500 people attended the event.
- DPW hosted a local Girl Scout troop in celebration of their completion of Water WOW project & badges. Enviroscape watershed and Ward's floodplain models were used to engage the Girl Scouts and parents. Dwayne coloring books, rain gauges and other educational materials were distributed. Approximately 20 attendees.

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: 4

Number of SSOs removed: 4

MS4 System Mapping

Optional: Provide additional status information regarding your map:

Framingham's municipal GIS system is a robust mapping system. As catchment investigation and other field work continue to be performed, updates are made to the GIS system to more accurately reflect system connections. As a result, adjustments and modifications occur on an on-going basis. A thorough review of all catchments is underway.

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 above referenced outfall screening data is attached to the email submission

○ The above referenced outfall screening data can be found at the following publicly available website:

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

Number of outfalls screened: 34

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

Percent of outfalls screened: 87

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

During a comprehensive review of the outfall inspection data during this reporting period, it was determined that dry weather outfall screening and sampling was not performed at selected outfalls due to an inability to locate or access these outfalls. The 100% of outfalls screened as reported in Permit Year 3 & 4 applies to outfalls that were located and could be accessed at that time. For outfalls where dry weather screening was incomplete, screening will be attempted again during Permit Year 6, and should the outfalls not be located or accessed, screening will take place at the nearest upstream structure to satisfy this requirement.

Dry weather screening was completed at 4 outfalls during this reporting period. To date, 434 of 544 outfalls (80%) have been screened during dry weather. At 39 outfalls that could not be accessed or located in prior reporting periods, dry weather screening was performed at the upstream structure during catchment investigations to satisfy this requirement, for a total of 473 of 544 outfalls screened (87%). As the current drainage mapping has several combined catchment areas (i.e. more than one outfall per catchment in certain catchment areas), dry weather outfall screening has been completed in 86% of the catchments. The City of Framingham is internally working on updating mapping and re-delineating catchments to have one delineated tributary catchment area per outfall.

Wet weather screening and sampling was performed at 31 outfalls this reporting period. To date, 41/544 outfalls (8%) have been sampled during wet weather conditions. Since the current drainage mapping has more than one outfall per catchment in certain catchment areas, wet weather outfall screening and sampling has been completed in 6% of the catchments.

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 publicly available website:

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

Number of catchment investigations completed this reporting period: 147

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

Percent of total catchments investigated: 49

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

Significant progress was made on catchment investigations this permit year. Catchments were prioritized based on receiving water body impairments, water quality considerations, and proximity to bathing beaches. Additionally, catchments previously identified as having likely sewer input during dry weather outfall screening were prioritized. Catchment investigations were started in 156 catchment areas and completed in 147 catchment areas during this reporting period. There are 9 catchments that are "incomplete" or "pending" due to ongoing construction or maintenance needs affecting access to the drainage system, or unresolved evidence of an illicit discharge. In catchment areas with at least one sample showing likely sewer input, follow-up investigations are ongoing. In catchment areas with no key junction manholes, where dry weather outfall screening was completed in previous reporting periods and no flow was observed, dry weather outfall screening was deemed sufficient, and no in-system catchment investigations are required. Based on dry weather outfall inspection data, 83 catchments were deemed completed with no flow observed, and 7 catchments were deemed complete with flow observed and sampling results not indicating evidence of an illicit discharge. During Permit Year 4 (FY'22) 7 catchments investigations were completed within the Lake Waushakum watershed. In total, catchment investigations are complete in 244 out of the 496 catchments.

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 publicly available 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: 1

Number of illicit discharges removed: 1

Estimated volume of sewage removed: 1,440 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: 2

Total number of illicit discharges removed: 2

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

During Year 2, on March 2, 2020, a residential property was identified as having their washing machine connected to a sump pump that discharged to Beaver Dam Brook. The Framingham Conservation Commission issued a Notice of Violation. The homeowner disconnected the discharge pipe and reconnected the washing machine effluent to the sanitary sewer.

Employee Training

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

Framingham employees involved in the IDDE program participated in annual IDDE training. Four employees participated in virtual self-paced training sponsored by Central Massachusetts Regional Stormwater Coalition.
MS4 Year 5 Senior Stormwater & Environmental Engineer Training
-July 26, 2022 EPA Soak up the Rain Webinar Series - Retrofit Manual
-August 2-4, 2022 National Highway Institute Urban Drainage Design Training
-October 3, 2022 Mass DEP Wetlands, Wetland Regulations and the MCP
-October 13, 2022 - massFM (Floodplain Managers) Annual Conference
-December 7, 2022 LSPA Dredging 201- Fundamentals of Sediment Remediation
-January 23-25, 2023 NEWEA Annual Conference
-February 21, 2023 Stormwater University Porous Pavement
-May 10, 2023 NEWEA Future of Stormwater in New England
-June 14, 2023 USACE Flood Fight Demonstration & Training

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: 264

Number of inspections completed: 974

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

During this permit year, the City migrated to a new inspection tool in April 2023 (VueWorks). Data was pulled from two inspection tracking software programs, Forms on Fire & VueWorks.

The City conducts numerous site plan reviews, construction inspections, and enforcement actions that involve water quality and stormwater controls. These are conducted by the Department of Public Works, the Planning Board, the Conservation Commission, the Health Department, and the Building Department for compliance with numerous City rules and regulations. Many of the sites are less than an acre and therefore not covered under the MS4 permit. If the project had a stormwater management component, whether or not the site was over 1 acre of disturbance, the City considered it for the metrics above.

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

Ordinance or Regulatory Mechanism

Date update was completed (due in year 3):	April 27, 2021
Website of ordinance or regulatory mechanism:	https://www.framinghamma.gov/242/City-Charter-Ordinances

As-built Drawings

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

Number of as-built drawings received: 52

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

If the project had a stormwater management component and the DPW received an as-built plan, whether or not the site was over 1 acre of disturbance, the City considered it for the metrics above. This number includes 3 City projects. In Permit Year 4 (FY'22) the City processed a higher number of occupancy permits related to a large development project.

Street Design and Parking Lots Report

Below, describe any changes made or planned to be made to local regulations and guidelines based on the report completed in Year 4:

The Street Design & Parking Lots report completed in Year 4 reviewed regulatory mechanisms using a list of key questions in five categories and the degree to which each mechanism was rated as Conventional, Better or Best using a system based on the Local Bylaw and Regulation Assessment Tool developed by MassAudubon. Of the 28 rankings assigned, Framingham scored 20 in the "Better" or "Best" categories and 8 in the "Conventional" category. Recent updates to Zoning Ordinances were largely focused on increasing affordability requirements. Guidelines, Rules & Regulations and Ordinances adopted by the Planning Board are in the process of being reviewed and stormwater updates will be incorporated into these discussions. The anticipated date for updates is as reported in our previous report of 2025.

Green Infrastructure Report

Below, describe progress towards making green infrastructure practices allowable based on the report completed in Year 4:

The City's Zoning ByLaws were updated in 2018 and Planning Board Project Review Guidelines were updated in 2021, both which repeatedly emphasize the importance of low impact development (LID). Framingham requires developers completing a Site Plan Review to provide information on how the proposed project would affect local water bodies, the water table, impervious creation and stormwater runoff. Developers are encouraged to incorporate LID to mitigate stormwater runoff. Incorporating these aspects into Plan Review provides a mechanism for the City to have input and dialogue about increasing critical concerns

surrounding stormwater management.

Retrofit Properties Inventory

Below, list remaining permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas (must maintain a minimum of 5 sites in inventory until less than 5 sites remain):

An inventory of at least five (5) City-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 are identified in the City's SWMP. The inventory identifies if the properties are located in a drainage area for a water quality limited waterbody with additional requirements for pollutant removal. Additionally, a separate BMP retrofit list is incorporated into the Phosphorus Source Identification report for Lake Waushakum as updated this permit term.

Below, list all properties that have been modified or retrofitted with BMPs to mitigate impervious area that were inventoried as part of 2.3.6.d of the permit. Non-MS4 owned properties that have been modified or retrofitted with BMPs to mitigate impervious area may also be listed, but must be indicated as non-MS4.

Appendix J of Stormwater Master Plan.

- Commuter Rail Parking Lot (non-MS4 owned): infiltration basin
- Farm Pond Park - skatepark: bioretention swales
- High School Junior Parking Lot: reduce pavement, installed water quality units
- Little Farm Road cul-de-sac: reduce pavement
- Fuller Middle School renovation: reduce impervious cover, add stormwater BMPs
- Speen St pump station: reduce impervious cover, establish pervious parking area

MCM6: Good Housekeeping

Catch Basin Cleaning

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

Number of catch basins inspected: 6,426

Number of catch basins cleaned: 6,220

Total volume or mass of material removed from all catch basins: 1,215 tons

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

Total number of catch basins: 8,497

If applicable:

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

The City collects and records % full sump data during catch basin inspections and continues to evaluate

incorporating conclusions from this data into the inspection and service schedule.

Street Sweeping

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

- ○ Number of miles cleaned:
- ○ Volume of material removed: [Select Units]
- ◉ Weight of material removed: 1,042 tons

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: 20

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

Continue to monitor areas susceptible to washout.

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 publicly available 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:

Framingham Ponds Year End Report 2022, prepared by SOLitude Lake Management for the City of Framingham. This report summarized herbicide & algaecide treatment for nuisance vegetation and water quality monitoring conducted by SOLitude at the following ponds: Learned Pond, Norton Pond, Gleason Pond, Lake Waushakum, Mohawk Pond and Farm Pond. Lake Waushakum and Farm Pond have water quality impairments with additional permit requirements under Appendix H. Two rounds of water quality samples were collected from each of the ponds and analyzed for the following water quality parameters: pH, turbidity,

alkalinity, nitrate-nitrogen, total and soluble phosphorus, ammonia, and true and apparent color. Samples were also taken for algae and cyanobacteria species identification and counts.

Framingham Sudbury River Year End Report 2022, prepared by SOLitude Lake Management for the City of Framingham. This report summarizes water chestnut control efforts for the ponded section of the Sudbury River.

Framingham contracted with Water & Wetland, Lake, Pond and Wetland Management group who provided summaries for Big Farm Pond, Gleason Pond, Learned Pond, Little Farm Pond, Mohawk Pond, Norton Pond, Sudbury River and Waushakum Pond. The surveys included an assessment of plant species documentation, dissolved oxygen and temperature readings, Secchi disk readings, and water quality testing parameters.

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. If any of the above year 5 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 City is an active member of the Central Massachusetts Regional Stormwater Coalition (CMRSWC), the Massachusetts Statewide Municipal Stormwater Coalition, and the Massachusetts Coalition for Water Resources Stewardship (MCWRS). The City supports the Think Blue Massachusetts statewide stormwater awareness & education campaign.

The Baker-Polito Administration announced Framingham as a recipient of an Environmental Protection Agency (EPA) 319 Clean Water Act grant which is administered by Massachusetts Department of Environmental Protection (DEP) to continue the design and construction of BMPs to reduce pollution from stormwater runoff discharging into Lake Waushakum.

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 6 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

Annual Requirements

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

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

Provide any additional details on activities planned for permit year 6 below:

Framingham plans to continue to make progress on wet weather and catchment investigation inspections. The City will finish installation of a demonstration project during Year 6 within the Lake Waushakum watershed. The City is also the recipient of MVP and 319 grants which will fund milestone stormwater projects. The 319 grant will fund final design, permitting and construction of a bioretention system that will reduce nutrients entering the impaired Lake Waushakum at the City' public bathing beach property. MVP is funding a stream restoration, flood mitigation and boardwalk project in the Walnut Street neighborhood. More about our MVP funded Walnut Street Neighborhood Flood Mitigation project can be found at www.FraminghamMA.gov/Walnut.

Part V: Certification of Small MS4 Annual Report 2023

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:	CHARLIE SISITSKY	Title:	MAYOR
Signature:		Date:	9/21/23

[Signatory may be a duly authorized representative]

Year 6 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: July 1, 2023-June 30, 2024

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form. Also ensure any websites included on this form are to publicly accessible sites

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, 2023 and June 30, 2024 unless otherwise requested.

Part I: Contact Information

Name of Municipality or Organization: City of Framingham

EPA NPDES Permit Number: MAR041116

Primary MS4 Program Manager Contact Information

Name: Eric Johnson Title: City Engineer

Street Address Line 1: 110 Western Avenue

Street Address Line 2: n/a

City: Framingham State: MA Zip Code: 01702

Email: rain@framinghamma.gov Phone Number: 508-532-6010

Stormwater Management Program (SWMP) Information

SWMP Location (publicly available web address): http://www.framinghamma.gov/3443/MS4-Permit

Date SWMP was Last Updated: June 2024

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

n/a

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

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.*

Annual Requirements

☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements

☒ Kept records relating to the permit available for 5 years and made available to the public

☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented

- ○ This is not applicable because we do not have sanitary sewer
- ○ This is not applicable because we did not find any new SSOs
- ○ The updated SSO inventory is attached to the email submission
- ◉ The updated SSO inventory can be found at the following publicly available website:

The SSO inventory is included as Appendix F of the City's Stormwater Management Plan and can be found at the following website: https://www.framinghamma.gov/1133/Stormwater-management

☒ Updated system map due in year 10 with information from completed catchment investigations

☒ Provided training to employees involved in IDDE program within the reporting period

☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters

☒ All curbed roadways were swept at least once within the reporting period

☒ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt

- ☒ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- ☒ Updated inventory of all permittee owned facilities as necessary
- ☒ O&M programs for all permittee owned facilities have been completed and updated as necessary
- ☒ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs
- ☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- ☒ Inspected all permittee owned treatment structures (excluding catch basins)

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

n/a

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
    - ☐ This is not applicable because there are no septic systems present

** 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:

n/a

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

Annual Requirements

*Public Education and Outreach**

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

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

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

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

Structural BMPs

☐ Installed a structural BMP as a demonstration project within the drainage area of the water quality limited water or its tributaries. The type of BMP installed is (*e.g. biofiltration)*:

☐ 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.

- ◉ No BMPs were installed
- ○ The above referenced BMP information is attached to the email submission
- ○ The above referenced BMP information can be found at the following publicly available website:

Total estimated phosphorus removed in **lbs/year** from the installed BMPs: 0

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:

Appendix F does not apply to Framingham since there are no TMDLs within the City limits. No structural water quality BMPs have been installed in the catchments for phosphorus impaired waterbodies in the regulated area by the City of Framingham or its agents. A planned demonstration project included the incorporation of tree boxes to a drainage system section that was undergoing repair. Due to staff availability, and private property issues, delays were realized in the execution of this project. Materials have been ordered and are awaiting installation. Installation is expected to be completed during Permit Year 7.

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☒ Increased street sweeping frequency of all municipal owned streets and parking lots to a schedule that targets areas with potential for high pollutant loads

- ○ The street sweeping schedule is attached to the email submission
- ◉ The street sweeping schedule can be found at the following publicly available website:

https://www.framinghamma.gov/2074/Urban-Street-Sweeping-Program

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

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

The City has a robust street sweeping schedule which includes sweeping all curbed roadways annually, urban and main roadways monthly, and downtown areas weekly. We continue to collect data to analyze and create a prioritization of catch basin cleanings. Currently, all catch basins are scheduled for annual inspections and/or cleaning.

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

n/a

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:

The Sudbury River is listed on the 2018/2020 303d list (which became effective during Permit Year 4) as having an e.coli impairment.

Part IV: Minimum Control Measures

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

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 13

*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:Household Hazardous Waste Day

Message Description and Distribution Method:

The City hosts bi-annual Household Hazardous Waste Day events to encourage proper waste disposal. Messages were posted via social media, prominent traffic message boards in multiple locations in the City as well as on the City website.

Targeted Audience: Residents

Responsible Department/Parties: City/ DPW

Measurable Goal(s):

City of Framingham Facebook post on 5/3/24 – 4 likes, 10 shares
Framingham Public Works Facebook post on 5/4/24 – 2 shares
Framingham Public Works Facebook post on 5/8/24 – 5 likes, 3 shares
Framingham Public Works Facebook post on 5/10/24 – 2 likes
City of Framingham Facebook post on 5/11/24 – no metrics

Message Date(s): 9/23/23, , 4/11/245/3/24, 5/4/24, 5/8/24, 5/10/24, 5/11/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Keep Storm Drains Clear

Message Description and Distribution Method:

Facebook and Instagram posts reminding residents to keep storm drains clear of leaves and debris to prevent street flooding during heavy rain.

Targeted Audience: Residents

Responsible Department/Parties: City/ DPW

Measurable Goal(s):

Framingham Public Works Facebook post on 9/13/23 - 2 likes, 1 comment, 2 shares
City of Framingham Facebook post on 9/13/23 - no metrics
Framingham Public Works Facebook post on 12/10/23 - 8 likes, 2 comments, 7 shares
City of Framingham Facebook post on 12/10/23 - 4 likes, 1 comment, 2 shares
City of Framingham Instagram post on 12/10/23 – no metrics
Framingham Public Works Facebook post on 1/9/24 - 1 like
Framingham Public Works Facebook post on 3/23/24 - 4 likes, 1 share

Message Date(s): 9/13/23, 12/10/23, 1/9/24, 3/23/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Winter Deicing Activities

Message Description and Distribution Method:

From November 1, 2023, through February 28, 2024, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target deicing activities that have the potential to impact water quality.

Targeted Audience: All

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

3 Facebook Posts - 10 likes and reactions, 1228 people reached
3 Instagram Posts - 3 likes and reactions, 27 people reached
26 Twitter Posts - 8 likes and reactions, 1194 people reached

Message Date(s): 11/23-2/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Lawn Care

Message Description and Distribution Method:

From March 1, 2024, through May 31, 2024, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target lawn care activities that have the potential to impact the water quality.

Targeted Audience: All

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

25 Facebook Posts - 45 likes and reactions, 4842 people reached
17 Instagram Posts - 9 likes and reactions, 136 people reached
79 Twitter Posts - 10 likes and reactions, 1721 people reached

Message Date(s): 3/24-5/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Pet Waste

Message Description and Distribution Method:

From June 1, 2024, through September 30, 2024, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target pet waste activities that have the potential to impact the quality of water quality.

Targeted Audience: All

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

8 Facebook Posts - 12 likes and reactions, 1717 people reached
8 Instagram Posts - 3 likes and reactions, 45 people reached
69 Twitter Posts - 1 likes and reactions, 557 people reached

Message Date(s): 6/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Septic System Maintenance

Message Description and Distribution Method:

From July 1, 2024, through September 30, 2024, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target septic system maintenance activities (bacteria/ pathogens) that have the potential to impact water quality.

Targeted Audience: All

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

5 Facebook Posts - 3 likes and reactions, 687 people reached
5 Instagram Posts - 1 likes and reactions, 21 people reached
28 Twitter Posts - 7 likes and reactions, 510 people reached

Message Date(s): 6/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Leaf/ Yard Waste

Message Description and Distribution Method:

From October 1, 2023, through November 30, 2023, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target leaf/yard waste activities that have the potential to impact the quality of water quality.

Targeted Audience: All

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

2 Facebook Posts - 1 likes and reactions, 693 people reached
2 Instagram Posts - 1 likes and reactions, 7 people reached
6 Twitter Posts - 0 likes and reactions, 707 people reached

Message Date(s): 10/23-11/23

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:

This message was in addition to the ones proposed in the NOI.

BMP:Residential Water Quality Impacts

Message Description and Distribution Method:

From October 1, 2023, through June 30, 2024, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target residential activities that have the potential to impact the quality of water quality.

Targeted Audience: Residents

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

83 Facebook Posts - 149 likes and reactions, 15274 people reached
72 Instagram Posts - 32 likes and reactions, 518 people reached
460 Twitter Posts - 71 likes and reactions, 1368 people reached

Message Date(s): 10/23-6/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Commercial Water Quality Impacts

Message Description and Distribution Method:

From October 1, 2023, through June 30, 2024, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target the activities of the commercial business and employees that have the potential to impact the quality of water quality.

Targeted Audience: Businesses, institutions and commercial facilities

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

4 Facebook Posts - 7 likes and reactions, 427 people reached
3 Instagram Posts - 1 likes and reactions, 21 people reached
30 Twitter Posts - 1 likes and reactions, 750 people reached

Message Date(s): 10/23-6/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Industrial Water Quality Impacts

Message Description and Distribution Method:

From October 1, 2023, through June 30, 2024, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target the activities of the industrial industry and employees that have the potential to impact the quality of water quality.

Targeted Audience: Industrial facilities

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

15 Facebook Posts - 22 likes and reactions, 2274 people reached
6 Instagram Posts - 2 likes and reactions, 43 people reached
63 Twitter Posts - 6 likes and reactions, 2840 people reached

Message Date(s): 10/23-6/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Developers & Contractors Water Quality Impacts

Message Description and Distribution Method:

From October 1, 2023, through June 30, 2024, the Central Massachusetts Regional Stormwater Coalition distributed daily messages through social media to target the activities of the developers and contractors and employees that have the potential to impact the quality of water quality.

Targeted Audience: Developers (construction)

Responsible Department/Parties: Central MA Regional Stormwater Coalition

Measurable Goal(s):

8 Facebook Posts - 12 likes and reactions, 1761 people reached
8 Instagram Posts - 1 likes and reactions, 48 people reached
36 Twitter Posts - 4 likes and reactions, 2128 people reached

Message Date(s): 10/23-6/24

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:

This message was in addition to the ones proposed in the NOI.

BMP:Public Works Operations Posts

Message Description and Distribution Method:

The City regularly posts tips on social media about proper recycling for curbside bins, availability of recycling center and yard waste facility, electronics recycling days, street sweeping schedules, brush collection, sanitation schedules including holiday tree collection, and leaf and brush collection, to inform residents about public works operations. Flooding tips from MEMA were also shared.

Targeted Audience: Residents

Responsible Department/Parties: City/ DPW

Measurable Goal(s):

Metrics not obtained.

Message Date(s): Permit Year 6

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:

This message was in addition to the ones proposed in the NOI.

BMP:Community Events Posts

Message Description and Distribution Method:

The City regularly shares social media posts about community cleanup efforts lead by community group Keep Framingham Beautiful and efforts by student groups including the High School Environmental Club and the KFB Student chapter at the high school, as well as community events including Earth Day Fest, Arbor Day and sustainability tips.

Targeted Audience: Residents

Responsible Department/Parties: City/ DPW

Measurable Goal(s):

Metrics not obtained.

Message Date(s): Permit Year 6

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:

This message was in addition to the ones proposed in the NOI.

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 City's Stormwater Management Plan is posted on the City's website at https://www.framinghamma.gov/1133/Stormwater-Management.

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**:

-DPW hosted Household Hazardous Waste Day on Saturday September 23, 2023 (139 residents participated) and Saturday May 11, 2024.
-The City's participation in public events to educate and involve the public on the City's stormwater management efforts were limited due to staff shortages.
-DPW engaged with the FHS Environmental Awareness Club.
-DPW presented to Potter Road 5th grade science classes with the Enviroscape watershed and Ward's floodplain models. Approximately 100 students participated. Distributed Dwayne coloring books. February 1-2, 2024.
-DPW presented to McCarthy Elementary 5th grade science classes with the Enviroscape watershed and Ward's floodplain models. Approximately 100 students participated. Distributed Dwayne coloring books. February 7-8, 2024.
-Framingham Conservation Assistant agent and Commission members staffed a booth at Framingham Earth Day Festival, April 27, 2024 on the Centre Common, which included demonstrations using the Enviroscape model to demonstrate sources of water pollution and describe ways citizens can prevent pollution. Distributed coloring books, ThinkBlue Ducks, dog waste bag dispensers, and informational bookmarks & postcards.
-DPW, Conservation, Health Department and Parks & Rec provide regular updates and participate in communication with Lake Waushakum Association members and other community groups to present information on water quality and stormwater systems.
-DPW supports local litter cleanup group (Keep Framingham Beautiful) by disposing of collected debris/trash and sharing stormwater messages. Keep Framingham Beautiful members have installed drain placards.
-Lake Waushakum Association neighborhood members continue to monitor and replace as needed the drain placards installed during Permit Year 4.
-Our municipality participated in the Central Massachusetts Regional Stormwater Coalition (CMRSWC) and the Massachusetts Statewide Municipal Stormwater Coalition (Statewide Coalition).

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: 4

Number of SSOs removed: 4

MS4 System Mapping

Percent of Phase II map complete: 90

Optional: Provide additional status information regarding your map:

Framingham's municipal GIS system is a robust mapping system. As catchment investigation and other field work continue to be performed, updates are made to the GIS system to more accurately reflect system connections. As a result, adjustments and modifications occur on an on-going basis. A thorough review of all catchments is underway.

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 above referenced outfall screening data is attached to the email submission
- ○ The above referenced outfall screening data can be found at the following publicly available website:

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

Number of outfalls screened: 162

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

Percent of outfalls screened: 100

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

During a comprehensive review of the outfall inspection data during Permit Year 5, it was determined that dry weather outfall screening and sampling was not performed at all outfalls due to an inability to locate or access certain outfalls; screening of these outfalls was completed during this permit year. Where outfalls still could not be located or accessed, screening was conducted at the nearest upstream structure.

Dry weather screening was completed at 111 outfalls during this reporting period. To date, all 536 known outfalls (100%) have been screened during dry weather.

Wet weather screening and sampling was performed at 51 outfalls this reporting period. To date, 90 of 536 outfalls (17%) have been sampled during wet weather conditions.

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 publicly available website:

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

Number of catchment investigations completed this reporting period: 32

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

Percent of total catchments investigated: 63

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

Catchment investigations were initiated in 27 catchment areas and completed in 32 catchment areas during this reporting period. Investigations for 4 catchments were initiated during Permit Year 5 and completed during this reporting period, and investigations for 1 catchment initiated in Permit Year 5 was deemed "pending" due to ongoing construction affecting access to the drainage system. Follow-up investigations were performed in 3 catchment areas previously indicating likely sewer input due to sampling results; no evidence of illicit discharges was observed during the follow-up inspections and sampling in these catchment areas and catchment investigations are considered complete. In catchment areas with no key junction manholes, where dry weather outfall screening was completed during this reporting period and no evidence of illicit discharge was observed or indicated from sampling results, the dry weather screening was deemed sufficient, and no in-system catchment investigations are required. Based on dry weather outfall inspection data from this reporting period, 37 catchments were deemed completed with no flow observed, and 6 catchments were deemed complete with flow observed and sampling results not indicating evidence of an illicit discharge. In total, catchment investigations are complete in 308 out of 492 catchments (63%). There are 496 catchment areas in the City's GIS; during this reporting period it was determined that two of these catchment areas are privately owned, and two do not exist, bringing the total City-owned catchment count to 492. The City of Framingham currently has catchment areas with multiple outfalls and is working internally to update the stormwater mapping so that there is one delineated tributary catchment area per outfall.

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 publicly available 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: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 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: 2

Total number of illicit discharges removed: 2

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 conducted **during this reporting period**:

Framingham Stormwater Engineer, Highway Engineer and Highway Supervisors, who work directly with the stormwater system participated in annual IDDE training including review of proper protocols.

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: 260

Number of inspections completed: 800

Number of enforcement actions taken: 5

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

Ordinance or Regulatory Mechanism

Date update was completed (due in year 3):	April 27, 2021
Website of ordinance or regulatory mechanism:	https://www.framinghamma.gov/242/Charter-Code-of-the-City-of-Framingham

As-built Drawings

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

Number of as-built drawings received: 22

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

If the project had a stormwater management component and the DPW received an as-built plan, whether or not the site was over 1 acre of disturbance, the City considered it for the metrics above. This number includes 3 City projects. In Permit Year 6 (FY24), 20 as-builts were received for residential and commercial building projects, and 2 as-builts were logged for City infrastructure improvements projects.

Street Design and Parking Lots Report

Below, describe any changes made or planned to be made to local regulations and guidelines based on the report completed in Year 4:

The Street Design & Parking Lots report completed in Year 4 reviewed regulatory mechanisms using a list of key questions in five categories and the degree to which each mechanism was rated as Conventional, Better or Best using a system based on the Local Bylaw and Regulation Assessment Tool developed by MassAudubon. Of the 28 rankings assigned, Framingham scored 20 in the "Better" or "Best" categories and 8 in the "Conventional" category. Recent updates to Zoning Ordinances were largely focused on increasing affordability requirements. Guidelines, Rules & Regulations and Ordinances adopted by the Planning Board are in the process of being reviewed and stormwater updates will be incorporated into these discussions. The anticipated date for updates is as reported in our previous report of 2025.

Green Infrastructure Report

Below, describe progress towards making green infrastructure practices allowable based on the report completed in Year 4:

The City's Zoning ByLaws were updated in 2018 and Planning Board Project Review Guidelines were updated in 2021, both which repeatedly emphasize the importance of low impact development (LID). Framingham requires developers completing a Site Plan Review to provide information on how the proposed project would affect local water bodies, the water table, impervious creation and stormwater runoff. Developers are encouraged to incorporate LID to mitigate stormwater runoff. Incorporating these aspects into

Plan Review provides a mechanism for the City to have input and dialogue about increasing critical concerns surrounding stormwater management.

Retrofit Properties Inventory

Below, list remaining permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas (must maintain a minimum of 5 sites in inventory until less than 5 sites remain):

An inventory of at least five (5) City-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 are identified in the City's SWMP. The inventory identifies if the properties are located in a drainage area for a water quality limited waterbody with additional requirements for pollutant removal. Additionally, a separate BMP retrofit list is incorporated into the Phosphorus Source Identification report for Lake Waushakum as updated this permit term.

Below, list all properties that have been modified or retrofitted with BMPs to mitigate impervious area that were inventoried as part of 2.3.6.d of the permit and the type of BMP(s) implemented. Non-MS4 owned properties that have been modified or retrofitted with BMPs to mitigate impervious area may also be listed, but must be indicated as non-MS4.

Appendix J of Stormwater Master Plan.
- Commuter Rail Parking Lot (non-MS4 owned): infiltration basin
- Farm Pond Park - skatepark: bioretention swales
- High School Junior Parking Lot: reduce pavement, installed water quality units
- Little Farm Road cul-de-sac: reduce pavement
- Fuller Middle School renovation: reduce impervious cover, add stormwater BMPs
- Speen St Pump Station: reduce impervious cover, establish pervious parking area

MCM6: Good Housekeeping

Catch Basin Cleaning

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

Number of catch basins inspected: 6,879

Number of catch basins cleaned: 6,879

Total volume or mass of material removed from all catch basins: 1,000 tons

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

Total number of catch basins: 8,497

If applicable:

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

The City collects and records % full sump data during catch basin inspections and continues to evaluate incorporating conclusions from this data into the inspection and service schedule.

Street Sweeping

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

- ○ Number of miles cleaned:
- ○ Volume of material removed: [Select Units]
- ◉ Weight of material removed: 1,134.57 [Select Units]

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: 20

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

One inspection occurred per quarter at each of the City facilities with SWPPPs - the DPW Operations Center, Henry Street Facility, Arthur Street Facility, Recycling Drop-off Center, and Park Maintenance & Operations Facility

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 publicly available 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.

Year 7

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 7 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

- Complete investigations of catchments associated with Problem Outfalls
- Complete investigations of catchments where any information gathered on the outfall/interconnection identifies sewer input

Annual Requirements

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

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

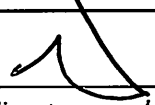
Provide any additional details on activities planned for permit year 7 below:

Although not specifically being utilized to meet MS4 Permit requirements, the City is currently "daylighting" the existing outall pipe at Waushakum Beach and replacing the pipe with a vegetated surface bioretention system to optimize phosphorus removal. Construction will be completed in Permit Year 7.

Part V: Certification of Small MS4 Annual Report 2023

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:	Charlie Sisitsky	Title:	Mayor
Signature:		Date:	9/30/24

[Signatory may be a duly authorized representative]

APPENDIX D

BMP MATRIX

LAKE WAUSHAKUM PHOSPHORUS SOURCE IDENTIFICATION REPORT,
Weston & Sampson, May 2022

MCM	BMP	BMP Description	Responsible Department	Year 1 May 2018 thru Jun 2019	Year 2 Jul 2019 thru Jun 2020	Year 3 Jul 2020 thru Jun 2021	Year 4 Jul 2021 thru Jun 2022	Year 5 Jul 2022 thru Jun 2023	Measurable Goal
1	Develop & distribute public education message to residents	The DPW will continue the "Scoop the Poop" public education campaign to inform residents about how pet waste impacts water quality. The DPW will distribute pet waste bag dispensers with an information flyer at Framingham's Earth Day. The Town Clerk will also distribute the dispensers & information to persons obtaining dog licenses.	DPW - Eng	X					# of pet waste bag dispensers distributed Goal is to distribute over 200
1	Develop & distribute public education message to businesses	The DPW will provide information to local businesses on our website or via facebook. The message will focus on proper waste disposal.	DPW - PR		X				# of views of the website/facebook Goal is 50 views
1	Develop & distribute public education message to residents	The DPW will provide information to residents on our website or via facebook. The message will focus on yard care.	DPW - PR			X			# of views of the website/facebook Goal is 100 views
1	Develop & distribute public education message to businesses	The DPW will provide information to businesses on our website or via facebook. The message will focus on lawn care & landscaping.	DPW - PR				X		# of views of the website/facebook Goal is 50 views
1	Develop & distribute public education message to developers	The DPW-Engineering office will maintain a Construction BMP bulletin board near our permitting customer service desk. The bulletin board will display information about the proper selection, installation, and maintenance of erosion & sediment control BMPs.	DPW - Eng	X					# of public way access, street opening, or trench permit applications Typically, the Town issues over 200 permits a year. All permits applications are submitted through DPW - Engineering customer service.
1	Develop & distribute public education message to developers	Information will be provided with permits on the new stormwater management requirements for water quality for construction & post-construction BMPs.	DPW - Eng					X	# of stormwater permit applications New development will be required to show compliance with new stormwater standards during the Town permitting process
1	Develop & distribute public education message to industrial facilities	Similar to the education messages for businesses, the DPW will provide information to local industrial facilities on our website or via facebook. The message will focus on fleet management.	DPW - PR			X			# of views of the website/facebook Goal is 50 views
1	Develop & distribute public education message to industrial facilities	The DPW will provide information to local industrial facilities on our website or via facebook. The message will focus on landscaping.	DPW - PR					X	# of views of the website/facebook Goal is 50 views
1	Evaluate effectiveness of public educational messages annually	The DPW's Public Relations Project Manager will evaluate measurable goals from the public education MCM annually and adjust BMPs as needed.	DPW - PR	X	X	X	X	X	Update included in Annual Report to EPA

MCM	BMP	BMP Description	Responsible Department	Year 1 May 2018 thru Jun 2019	Year 2 Jul 2019 thru Jun 2020	Year 3 Jul 2020 thru Jun 2021	Year 4 Jul 2021 thru Jun 2022	Year 5 Jul 2022 thru Jun 2023	Measurable Goal
2	Conduct annual public involvement activity	The DPW will host an annual household hazardous waste collection event.	DPW - Highway	X					# of participants Goal is 25 participants
2	Conduct annual public involvement activity	The DPW will host an annual household hazardous waste collection event.	DPW - Highway		X				# of participants Goal is 25 participants
2	Conduct annual public involvement activity	The DPW will host an annual household hazardous waste collection event.	DPW - Highway			X			# of participants Goal is 50 participants
2	Conduct annual public involvement activity	The DPW will coordinate with OARS and LCWC for a volunteer stream clean-up event in Framingham as part of their annual river clean-up event in the fall. The focus area will be Beaver Dam Brook.	DPW - Eng				X		# of participants Goal is 50 participants
2	Conduct annual public involvement activity	The DPW will coordinate with OARS and LCWC for a volunteer stream clean-up event in Framingham as part of their annual river clean-up event in the fall. The focus area will be Cochituate Brook.	DPW - Eng					X	# of participants Goal is 50 participants
2	Post SWMP and Annual Reports to Town website	Post the SWMP and Annual Reports to the Town website with contact information to provide the public opportunity to comment.	DPW - PR		X	X	X	X	SWMP and reports posted.

MCM	BMP	BMP Description	Responsible Department	Year 1 May 2018 thru Jun 2019	Year 2 Jul 2019 thru Jun 2020	Year 3 Jul 2020 thru Jun 2021	Year 4 Jul 2021 thru Jun 2022	Year 5 Jul 2022 thru Jun 2023	Measurable Goal
3	Inventory all SSOs	The Sewer Department will identify and maintain an inventory of all known locations where SSOs have discharged to the MS4 within the previous five (5) years.	DPW - Sewer	X	X	X	X	X	Develop SSO inventory by June 2019 Update annually
3	Prepare GIS map of drainage system	The GIS division of the DPW-Engineering Department maintains the MS4 mapping data. Mapping will include information as required by the permit. Mapping will be revised as needed based on field observations or new or re-development.	DPW - Eng		X	X	X	X	Complete Phase I mapping by June 2020 Complete Phase II mapping by June 2028
3	Develop written IDDE program	The DPW will develop a written IDDE program to outline the means and methods to identify, investigate, track, and eliminate illicit discharges to the MS4. The IDDE program will include an outfall and interconnection screening and sampling procedure.	DPW - Eng	X					Complete written IDDE program by June 2019
3	Develop catchment investigation procedure	DPW will develop a systematic procedure to investigate each catchment associated with an outfall or interconnection. The catchment investigation procedures will be incorporated into the IDDE program.	DPW - Eng		X				Complete catchment investigation procedure by December 2019.
3	Complete initial outfall and interconnection inventory and prioritize outfalls	DPW - Engineering will inventory outfalls and conduct a priority ranking to assess illicit discharge potential based on existing information.	DPW - Eng	X					Priority ranking complete by June 2019
3	Perform dry-weather outfall screening and sampling	DPW - Engineering will inspect all outfalls & interconnections for the presence of dry weather flow. Samples will be collected and analyzed if flow is observed.	DPW - Eng	X	X	X			Dry weather screening completed per catchment invetigation requirements
3	Update outfalls and interconnection inventory and priority ranking	DPW - Engineering will update the outfall & interconnection inventory based on the dry-weather screening and sampling.	DPW - Eng			X			Complete ranking update by June 2021
3	Perform IDDE investigations in catchments	DPW - Highway will inspect and investigate each catchment associated with an outfall or interconnection. Investigations of catchments associated with Problem Outfalls shall begin no later than July 2020.	DPW - Highway			X	X	X	Track # of catchments investigated. Investigations of catchments associated with Problem Outfalls will be completed by June 2025. Remaining catchment investigations will be completed by June 2028.
3	Perform wet-weather sampling at outfalls and interconnections	DPW - Engineering will collected and analyze wet-weather samples for catchments with at least one Sytem Vulnerability Factor.	DPW - Eng		X	X	X	X	Wet weather sampling completed by June 2021
3	Investigate & eliminate reported or observed illicit discharges	Illicit discharge investigation and enforcement will be conducted in accordance with the IDDE program. DPW - Engineering will track information for record keeping and reporting.	DPW - Highway & Eng	X	X	X	X	X	Track # of illicit discharges detected and status toward elimination.
3	Annual employee training on IDDE	The DPW will provide annual training to Town employees involved in the IDDE program, including how to recognize illicit discharges and SSOs.	DPW - Eng	X	X	X	X	X	Conduct annual training, track # and names of participants

MCM	BMP	BMP Description	Responsible Department	Year 1 May 2018 thru Jun 2019	Year 2 Jul 2019 thru Jun 2020	Year 3 Jul 2020 thru Jun 2021	Year 4 Jul 2021 thru Jun 2022	Year 5 Jul 2022 thru Jun 2023	Measurable Goal
4	Develop written procedure for site plan review	The DPW will develop written procedures for site plan review.	DPW - Eng	X					Complete written site plan procedures by June 2019
4	Perform site plan reviews for construction & post-construction BMPs	The DPW will review plans for compliance with construction and post-construction BMP requirements.	DPW - Eng	X	X	X	X	X	Track # of site plan reviews and approvals
4	Develop written procedure for construction site inspections	The DPW will develop written procedures for site inspections and enforcement.	DPW - Eng	X					Complete written site inspection & enforcement procedures by June 2019
4	Conduct construction site inspections	DPW inspectors will inspect active construction sites for adequate erosion & sediment controls.	DPW - Eng	X	X	X	X	X	Track # of site inspections

MCM	BMP	BMP Description	Responsible Department	Year 1 May 2018 thru Jun 2019	Year 2 Jul 2019 thru Jun 2020	Year 3 Jul 2020 thru Jun 2021	Year 4 Jul 2021 thru Jun 2022	Year 5 Jul 2022 thru Jun 2023	Measurable Goal
5	Amend current bylaw or develop new stormwater bylaw for new development and redevelopment	The DPW will work with Planning Board and Conservation Commission to either amend or develop a new bylaw to address post-construction stormwater standards.	DPW - Eng Conservation Planning Board			x			Amended bylaw by June 2021
5	Develop report on street and parking design	The Planning Board will perform an assessment of current street and parking guidelines that affect creation of impervious cover to identify and assess potential design standard changes to support low impact design options.	Planning Board				x		Assessment report completed by June 2022
5	Develop report assessing barriers to green infrastructure	The Planning Board will develop a report assessing existing local regulations to determine the feasibility of making LID and green infrastructure practices allowable when appropriate site conditions exist.	Planning Board				x		Assessment report completed by June 2022
5	Identify at least 5 municipally-owned properties that can be retrofitted with BMPs	DPW - Engineering will work with other Town Departments to identify potential retrofits on Town property, with a focus on planned or proposed capital improvement projects.	DPW - Eng, Facilities Management, Parks & Rec, & School Dept				x		Inventory completed by June 2022

MCM	BMP	BMP Description	Responsible Department	Year 1 May 2018 thru Jun 2019	Year 2 Jul 2019 thru Jun 2020	Year 3 Jul 2020 thru Jun 2021	Year 4 Jul 2021 thru Jun 2022	Year 5 Jul 2022 thru Jun 2023	Measurable Goal
6	Inventory municipal facilities	DPW - Engineering will use GIS to create an inventory of Town-owned properties in the following categories: parks and open space, buildings and facilities where pollutants are exposed to stormwater runoff, and vehicles and equipment.	DPW - Eng		X				Inventory completed by June 2020
6	Develop O&M procedures for: parks & open space	Parks & Rec will complete written O&M procedures for Town parks in accordance with permit requirements. Conservation Commission will complete written O&M procedures for Town open space in accordance with permit requirements.	Parks & Rec; ConCom		X				Complete written O&M procedures for Parks & Open Space by June 2020
6	Develop O&M procedures for: buildings & facilities	DPW, Capital Projects & Facilities Management, and Schools will complete written O&M procedures for Town-owned buildings and facilities in accordance with permit requirements.	DPW; Facilities Management; Schools		X				Complete written O&M procedures for Buildings & Facilities by June 2020
6	Develop O&M procedures for: vehicles & equipment	DPW - Fleet & Facilities will complete written O&M procedures for vehicle & equipment storage in accordance with permit requirements. These O&M procedures can be utilized by other Town Department's with fleets (e.g. police department)	DPW - Fleet		X				Complete written O&M procedures for Vehicles & Equipment by June 2020
6	Develop written O&M procedures for maintenance of MS4 infrastructure	DPW - Engineering will work with DPW Highway to document operations and maintenance procedures for Town infrastructure and include these written procedures in the SWMP.	DPW - Eng		X				Incorporate O&M procedures in SWMP by June 2020
6	Clean and maintain catch basins	DPW-Highway implements a catch basin cleaning program annually.	DPW - Highway	X	X	X	X	X	Complete annual catch basin cleaning
6	Sweep municipally-owned streets and parking lots in spring	DPW-Highway implements a street sweeping program annually.	DPW - Highway	X	X	X	X	X	Complete annual street sweeping
6	Ensure proper storage of catch basin cleanings and street sweepings prior to disposal or reuse	DPW-Highway will properly store catch basin cleanings at the Recycling Drop-off- Center (RDC), in accordance with the SWPPP. Catch basin cleanings will be sampled and disposed properly. DPW-Highway will store street sweepings at the DPW Operations Center, in accordance with the SWPPP. Street sweepings will be disposed properly.	DPW - Highway	X	X	X	X	X	Track amount of catch basin cleanins and street sweepings disposed annually.
6	Establish & implement procedures for winter road maintenance (i.e. road salt optimization program)	DPW-Highway implements a winter operations comprehensive plan for snow plowing, sanding and salting.	DPW - Highway	X	X	X	X	X	Implement winter road maintenance procedures.
6	Implement program to inspect and maintain stormwater treatment structures	As part of ongoing operations and maintenance, the DPW - Highway Department will implement the program for inspecting and maintaining the MS4.	DPW; Facilities Management; Schools	X	X	X	X	X	Track # of BMPs inspected & maintained.
6	Develop SWPPPs for DPW Operations Center	DPW will develop a SWPPP for the DPW Operations Center.	DPW - Fleet		X				SWPPP completed by June 2020
6	Develop SWPPP for Henry Street facility	DPW will develop a SWPPP for the Henry Street facility.	DPW - Highway		X				SWPPP completed by June 2020
6	Develop SWPPP for Arthur Street	DPW will develop a SWPPP for the Arthur Street facility.	DPW - Highway		X				SWPPP completed by June 2020
6	Develop SWPPP for RDC	DPW will develop a SWPPP for the RDC.	DPW - Sanitation		X				SWPPP completed by June 2020
6	Develop SWPPP for Yard Waste Recycling Facility	DPW will develop a SWPPP for the Yard Waste Recycling facility.	DPW - Sanitation		X				SWPPP completed by June 2020

MCM	BMP	BMP Description	Responsible Department	Year 1 May 2018 thru Jun 2019	Year 2 Jul 2019 thru Jun 2020	Year 3 Jul 2020 thru Jun 2021	Year 4 Jul 2021 thru Jun 2022	Year 5 Jul 2022 thru Jun 2023	Measurable Goal
6	Develop SWPPP for Park Maintenance & OperationsFacility	DPW will develop a SWPPP for the Park Maintenance & OperationsFacility.	Parks & Rec		X				SWPPP completed by June 2020
6	Conducted quarterly SWPPP inspections	Cconduct quarterly inspections, report results to department heads, and maintain records of inspections and actions.	DPW - Highway, DPW - Sanitation, DPW - Fleet, Parks & Rec			X	X	X	Complete quarerly inspections
6	Annual employee training on SWPPP	The DPW will provide annual training to Town employees involved in the SWPPPs.	DPW - Eng, DPW - Highway, DPW - Sanitation, DPW - Fleet Parks & Rec			X	X	X	Conduct annual training, track # and names of participants

MCM	BMP	BMP Description	Responsible Department	Year 1 May 2018 thru Jun 2019	Year 2 Jul 2019 thru Jun 2020	Year 3 Jul 2020 thru Jun 2021	Year 4 Jul 2021 thru Jun 2022	Year 5 Jul 2022 thru Jun 2023	Measurable Goal
WQ	Develop & distribute additional public education message for phosphorus reduction	The DPW will distribute three annual messages: one in the spring (March/April) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorous-free fertilizers; one in the summer (June/July) encouraging the proper management of pet waste, and one in the fall (August/September/October) encouraging the proper disposal of leaf litter. The DPW intends to redistribute messages provided by MassDEP via social media or on the City's website.	DPW - PR	X	X	X	X	X	# of views of the website/facebook Goal is 100 views
WQ	Develop & distribute additional public education message for bacteria reduction	The DPW will distribute annual messages on proper management of pet waste and septic systems.	DPW - PR	X	X	X	X	X	# of views of the website/facebook Goal is 100 views
WQ	Adopt or amend bylaws & regulations to optimize phosphorus removal	As part of the MCM 4, amend or develop a new bylaw to address post-construction stormwater standards. Tthe DPW will work with Planning Board and Conservation Commission to include language regarding optimization of phosphorus removal in the post-construction requirements.	DPW - Eng			X	X	X	Amended bylaw by June 2020
WQ	Complete a Phosphorus Source Identification Report	DPW-Eng will complete a Phosphorus Source Identification Report for the Lake Waushakum and Grist Mill Pond subbasins.	DPW-Eng				X		Complete Phosphorus Source Identification Report by June 2022
WQ	Establish procedures to properly manage grass cuttings and leaf litter on permittee property	Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces	DPW - Highway	X	X	X	X	X	Develop procedures
WQ	Additional catch basin cleaning in Southeast Framingham areas	DPW-Highway will implement additional annual catch basin inspections & cleaning in turbidity imparied water subbasins in Southeast Framingham (Lake Waushakum, Farm Pond, & Framingham Reservoir #2)	DPW - Highway	X	X	X	X	X	Complete additional catch basin cleaning in turbdity impaired subbasin
WQ	Additional street sweeping around Lake Waushakum & Grist Mill Pond (2 x year)	DPW-Highway will implement additional street sweeping in phosphorus imparied water subbasins (Lake Waushakum, Grist Mill Pond)	DPW - Highway	X	X	X	X	X	Complete additional street sweeping in phosphorus impaired subbasin
WQ	Evaluate BMPs for phosphorus reduction in drainage areas for water quality limited waterbodies where phosphorus is the impairment	As part of the BMP inventory required in MCM 4, DPW - Capital Projects will evaluate potential retrofit opportunities identified in the inventory or in the Phosphorus Source Identification Report	DPW - Capital					X	Complete BMP evaluation by June 2023
WQ	Design & construct BMP in Grist Mill Pond subbasin	DPW - Capital will plan, design, and construct a BMP for phosphorus reduction in the Grist Mill Pond subbasin. If feasible, the BMP will be integrated into a larger Capital project.	DPW - Capital					X	BMP design completed by June 2023. Construction completed by June 2024
WQ	Design & construct BMP in Lake Waushakum subbasin	DPW - Capital will plan, design, and construct a BMP for phosphorus reduction in the Lake Waushakum subbasin. If feasible, the BMP will be integrated into a larger Capital project.	DPW - Capital Parks & Rec					X	BMP design completed by June 2023. Construction completed by June 2024
WQ	Estimate phosphorus removal of the demonstration BMPs	DPW - Capital will use modeling to estimate the phosphorus removal of the constructed BMPs.	DPW - Capital					X	Phosphorus removal estimate completed by June 2024.

Weston & Sampson

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REPORT

May 2022

CITY OF
Framingham
MASSACHUSETTS

MS4 Permit Compliance
Lake Waushakum Phosphorus Source Identification Report



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1.0 REGULATORY SUMMARY AND PURPOSE

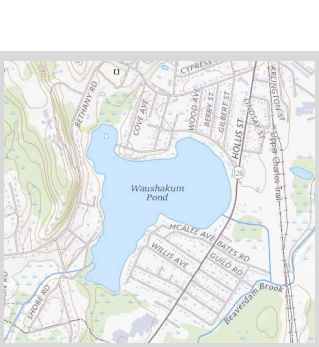
The 2016 MS4 Permit includes specific requirements for MS4 operators that discharge to impaired waterbodies where pollutants typically found in stormwater—specifically nutrients, solids, bacteria/pathogens, chloride, metals, and oil and grease—are the cause of the impairment and there is not a Total Maximum Daily Load (TMDL) approved by USEPA. Additional requirements for phosphorus impairments include supplementary public education efforts, specific BMP design standards, increased street sweeping, and the development of a Phosphorus Source Identification Report for each waterbody with a phosphorus impairment.

This memorandum discusses progress to date towards the development of a PSIR for the portion of Lake Waushakum in Framingham, MA. In accordance with permit requirements, the report will include the following elements:

1. A calculation of the total MS4 areas draining to the water quality limited receiving water, incorporating updating mapping of the MS4 and catchment delineations;
2. All screening and monitoring results targeting the receiving water;
3. Impervious area and Directly Connected Impervious Area (DCIA) for the target catchment area(s);
4. Identification, delineation, and prioritization of potential catchments with high phosphorus loadings; and
5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment, including the removal of impervious area.

The PSIR must be completed on or before the end of Permit Year 4 or June 30, 2022.

1.1 Waterbody Description



Lake Waushakum Locus Map (USGS)

Waushakum Pond, known locally as Lake Waushakum, is an 82-acre kettle pond located in Framingham and Ashland, Massachusetts. While most of the pond's area is in Framingham, a majority of the contributing watershed area is in Ashland. The pond was first flagged for poor water quality during a year-long water quality survey conducted by the Massachusetts Division of Water Pollution Control (DWPC) between 1975 and 1976. It has since been listed on every available Massachusetts Integrated List of Waters, or 303(d) list, for non-native aquatic plants, macrophytes, turbidity, dissolved oxygen, and total phosphorus impairments. The City of Framingham owns and operates a public beach on Waushakum Pond. This beach has closed to swimmers multiple times during recent seasons due to elevated bacteria counts and water quality concerns. Nuisance aquatic plants must be controlled by in-lake chemical treatment, creating recurring expenses for both Framingham and Ashland.

2.0 LITERATURE REVIEW

A literature review and review of historic sampling was conducted as part of this phosphorus source identification report.

2.1 Literature Review

Given that water quality in Waushakum Pond has been an ongoing point of concern, many studies, reports, and remediation plans for the pond have previously been developed. The following studies and reports were reviewed as part of the Phosphorus Source Identification Report:

- Waushakum Pond Diagnostic/Feasibility Study; Prepared for the Framingham Planning Department by IEP, Inc. and Camp, Dresser and McKee, Inc., October 1988.

- Diagnostic/Feasibility Study for Waushakum Pond; Prepared for the Ashland Conservation Commission by Environmental Science Services, Inc., December 2001.

- Framingham Open Space and Recreation Plan; Prepared by the Open Space and Recreation Planning Committee, Department of Parks and Recreation, and the Department of Community and Economic Development, July 2008.

- 2015 Proposal for Aquatic Management Program at Waushakum Pond; Prepared for the Ashland Department of Public Works by Aquatic Control Technology, March 2015.

The 1988 Diagnostic/Feasibility study included a bathymetric survey of the pond, in-lake sampling, stormwater outfall sampling, the calculation of hydrologic and nutrient budgets, and recommendations for in-lake and watershed management strategies. The study also calculated phosphorus input to Waushakum Pond based on non-point source nutrient export from different land uses in the watershed. In 1988, most of the watershed was either forest (47% of watershed) or residential (35%).

Each outfall discharging to Waushakum Pond was sampled during a wet-weather events in June 1986, and follow-up sampling at outfalls with elevated nutrient levels in April 1987. The sampling results were correlated to the land use characteristics of the tributary drainage area. Water quality was monitored over the course of one year from various in-lake stations. Impervious coverage was not considered in the study, but a nutrient budget was calculated for the pond. The following is an excerpt from the 1988 report:

> "The largest source of phosphorus is storm drains which contribute 81 kg/year, or 36% of the total input. Although storm drains contribute only a small portion of the water flowing into Waushakum Pond, the flows are of degraded quality as shown by storm sampling results".

The highest phosphorus concentration observed in 1988 was at Drain 7, now known as OF-2000203, between 60 and 124 Lake Avenue. Land use in the catchment area tributary to this outfall today is mostly residential with 32% impervious coverage.

The 1988 study concluded that the two most significant problems at Waushakum Pond are dense aquatic vegetation and occasionally high algal biomass. As these are typically problems associated with elevated nutrient levels, the report proposed various programs to address the nutrient loading from stormwater, the sediment loading from stormwater, and the internal nutrient cycling of the pond.

IEP eventually proposes a watershed management program including the diversion of stormwater to leaching catch basins, annual cleaning of all catch basins in the tributary area, public education, and enhanced erosion and sediment control components, as well as in-lake management strategies including aeration, alum treatment, and hydro-raking.

The 2001 Diagnostic/Feasibility Study also included collection of water quality samples from the inlet stream, outlet stream, and two in-lake stations at Waushakum Pond. The pond was again found to have elevated phosphorus levels, with high concentrations measured at the bottom of the pond and in the pond's tributary stream. This report proposed management strategies including a "pollutant source investigation" in the watershed contributing to Waushakum Pond, a public education campaign, increased street sweeping and catch basin cleaning, and a "build-out-analysis" which would analyze how development in the watershed might affect nutrient loading and the resultant water quality in the pond. The recommended street sweeping frequency was once per month; the recommended catch basin cleaning frequency was twice per year. Many of these recommendations meet or exceed requirements of the 2016 MS4 Permit.

The Framingham Open Space Plan and the 2015 Aquatic Control Technology proposal provide insight into the types of treatment and remediation initiatives that have been undertaken at Waushakum Pond. In 2008, the Town of Ashland, received funding from a Section 319 Grant to implement a watershed management program for Lake Waushakum, which included working with Framingham staff to design and install structural best management practices in the pond's watershed area in both municipalities. According to a July 2019 article in the Metrowest Daily News, three rain gardens were installed as part of that effort, but two of them have been dismantled in the past decade. The Aquatic Control Technology proposal was for in-lake chemical treatment to control nuisance aquatic vegetation such as milfoil, elodea, and coontail. In-lake treatment has been conducted many times in Waushakum Pond, as it is a relatively inexpensive, albeit temporary, solution to the pond's nuisance aquatic vegetation concerns.

2.2 Historic Sampling Data

Historic sampling data from Waushakum Pond is available from both the 1988 study and the 2001 study. Both in-lake and wet-weather outfall sampling was conducted as part of the 1988 study; only in-lake sampling was conducted in 2001. Historical sampling data are presented in Tables 1 and 2.

Table 1: In-Lake Sampling Data

Sampling Period	Source	Site	Site Description	Mean Total Phosphorus (mg/L)
March 1986-Feb 1987	IEP, Inc.	1a	Eastern portion of pond, surface	0.02
		1b	Eastern portion of pond, mid-depth	0.01
		1c	Eastern portion of pond, deep	0.12
		2a	Western portion of pond, surface	0.02
		2b	Western portion of pond, middle	0.02
		2c	Western portion of pond, deep	0.02
		3	Inlet stream	0.02
		4	Outlet stream	0.01
Nov-01	ESS, Inc.	WP-1S	Eastern portion of pond, surface	0.04
		WP-1B	Eastern portion of pond, bottom	0.03

Table 1: In-Lake Sampling Data				
Sampling Period	Source	Site	Site Description	Mean Total Phosphorus (mg/L)
		WP-2S	Western portion of pond, surface	0.06
		WP-2B	Western portion of pond, bottom	0.86
		T1	Inlet stream	0.21

Table 2: Outfall Sampling Data Wet-Weather Samples Collected by IEP, Inc. in June 1986			
Outfall ID (1987)	Outfall ID (Current)	Current Owner	1986 Total Phosphorus (mg/L)
1	2011963	MassDOT	Inactive (No flow)
2	2000197	City of Framingham	Inactive (No flow)
3	2000204	City of Framingham	0.26
4	2006433	City of Framingham	Inactive (No flow)
5	2000205	City of Framingham	0.35
6	2000206	City of Framingham	Inactive (No flow)
7	2000203	City of Framingham	0.88
8	2012000*	City of Framingham	0.22
9	2000201	City of Framingham	0.065
10	2000200	City of Framingham	0.12
11	-	Town of Ashland	Inactive (No flow)
12	-	Town of Ashland	Inactive (No flow)
13	2000199	City of Framingham	0.32
*2012000 is approximately 600 feet from the waterbody edge, but flow from the outfall reaches the lake at the location shown as outfall 8 in the 1987 report.			

Version 4.02 of the National Stormwater Quality Database (NSQD), published by Pitt, Maestre, and Clary in 2018 under the direction of the EPA, determined that the median phosphorus concentration in runoff in predominantly residential areas is 0.44 mg/l nationwide, sometimes lower in rainfall region 1, or the northeast. Runoff from the catchment tributary to OF-2000203 exceeded that median in 1986.

3.0 LAKE WAUSHAKUM CATCHMENT AREA

Weston & Sampson used available GIS mapping to determine land use characteristics for each delineated catchment area tributary to Lake Waushakum. Impervious area data was used to calculate percent impervious cover and percent directly connected impervious area in each catchment. This section details the procedures for and results of those calculations.

3.1 Available GIS Mapping

The City's GIS includes extensive mapping of the drainage system tributary to Waushakum Pond, including catchment delineations which were evaluated and modified as part of this report. There are currently ten outfalls owned by the City of Framingham that discharge directly to Waushakum Pond, and one that discharges to an upstream wetland area. There is also one outfall discharging to Lake Waushakum that is owned by MassDOT within the City of Framingham, but it only receives drainage from Route 126 (Hollis Street), which is a state road. The total drainage area in Framingham tributary to Waushakum Pond is 149 acres, including areas along the shore which contribute runoff directly into the pond but not into the drainage system. The pipes, drain manholes, and catch basins in this area are over 100 years old—GIS data indicates that most of the structures were installed in 1915. There are no mapped structural BMPs in the drainage system tributary to Waushakum Pond. A map showing the drainage infrastructure in the contributing catchment areas is included in Appendix A.

The impervious area on all parcels within the drainage area tributary to Waushakum Pond was delineated based on the most currently available aerial imagery. Land use data for the properties within the MS4 catchment areas, as well as impervious area delineations for roads and other rights-of-way, was collected from MassGIS' most recent (2016) land use data layer. Table 3 presents a summary of land use in the tributary area:

Table 3: Land Use in Lake Waushakum Drainage Area in Framingham

Land Use	Acres	Percent of Overall Catchment Area
Tax exempt*	53.29	35.84%
Residential - single family	49.56	33.33%
Residential - multi-family	16.00	10.76%
Right-of-way	15.09	10.15%
Open land	8.36	5.62%
Water	5.37	3.61%
Commercial	0.68	0.46%
Unknown	0.35	0.23%
Grand Total	148.70	100.00%

*The tax exempt land use includes all publicly-owned land including schools, parks, and government buildings, as well as property that is exempt from taxation such as property owned by religious groups, housing/utility authorities, hospitals, museums, etc.

3.2 Directly Connected Impervious Area

The land use data and impervious area delineation were used to calculate the percent of Directly Connected Impervious Area (DCIA) for each MS4 catchment area. Percent DCIA is calculated by applying the Sutherland Equation developed in the 1995 publication *Methodology for Estimating the*

Effective Impervious Area of Urban Watersheds[1]. In order to properly use the Sutherland Equations, the MassGIS land use codes were converted to EPA land use codes using the conversion methodology recommended by EPA and included in Table 4. Properties with an "Unknown" land use were considered as Commercial or Medium-density residential, which have the same Sutherland Equation. Weston & Sampson determined the amount and percent of impervious area in each MS4 catchment area for each land use, then used the appropriate Sutherland Equation to determine the percent DCIA for each land use in each catchment. These percentages were used to determine the total DCIA for each catchment. Table 5 lists the Sutherland Equation that was used for each land use type. Table 6 presents impervious area and DCIA statistics for each catchment.

Table 4: Conversion of MassGIS 2016 Land Use Codes to EPA Land Use Codes

MassGIS 2016 Code	MassGIS 2016 Use	EPA Code	EPA Use
3	Commercial	1	Commercial
2	Open Land	9	Open Land
12	Residential- Multi-Family	5	High-Density Residential
11	Residential- Single Family	4	Medium-Density Residential*
55	Right-of-Way (Roads)	2	Industrial**
9	Tax-Exempt	6	Urban Public/Institutional

*EPA designates Medium-Density Residential as residential areas with parcel sizes between ¼ and ½ acre, which most closely matches this area[2]

**EPA considers all transportation uses, including roads, to be Industrial uses

Table 5: EPA Land Use Classes and Corresponding Sutherland Equations (Source: EPA)

EPA Code	Land Use	Watershed Selection Criteria	Sutherland Equation (where IA(%) > 1)
1	Commercial	Average: Mostly storm sewered with curb and gutter, no dry wells or infiltration, residential rooftops not directly connected	DCIA%=0.1(IA%) ^ 1.5
2	Industrial	Average: Mostly storm sewered with curb and gutter, no dry wells or infiltration, residential rooftops not directly connected	DCIA%=0.1(IA%) ^ 1.5
3	Low Density Residential	Somewhat connected: 50% not storm sewered, but open section roads, grassy swales, residential rooftops not connected, some infiltration	DCIA%=0.04(IA%) ^ 1.7
4	Medium Density Residential	Average: Mostly storm sewered with curb and gutter, no dry wells or infiltration, residential rooftops not directly connected	DCIA%=0.1(IA%) ^ 1.5
5	High Density Residential	Highly Connected: Same as above, but residential rooftops are connected	DCIA% = 0.4(IA%) ^ 1.5
6	Urban Public/ Institutional	Average: Mostly storm sewered with curb and gutter, no dry wells or infiltration, residential rooftops not directly connected	DCIA%=0.1(IA%) ^ 1.5
7	Agriculture	Mostly Disconnected: Small Percentage of	DCIA%=0.01(IA%) ^ 2

[1] Sutherland, R.C., "Methodology for Estimating the Effective Impervious Area of Urban Watersheds", Watershed Protection Techniques, Vol. 2, No. 1, Fall 1995.

[2] United States Environmental Protection Agency., "Methodology to Calculate Baseline Estimates of Impervious Area and Directly Connected Impervious Area for Massachusetts Communities". March 2010. https://www3.epa.gov/region1/npdes/stormwater/ma/IA-DCIA-Calculation-Methodology.pdf

Table 5: EPA Land Use Classes and Corresponding Sutherland Equations (Source: EPA)			
EPA Code	Land Use	Watershed Selection Criteria	Sutherland Equation (where IA(%) > 1)
		urban area is storm sewered, or 70% or more infiltrated/disconnected	
8	Forest	Mostly Disconnected: Small Percentage of urban area is storm sewered, or 70% or more infiltrated/disconnected	DCIA%=0.01(IA%)^2
9	Open Land	Average: Mostly storm sewered with curb and gutter, no dry wells or infiltration, residential rooftops not directly connected	DCIA%=0.1(IA%)^1.5
10	Water	n/a	n/a

Table 6: Impervious Area and DCIA Statistics for Waushakum Pond Sub-Catchments in Framingham							
Catchment	Outfall	Impervious Area (Acres)	DCIA (Acres)	Catchment Area (Acres)	Percent IA	Percent DCIA	Percent Connectivity
1003	2000006	1.60	1.12	3.26	49.1%	34.2%	70%
2366	2000200	1.10	0.42	4.20	26.2%	10.1%	39%
2367	2000201	8.14	2.77	38.54	21.1%	7.2%	34%
2368	2000203	2.23	0.76	7.04	31.7%	10.8%	34%
2369	2012000	4.53	1.63	13.78	32.9%	11.8%	36%
2371	2006433	2.31	1.21	3.94	58.6%	30.6%	52%
2372	2000204	4.62	2.27	9.71	47.6%	23.3%	49%
2373	2000197	2.58	1.39	4.55	56.7%	30.6%	54%
2482	2000199	1.54	0.74	3.15	48.8%	23.6%	48%
2484	2000197	0.07	0.05	0.12	63.3%	42.7%	68%
2485	2000206	0.14	0.06	0.70	20.0%	9.1%	45%
2370G	2000205	2.90	1.37	5.78	50.2%	23.8%	47%
Overland	-	8.33	2.21	53.94	15.4%	4.1%	27%
Watershed in Framingham		40.09	16.00	148.71	27.0%	10.8%	40%

Note: Percent Connectivity is the percent of total impervious area which is connected.

Many studies have been published in the past 15 years discussing the relationship between urban, impervious land cover and waterbody hydrology, habitat, biology, and ecosystem function. These studies have more recently included correlations between DCIA and biological indicators such as fish assemblages and algal blooms. Watersheds with as low as 4-6% IA and 1-5% DCIA typically begin to show water quality impacts. While the DCIA in the Lake Waushakum drainage area exceeds this threshold, the calculated range of percent DCIA is expected for municipalities similar to Framingham[3].

[3] Obropta, C.C. & Del Monaco, N. "Reducing Directly Connected Impervious Areas with Green Stormwater Infrastructure". *Journal of Sustainable Water in the Built Environment.* 2018. https://ascelibrary.org/doi/pdf/10.1061/JSWBAY.0000833

4.0 POLLUTANT LOADING ANALYSIS AND PRIORITIZATION OF CATCHMENTS WITH HIGHER POTENTIAL PHOSPHORUS LOADS

4.1 Pollutant Loading Analysis

The 2016 MS4 Permit requires all Phosphorus Source Identification Reports to include the identification, delineation, and prioritization of potential catchments with high phosphorus loadings. The potential for a particular site or area to contribute phosphorus to stormwater varies based on land use, impervious coverage, directly connected impervious area, and soil type. Hydrologic soil group (HSG), or the soil's ability to infiltrate stormwater, is the most important soil characteristic for the purposes of this analysis. HSG is ranked from A to D, with type A soils more suited for infiltration, and type D soils more likely to contribute runoff.

To identify catchment areas with higher potential phosphorus loads, a model for each catchment area was developed using land use data (MassGIS, 2016), impervious area delineations from an outside consultant, and soil HSG data from the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). A land use/land cover grid was developed for the catchment areas tributary to Lake Waushakum. That grid, which calculated the areas of each combination of land use, land cover, and soil type in each catchment, is included as Appendix B.

4.1.1 Catchment Summaries

The characteristics of each catchment area tributary to Lake Waushakum as they relate to potential phosphorus loading are summarized below:

1.1.1. Catchment 1003 – Discharges to Outfall 2000006

Catchment 1003 covers 3.26 acres around Fay Road, west of Lake Waushakum. Outfall 2000006 discharges to a wetland system between Fay Road and Bethany Road which is tributary to the lake. The most predominant land use in this catchment is medium-density residential; the catchment is 49% impervious coverage and 34% directly connected impervious area. The soils in this catchment are hydrologic soil group (HSG) A. Potential sources of phosphorus in the catchment include leaf litter, grass clippings, pet waste, and other sediment and debris that accumulate on roadways.

1.1.2. Catchment 2366 – Discharges to Outfall 2000200

Catchment 2366 covers 4.20 acres on the western side of Lake Waushakum and includes Barbieri Road, Daisley Place, and part of Bethany Road, which is more heavily trafficked. The most predominant land uses in this catchment area are tax-exempt land—specifically an undeveloped portion of a parcel owned by the Congregation of the Sisters of St. Joseph at 77 Bethany Road—and medium and high-density residential land. The catchment is comprised of 26% impervious coverage, of which 11% is directly connected impervious area; soils are hydrologic soil group (HSG) A or C. This is the only delineated catchment area without sanitary sewer. All of the parcels within catchment 2366 have private septic systems. Potential sources of phosphorus in this catchment include leaf litter, grass clippings, pet waste, groundwater seepage from septic systems, and other sediment and debris that accumulate on roadways.

1.1.3. Catchment 2367 – Discharges to Outfall 2000201

Catchment 2367 covers 38.54 acres on the western side of Lake Waushakum. It includes part of Bethany Road and predominantly consists of tax-exempt land, since the catchment covers a

portion of the 84-acre nursing home, rectory, and school owned by the Congregation of the Sisters of St. Joseph at 77 Bethany Road. The catchment is comprised of 21% impervious coverage, of which 7.2% is directly connected impervious area; soils are mostly HSG C. Potential sources of phosphorus in this catchment include leaf litter, grass clippings, roadway debris, and fertilizers, pesticides, or other chemicals used in lawn maintenance and landscaping that may contain phosphorus.

1.1.4. Catchment 2369 – Discharges to Outfall 2012000

Catchment 2369 covers 13.78 acres on the northwest corner of Lake Waushakum. It includes parts of Bethany Road, Winthrop Street, and Conant Road. The predominant land use in this catchment is tax-exempt land, followed by high-density residential land. A significant portion of the tax-exempt property is the parcel owned by the Congregation of the Sisters of St. Joseph located at 77 Bethany Road, which is also within this catchment. The catchment is comprised of 33% impervious coverage, of which 11.8% is directly connected impervious area, however stormwater discharges from outfall 2012000 travel overland before reaching Lake Waushakum. Soils in this catchment are both HSG A and C. Potential sources of phosphorus in this catchment include leaf litter, grass clippings, pet waste, roadway debris, and fertilizers, pesticides, or other chemicals used in lawn maintenance and landscaping that may contain phosphorus.

1.1.5. Catchment 2368 – Discharges to Outfall 2000203

Catchment 2368 covers 7.04 acres on the northern side of Lake Waushakum. It includes Lake Avenue and parts of Cove Avenue and Dow Street. The predominant land uses are tax exempt/open land, since this catchment includes all of Anna Murphy Park, and medium density residential land. The catchment is comprised of 31.67% impervious coverage, of which 10.8% is directly connected impervious area. Potential sources of phosphorus in this catchment include leaf litter, grass clippings, pet waste, roadway debris, and any fertilizers, pesticides, or chemicals used in lawn/field maintenance.

1.1.6. Catchment 2485 – Discharges to Outfall 2000206

Catchment 2485 covers 0.70 acres on the northern side of Lake Waushakum and includes the part of Lake Avenue between Dow Street and Nipmuc Terrace. The only land use in this catchment is medium-density residential land. The catchment is comprised of 20% impervious area, of which 9.1% is directly connected impervious area. Potential sources of phosphorus in this catchment are those associated with residential land, including leaf litter, grass clippings, and pet waste.

1.1.7. Catchment 2370G – Discharges to Outfall 2000205

Catchment 2370G covers 5.78 acres on the northern side of Waushakum Pond. The catchment includes the part of Nipmuc Road between Nipmuc Terrace and Berry Road, and includes most of Wood Avenue. The predominant land use in this catchment is medium-density residential land. The catchment is comprised of 50.2% impervious coverage, of which 23.8% is directly connected impervious area. Potential sources of phosphorus from this catchment area are leaf litter, grass clippings, pet waste, and roadway debris.

1.1.8. Catchment 2371 – Discharges to Outfall 2006433

Catchment 2371 covers 3.94 acres on the northeast side of Lake Waushakum. The catchment includes most of Berry Street and the part of Nipmuc Road between Berry Street and Gilbert Street. The predominant land use is medium-density residential land. The catchment is comprised of 58.62% impervious coverage, of which 30.6% is directly connected impervious area. Potential sources of phosphorus from this catchment include leaf litter, grass clippings, pet waste, and roadway debris, however when the outfall was inspected in September 2020, it was found that the catch basin upstream of outfall 2006433 is a leaching basin, with an inlet grate over the outgoing pipe. It is therefore unlikely that discharge occurs from this outfall to Lake Waushakum during most storm events. No flow was observed from the outfall during wet-weather outfall screening in October 2020.

1.1.9. Catchment 2372 – Discharges to Outfall 2000204

Catchment 2372 covers 9.71 acres on the northeast side of Lake Waushakum. The catchment includes most of Gilbert Street, and the section of Nipmuc Road between Gilbert Street and Hollis Street (MA-126). The predominant land use in the catchment is medium-density residential land, followed by high-density residential land. There is one commercial property located partially in this catchment—a convenience store at 371 Hollis Street. The catchment is comprised of 47.6% impervious coverage, of which 23.34% is directly connected impervious area. Potential sources of phosphorus from this catchment include leaf litter, grass clippings, pet waste, and roadway debris.

1.1.10. Catchments 2373 and 2484 – Discharge to Outfall 2000197

Catchments 2373 and 2484 collectively cover 4.66 acres to the northeast of Lake Waushakum. Both catchments contribute runoff to the drain under Hollis Street (MA-126) and discharge to Lake Waushakum via outfall 2000197. Some stormwater runoff from the state's MS4 on Hollis Street is also discharged through outfall 2000197. Catchment 2373 includes George Street and Lindsay Street and is predominantly medium and high-density residential land; catchment 2484 includes a portion of Andrews Street and is entirely high-density residential land. Catchment 2373 is comprised of 56.68% impervious coverage, of which 30.56% is directly connected impervious area; catchment 2484 is comprised of 63.28% impervious coverage, of which 42.72% is directly connected impervious area. Potential sources of phosphorus from these catchments include leaf litter, grass clippings, pet waste, and roadway debris. Roadway debris from Hollis Street, which is the most heavily trafficked road in all the catchment areas draining to Lake Waushakum in Framingham, is also a significant potential source of phosphorus in stormwater runoff.

1.1.11. Catchment 2482 – Discharges to Outfall 2000199

Catchment 2482 covers 3.15 acres on the southern side of Lake Waushakum. This catchment includes Miller Avenue and parts of Willis Avenue and Whitney Avenue. Medium-density residential is the most prevalent land use in the catchment. The catchment is comprised of 48.84% impervious coverage, of which 23.63% is directly connected impervious area. Potential sources of phosphorus from this catchment include leaf litter, grass clippings, and roadway debris.

1.1.12. Overland Flow

There are 53.94 acres of land around Lake Waushakum within Framingham city limits that contribute overland flow to the waterbody. This land is almost entirely medium-density residential use, except for the city-owned Waushakum Beach along the northern edge of the pond and part of St. Tarcisius Cemetery, which abuts the wooded/wetland area on the northwest side of the pond. The area that contributes overland flow to Lake Waushakum is comprised of 15.5% impervious area. As part of Task 1, a calculation was performed, which indicated that this catchment area has 4.1% directly connected impervious area based on land use. However after visiting the lake and reexamining the mapping, it was determined that since the impervious areas on these parcels do not discharge into the MS4, all impervious coverage in this area would be considered disconnected impervious area. Soils in this area are all HSG A. Potential sources of phosphorus from this area include leaf litter, grass clippings, or any lawn care products used on the residential properties that might not comply with local or state guidelines. There are also 12 properties in the overland area along Bethany Road that have septic systems within 300 feet of the edge of Lake Waushakum, and contribute phosphorus loads to the waterbody.

4.1.2 Phosphorus Load Export Rates

Land use, impervious coverage, directly connected impervious area, and HSG have been utilized by EPA as part of the MS4 Permit to develop Phosphorus Load Export Rates (PLERs) for different combinations of those attributes in close geographical areas where there is no considerable difference in average annual rainfall. Table 7 presents the PLERs that are included in Attachment 1 of Appendix F of the 2016 Massachusetts MS4 Permit. Tax-exempt land is the most prevalent land use in the catchment areas tributary to Lake Waushakum, followed by medium and high-density residential land. Tax-exempt land was assigned the same PLER as commercial & industrial land in accordance with permit guidance.

Table 7: Phosphorus Load Export Rates (PLERs) by Land Use

Land Use Category	Land Surface Cover	PLER (lb/acre/year)
Commercial and Industrial	Directly Connected Impervious	1.78
	Pervious	*See Developed Pervious
Multi-Family and High Density Residential	Directly Connected Impervious	2.32
	Pervious	*See Developed Pervious
Medium Density Residential	Directly Connected Impervious	1.96
	Pervious	*See Developed Pervious
Low Density Residential	Directly Connected Impervious	1.52
	Pervious	*See Developed Pervious
Highway	Directly Connected Impervious	1.34
	Pervious	*See Developed Pervious
Forest	Directly Connected Impervious	1.52
	Pervious	0.13
Open Land	Directly Connected Impervious	1.52
	Pervious	*See Developed Pervious
Agriculture	Directly Connected Impervious	1.52
	Pervious	0.45
*Developed Pervious – HSG A	Pervious	0.03
*Developed Pervious – HSG	Pervious	0.12

Table 7: Phosphorus Load Export Rates (PLERs) by Land Use		
Land Use Category	Land Surface Cover	PLER (lb/acre/year)
B		
*Developed Pervious – HSG C	Pervious	0.21
*Developed Pervious – HSG C/D	Pervious	0.29
*Developed Pervious – HSG D	Pervious	0.37

4.1.3 Results

The land use/land cover grid shown in Appendix B, the directly connected impervious area (DCIA) determined for each catchment discussed in Section 3.2, and the PLERs included in Table 8 were used to calculate an estimated phosphorus load for each outfall. Disconnected impervious area, or the difference between impervious area and DCIA, was considered pervious coverage in HSG D to account for the fact that some runoff from disconnected impervious surfaces will be infiltrated before it reaches the MS4. Each distinct area of the land use/land cover grid was multiplied by the appropriate PLER to determine its yearly phosphorus load, and the results were summed by catchment area. The results of the pollutant loading analysis are presented in Table 8.

Table 8: Results of Pollutant Loading Analysis					
Catchment ID	Receiving Outfall	Catchment Area (Ac.)	DCIA (Ac.)	Disconnected IA (Ac.)	Catchment P Load (lbs/year)
2367	2000201	38.58	2.77	5.36	12.48
2372	2000204	9.86	2.27	2.36	5.70
2369	2012000	11.59	1.63	2.11	5.07
Overland	-	53.94	0.00*	8.33	4.29
2373	200197	4.79	1.39	1.19	3.52
2370G	2000205	5.82	1.37	1.52	3.34
2371	2006433	4.05	1.21	1.11	2.88
1003	2000006	3.26	1.12	0.49	2.24
2368	2000203	7.45	0.76	1.47	2.09
2482	2000199	3.23	0.74	0.79	1.77
2366	2000200	4.23	0.42	0.68	1.54
2485	2000206	0.70	0.06	0.08	0.37
2484	200197	0.12	0.05	0.02	0.11
Total	-	**144.36**	**12.67**	**25.02**	**43.16**

*Since runoff generated from impervious surfaces in the areas that contribute overland flow to Lake Waushakum is not collected by a storm sewer, it was considered disconnected impervious area and modeled as pervious land in HSG D.

Table 9 confirms that catchments with more DCIA have a higher potential to contribute phosphorus to stormwater runoff. While catchment 2367 has less high and medium-density residential land than most of the other catchments tributary to Lake Waushakum—and those residential uses have the highest PLERs—the significant amount of DCIA attributable to the parcel owned by the Congregation of the

Sisters of St. Joseph and Bethany Road outweighs the lower PLER assigned to tax-exempt uses. Smaller catchments with fewer acres of DCIA and disconnected impervious area have lower potential phosphorus loads, even when a higher percent of the catchment area is covered with impervious surfaces.

Non-point source runoff is also a significant source of potential phosphorus loading to Lake Waushakum. Since there are so many residential properties abutting the shores of the lake, runoff is generated from impervious area on those properties and discharges overland to the lake. Some of that runoff is likely infiltrated by lawns on the property, but what does reach the lake has a relatively high potential phosphorus load based on the amount of organic matter, such as leaf litter, grass clippings, soils, and dog waste that the runoff encounters. The presence of septic systems on properties between Bethany Road and the western edge of Lake Waushakum increases the potential phosphorus loading from non-point sources.

The results of the pollutant loading analysis is the basis for the catchment ranking discussed below.

4.2 Dry and Wet Weather Outfall Screening and Sampling

Dry and wet weather screening and sampling was conducted at each outfall discharging directly to Lake Waushakum on September 24, 2020, and October 30, 2020, respectively. Outfall 2000006, discharging to the wetland system tributary to Lake Waushakum, was not inspected during dry or wet weather due to access issues. The results of these sampling events were recorded in the City's GIS and summarized in a separate technical memo under Task Order No. 14. No dry weather flow was observed at any of the outfalls discharging to Lake Waushakum. Wet-weather flow was observed at seven out of the ten applicable outfalls—field kits were used to analyze samples for ammonia, chlorine, surfactants, temperature, salinity, and conductivity, and samples were sent to a laboratory to analyze samples for Escherichia coliform (E. coli), phosphorus, biological oxygen demand (BOD_5), total suspended solids (TSS) and turbidity. The wet-weather sampling results for phosphorus are presented in Table 9.

Table 9: Wet-Weather Phosphorus Sampling Results

Outfall ID	Address	Total Phosphorus (mg/L)
2000206	22 Nipmuc Terrace	0.13
2000205	46 Nipmuc Road	0.1
2006433	40 Nipmuc Road	-
2000204	20 Nipmuc Road	-
2000197	463 Hollis St	0.077
2000203	60 Lake Ave	0.26
2012000	62 Bethany Road	0.09
2000201	78 Bethany Road	0.12
2000200	1 Daisley Place	0.19
2000199	34 Miller Ave	-

While there is no benchmark criteria for phosphorus concentrations in the Massachusetts Surface Water Quality Standards, 0.020 mg/L is the target phosphorus concentration for Lake Boon as outlined in the TMDL for Lake Boon, a phosphorus-impaired waterbody also located in the SuAsCo watershed.

Assuming that a similar target will be established for Lake Waushakum when a TMDL is developed, that value has been adopted as a benchmark for outfall sampling. All outfalls that were flowing during the wet-weather sampling event exceeded that standard.

4.3 Catchment Ranking Matrix

The purpose of performing the pollutant loading analysis was to develop a priority ranking of the catchments tributary to Lake Waushakum. Catchments with the highest potential phosphorus load were considered highest priority. Since phosphorus concentrations exceeded benchmark criteria at each outfall that was flowing during wet-weather, and because observed phosphorus concentrations in stormwater discharge can vary depending on the time of year the sampling is conducted, the size of the storm event, and other factors, the sample phosphorus concentrations were not considered when ranking the catchment areas. Other data collected during outfall inspections, such as whether or not the outfall was flowing during wet-weather and distance from the outfall to Lake Waushakum, were considered.

Catchments where no wet-weather flow was observed were determined to be lower priority, despite higher potential phosphorus loads, since the lack of flow indicates that there is adequate storage in the system to prevent stormwater runoff from reaching Lake Waushakum during smaller storm events. Catchments contributing less than one pound per year of phosphorus were also determined to be lower priority. Catchments 1003 and 2369 were determined to be lower priority because their outfalls discharge to a wetland areas, which provide some treatment and storage before the flow reaches Lake Waushakum. The area that contributes overland flow to Lake Waushakum was not ranked, as it is not considered a delineated catchment area under the MS4 Permit as there is no point source discharge. The catchment ranking is presented in Table 10. A figure highlighting the High Priority catchments is included in Appendix C.

Table 10: Lake Waushakum Catchment Priority Ranking by Phosphorus Loading

Rank	Catchment ID	Receiving Outfall	Catchment P Load (lb/year)	Total Phosphorus Sampling Result (mg/L)	Catchment Designation
1	2367	2000201	12.48	0.12	High Priority
2	2373 & 2484	2000197	3.64	0.077	High Priority
3	2370G	2000205	3.34	0.1	High Priority
4	2368	2000203	2.09	0.26	High Priority
5	2366	2000200	1.54	0.19	High Priority
6	2485	2000206	0.37	0.13	Low Priority
7	2369	2012000	5.07	0.09	Low Priority
8	2372	2000204	5.70	-	Low Priority
9	1003	2000006	2.24	-	Low Priority
10	2371	2006433	2.88	-	Low Priority
11	2482	2000199	1.77	-	Low Priority

5.0 BEST MANAGEMENT PRACTICE (BMP) RETROFIT OPPORTUNITIES

In addition to a community-wide BMP retrofit inventory, the 2016 MS4 Permit requires permittees with discharges to a phosphorus-impaired waterbody to identify potential retrofit opportunities in the sub-catchments tributary to those receiving waters as part of the PSIR. Retrofit opportunities may include the installation of structural BMPs during redevelopment or the removal of impervious area.

5.1 Potential Retrofit Sites

The following factors were considered when identifying potential retrofit sites in the sub-catchments tributary to Lake Waushakum: parcel size, parcel ownership, soil type, and available open space. Areas within the right-of-way were also considered for impervious area disconnection and/or reduction. Municipal ownership was considered the most important factor, as it is unlikely that the City will be able to install a structural BMP on land that is privately owned unless the City plans to acquire the property in question. Soils and available open space were also weighed heavily as site suitability characteristics. Given the limited amount of City-owned property in the Lake Waushakum watershed, areas in both high priority and low priority catchments were considered for retrofit. These projects within the right-of-way are intended to be considered in conjunction with the City's existing schedule for roadway and sidewalk improvements in the area. The identified locations for potential BMP retrofit, listed in alphabetical order, are included in Table 11 and discussed in more detail below.

Table 11: Potential BMP Retrofit Sites

Site Address	Property Owner	Parcel Size (Ac.)	Percent Impervious Coverage	Soil Type	Existing Parcel Use	Sub-Catchment ID	Sub-Catchment Rank
Barbieri Road & Bethany Road Intersection	City of Framingham	N/A	N/A	C	Right-of-Way	2366	5
Berry Street ROW	City of Framingham	N/A	N/A	A	Right-of-Way	2371	9
77 Bethany Road	Congregation of the Sisters of St. Joseph	84.88	7.40%	C	Bethany Hill Place	2367	1
0 Cove Ave (Anna Murphy Park)	City of Framingham Department of Parks and Recreation	3.03	8.81%	A	Park	2368	4
Gilbert Street ROW	City of Framingham	N/A	N/A	A	Right-of-Way	2372	8
54 Nipmuc Road (Waushakum Beach)	City of Framingham Department of Parks and Recreation	1.10	9.36%	C	Public Beach/Park	2370G	3
Nipmuc Road ROW	City of Framingham	N/A	N/A	A & C	Right-of-Way	2372, 2371, 2370G	8, 9, 3
180 Winthrop Street (St. Tarcisius	Roman Catholic Archdiocese of	7.9	12.20%	A	Cemetery/ Wetlands Area	2369	7

Table 11: Potential BMP Retrofit Sites							
Site Address	Property Owner	Parcel Size (Ac.)	Percent Impervious Coverage	Soil Type	Existing Parcel Use	Sub-Catchment ID	Sub-Catchment Rank
Cemetery)	Boston						

5.1.1 Barbieri Road & Bethany Road Intersection

The intersection of Barbieri Road and Bethany Road presents the potential to install a small surface stormwater treatment practice such as a bioretention area between the sidewalk and the street. This area, which would likely have a footprint of 150 SF or less, could potentially infiltrate some surface runoff up to the 2-inch storm and provide traffic calming benefits. The existing drainage system would be left in place to provide bypass during larger storm events. A cut sheet of a standard surface bioretention area and examples of roadside bioretention areas are included in Appendix D. Potential phosphorus removal attributable to this project will depend on the amount of impervious area that is diverted to the BMP.

5.1.2 Berry Street Right-of-Way

Green infrastructure practices, such as bioretention areas or tree filter pits, could be installed within the right-of-way on Berry Street. Any practice would increase green space between the sidewalk and the street, providing traffic calming and pedestrian safety benefits as well as stormwater treatment. Green infrastructure would disconnect portions of the roadway from the MS4, infiltrating runoff for up to the 2-inch storm, and the existing drainage system would be left in place to provide bypass during larger storm events. Cut sheets for bioretention areas and tree filter pits as well as examples of these BMPs in the right-of-way are included in Appendix D. The City should look for specific locations to implement green infrastructure on Berry Street when planning future roadway and sidewalk improvements. Potential phosphorus removal attributable to this type of project will depend on how many BMPs are installed and how much impervious area is disconnected from the MS4.

5.1.3 77 Bethany Road

This site has a significant amount of impervious area (6.25 acres) that is likely all connected to the MS4, since the site has not been improved since 1963. The property is for sale, and there has been some discussion about the possibility of the City purchasing this property or a portion of it to build a new elementary school. However, funding for this acquisition has not yet been identified. The site has adequate green space for surface stormwater treatment practices, such as bioretention or infiltration, and could also be amenable to subsurface infiltration if a large redevelopment project were to occur. This is the largest parcel in the catchment area, and contributes an estimated 3 lb/year of phosphorus to Lake Waushakum, or 25% of the catchment's total phosphorus load. This retrofit opportunity will only be feasible if the City purchases the property or if the property is redeveloped.

5.1.4 0 Cove Ave (Anna Murphy Park)

While there is not much impervious area to be treated on-site at Anna Murphy Park, some of the green space could potentially be used to treat runoff from Cove Avenue. Each pair of catch basins on Cove Avenue could be disconnected from the MS4 and diverted to a green infrastructure practice, such as a bioretention area or tree filter pit, in Anna Murphy Park, reducing the amount of runoff that ultimately reaches Lake Waushakum. Alternatively, curb cuts could potentially be used to divert surface flow to green infrastructure practices in the park, leaving the existing drainage system in place to provide

bypass during larger storm events. Disconnecting a portion of Cove Ave from the MS4 would reduce the phosphorus load from this catchment by approximately 50%.

5.1.5 Gilbert Street Right-of-Way

There is historical flooding at 85 Gilbert Street and at the intersection of Nipmuc Road and Gilbert Street. This flooding is caused by relatively flat drainage pipes on Gilbert Street, a sag in the existing drainage pipe at the intersection of Nipmuc Road and Gilbert Street, and an undersized drainage pipe that runs through an easement at 20 Nipmuc Road and discharges directly into Lake Waushakum. The section of pipe at 20 Nipmuc Road requires regular maintenance due to root intrusion. In an effort to address both the flooding issue at this location and water quality issues in Lake Waushakum, the DPW Highway Division has been working with BETA Group to address these issues and has developed a plan for stormwater improvements, which is included in Appendix D. The plan is currently being updated to reflect the addition of a Contech CS-5 water quality unit, which will reduce the number of leaves getting to the outfall contributing to the phosphorus loading.

5.1.6 54 Nipmuc Road (Waushakum Beach)

Waushakum Beach is the only City-owned parcel on the shore of Lake Waushakum. Outfall 2000205, which discharges runoff from sub-catchment 2370G, is located at Waushakum Beach and contributes to ongoing chronic water quality issues in the area. In addition to the estimated 3.34 lb/yr of phosphorus discharged to the lake from this outfall, elevated bacteria counts in the swimming area adjacent to the outfall's discharge location prevent the beach from opening during the summer season.

In conjunction with the development of this PSIR, the City applied for and received a grant through the Metropolitan Area Planning Council (MAPC)'s Accelerating Climate Resiliency program to fund the preliminary design of resiliency improvements at Waushakum Beach. After conducting an alternative analysis for different stormwater treatment structures and potential solar retrofits at the site, a 50% design was developed for the daylighting of the existing outfall pipe and the installation of a bioretention system with specific plantings for phosphorus removal. The design also includes a riparian buffer area next to the bioretention area to deter geese from congregating at the site, which will reduce phosphorus and bacteria loading from waterfowl. The current design provides an estimated 3.34 lb/year of phosphorus removal, or 66% of the catchment's total load. The City is currently seeking funding for the final design and construction of the bioretention system, which are expected to cost approximately $136,000. 50% design drawings for this project are included in Appendix D.

5.1.7 Nipmuc Road Right-of-Way

Curb bump-outs, vegetated buffer strips, and/or tree filter pits could potentially be installed along Nipmuc Road between Hollis Street & Nipmuc Terrace. Nipmuc Road is a 40-foot right-of-way with a 28-foot surface width. While City design standards require street widths of 28 feet for collectors in residential districts, bump-outs or increased green space between the sidewalk and the road would create traffic calming and improve pedestrian safety in an area where many people speed. Runoff from Nipmuc Road could be diverted through curb cuts to BMPs in the buffer strip, disconnecting the street from the MS4 and reducing runoff volumes and pollutant loads to Lake Waushakum. The City should look for specific locations to implement green infrastructure on Nipmuc Road when planning future roadway and sidewalk improvements. Potential phosphorus removal attributable to this type of

project will depend on how many BMPs are installed and how much impervious area is disconnected from the MS4.

5.1.8 180 Winthrop Street (St. Tarcisius Cemetery)

The City has an drainage easement across St. Tarcisius Cemetery for the sections of pipe leading to outfall 2012000, which discharges to a wetland tributary to Lake Waushakum. Natural wetlands, when in good condition, provide nutrient removal to stormwater discharges. The City could perform a condition assessment of the wetland and, if necessary, perform some wetland restoration to ensure that phosphorus removal is maximized. The site is not suitable for a structural BMP because of its vicinity to the natural wetland, however the drainage in this area needs repair or reconfiguration and the easement requires maintenance.

5.2 Implementation

The City of Framingham will begin addressing the findings of this Phosphorus Source Identification Report in Permit Year 5 (FY2023). The City must first evaluate each potential retrofit opportunity identified in the previous section through the following actions:

- Determine a planned retrofit date for each potential retrofit site identified in Section 5.1 based on the next planned infrastructure, resurfacing, or redevelopment activity planned for the site.
- Determine an estimated cost for each potential retrofit project discussed in Section 5.1.
- Determine the engineering and regulatory feasibility of implementing each potential retrofit project.

A list of planned BMP retrofit projects and schedule for their implementation will be included in the City's Year 5 MS4 Annual Report.

In Permit Year 6 (FY2024), the City will plan and install one of the retrofit projects identified in Section 5.1 as a demonstration project in the Lake Waushakum watershed. The remainder of the retrofit projects, where implementation is feasible from an engineering and permitting perspective, will be installed according to the schedule included in the Year 5 annual report. Future availability of funding will also be considered in developing the schedule. Framingham will track any structural BMPs installed in the watershed and calculate the estimate phosphorus removal attributable to those BMPs consistent with Attachment 3 to Appendix F of the MS4 Permit. The BMP type, area treated, design storage volume, and estimated phosphorus removed in pounds per year by each BMP will be included in the City's future MS4 annual reports.

6.0 REFERENCES

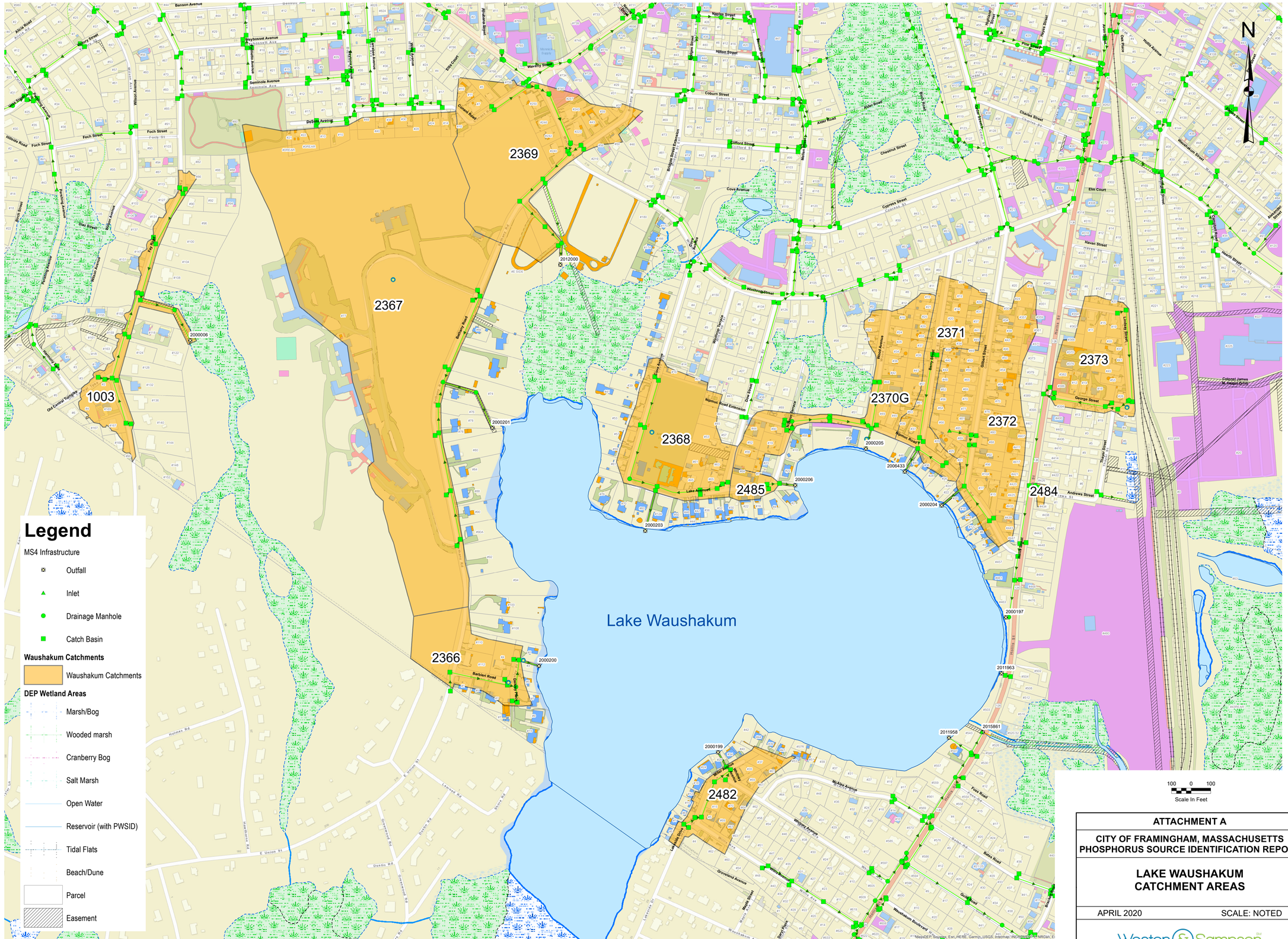
1. Sutherland, R.C., "Methodology for Estimating the Effective Impervious Area of Urban Watersheds", Watershed Protection Techniques, Vol. 2, No. 1, Fall 1995.

2. United States Environmental Protection Agency., "Methodology to Calculate Baseline Estimates of Impervious Area and Directly Connected Impervious Area for Massachusetts Communities". March 2010. https://www3.epa.gov/region1/npdes/stormwater/ma/IA-DCIA-Calculation-Methodology.pdf

3. Obropta, C.C. & Del Monaco, N. "Reducing Directly Connected Impervious Areas with Green Stormwater Infrastructure". *Journal of Sustainable Water in the Built Environment.* 2018. https://ascelibrary.org/doi/pdf/10.1061/JSWBAY.0000833

APPENDIX A

Lake Waushakum Catchment Area Map



ATTACHMENT A

CITY OF FRAMINGHAM, MASSACHUSETTS
PHOSPHORUS SOURCE IDENTIFICATION REPORT

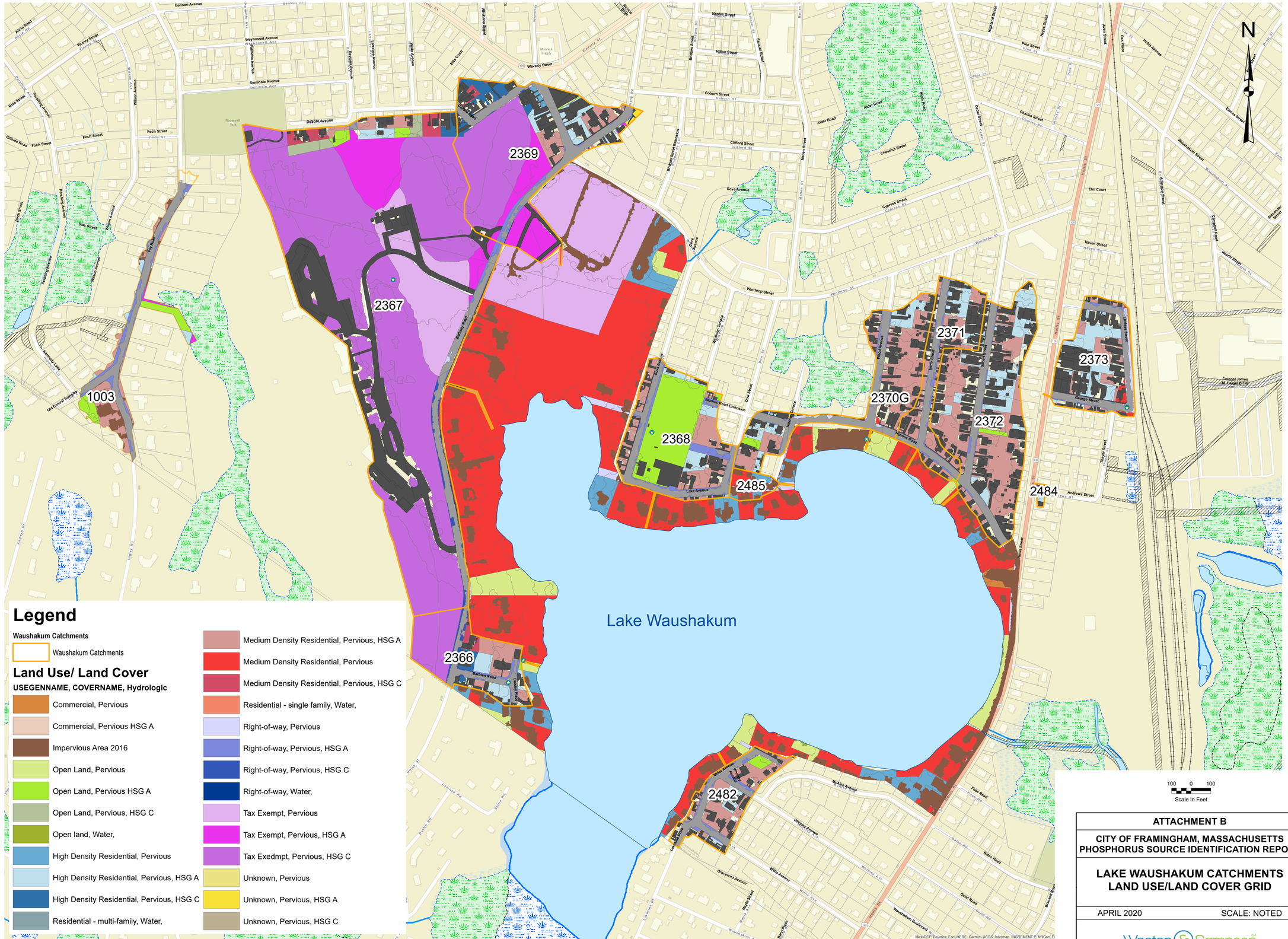
LAKE WAUSHAKUM CATCHMENT AREAS

APRIL 2020 SCALE: NOTED

Weston & Sampson

APPENDIX B

Land Use/Land Cover Map



ATTACHMENT B

CITY OF FRAMINGHAM, MASSACHUSETTS
PHOSPHORUS SOURCE IDENTIFICATION REPORT

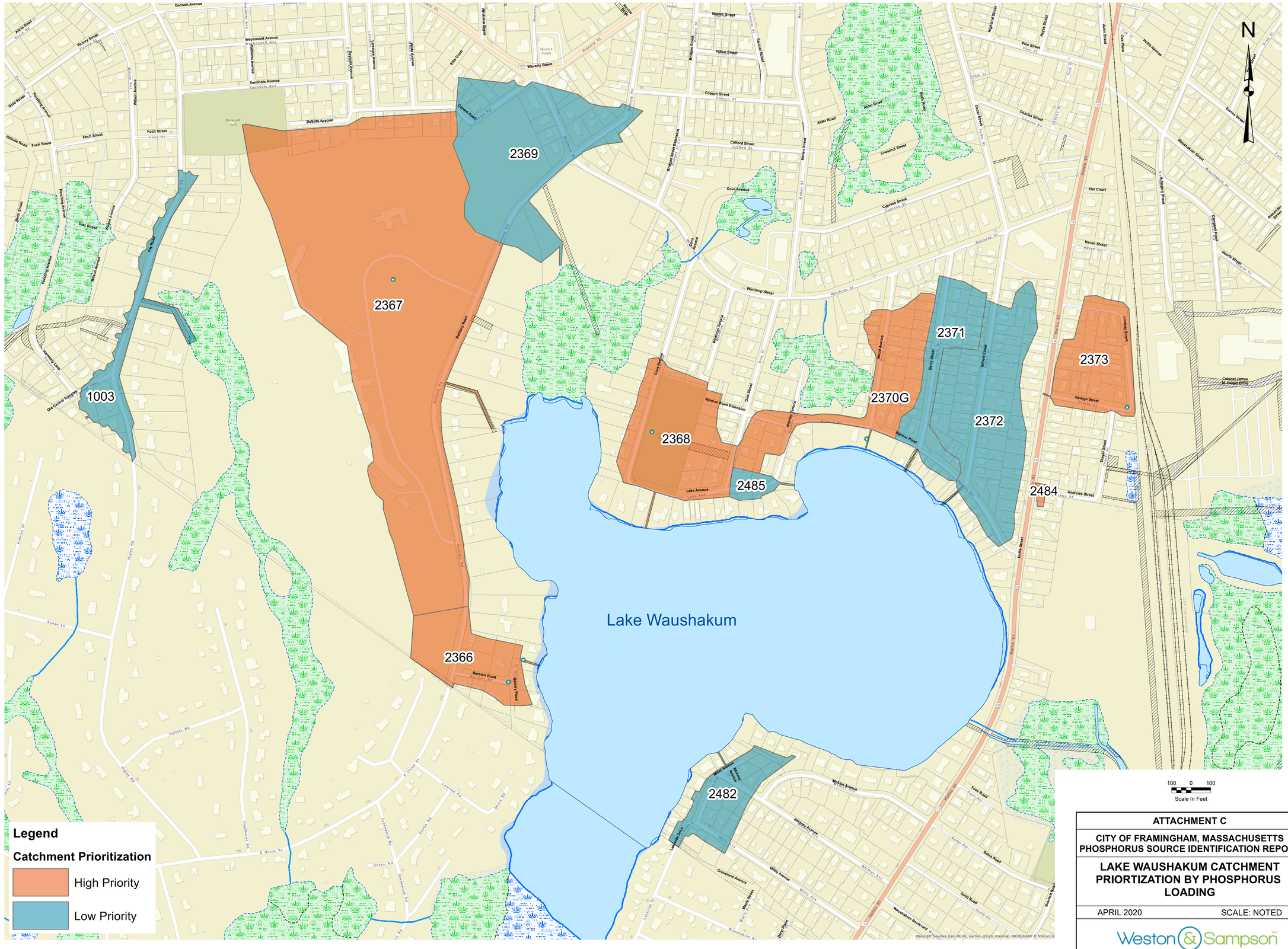
LAKE WAUSHAKUM CATCHMENTS
LAND USE/LAND COVER GRID

APRIL 2020 SCALE: NOTED

Weston & Sampson

APPENDIX C

Catchment Prioritization Map



ATTACHMENT C

CITY OF FRAMINGHAM, MASSACHUSETTS
PHOSPHORUS SOURCE IDENTIFICATION REPORT

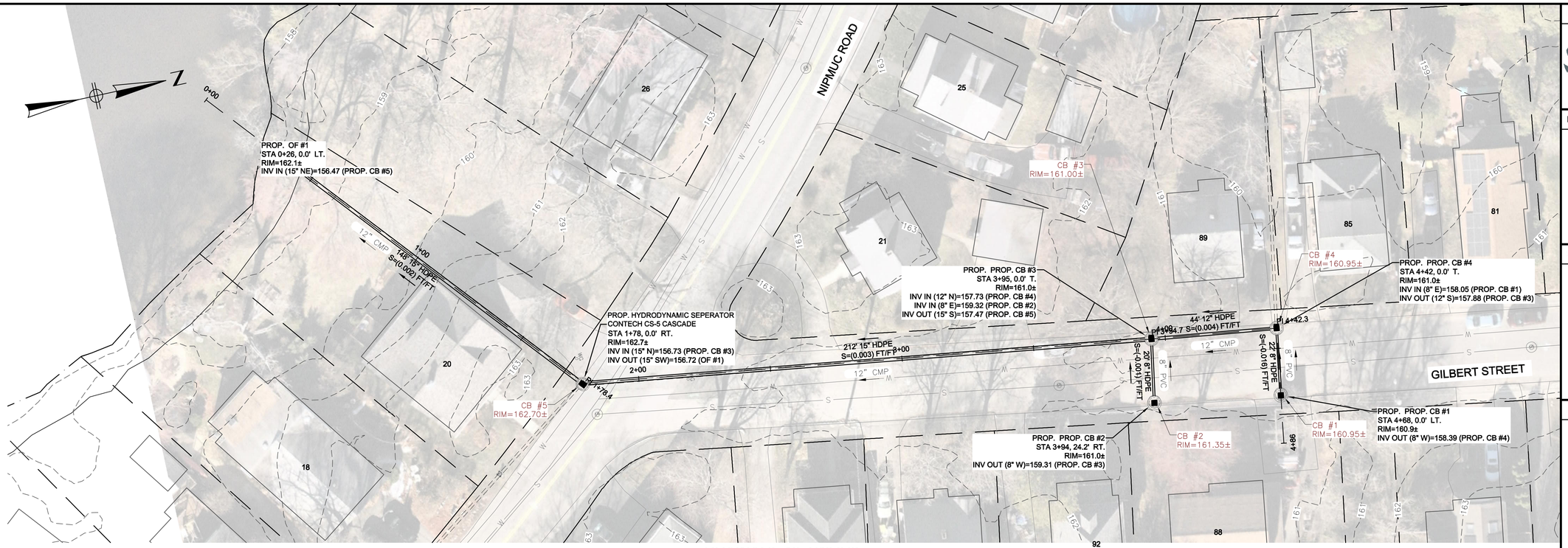
LAKE WAUSHAKUM CATCHMENT PRIORTIZATION BY PHOSPHORUS LOADING

APRIL 2020 SCALE: NOTED

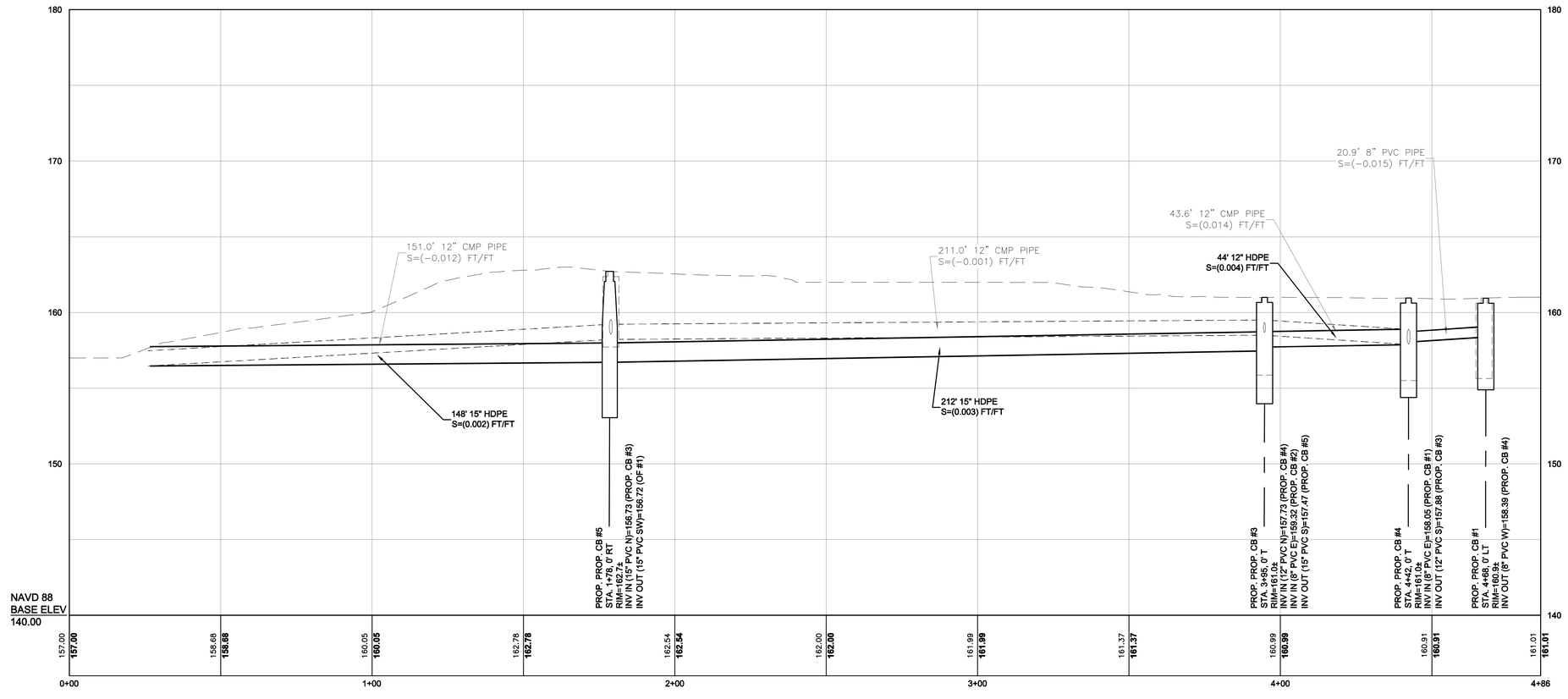
Weston & Sampson

Appendix D

BMP Retrofit Cut Sheets, Examples, and Working Designs



DRAINAGE NETWORK
STA 0+00 TO STA 4+85.99



PREPARED BY

BETA
www.BETA-Inc.com

REGISTERED PROFESSIONAL

SUBCONSULTANT

PROJECT

On Call Roadway Project FY 2022

Framingham, MA

TITLE

Nipmuc & Gilbert Drainage Improvements

NO.	REVISIONS	DATE

DRAWN BY:	JC
DESIGNED BY:	BB
CHECKED BY:	WPM
ISSUE DATE:	00/00/15
BETA JOB NO.:	0000-000

SCALE

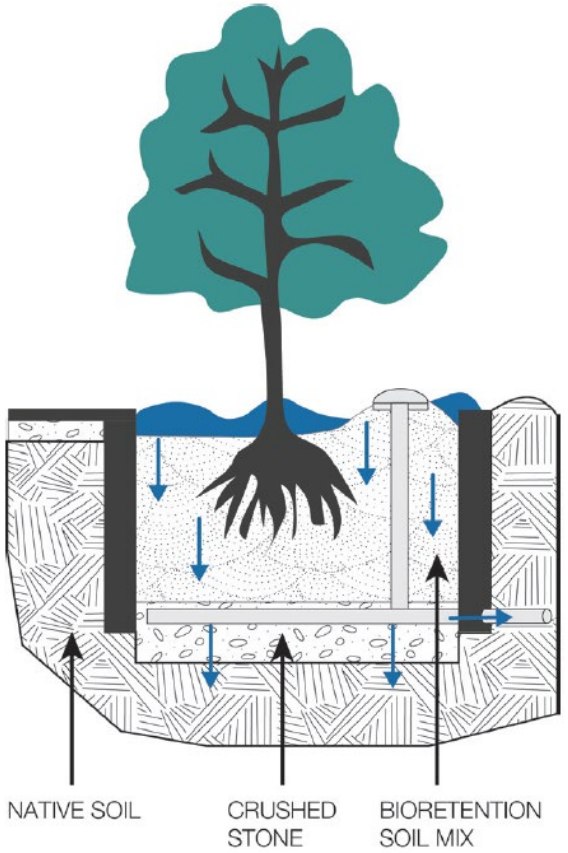
20 0 20 40
SCALE IN FEET: 1"=20'

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

For Review Only

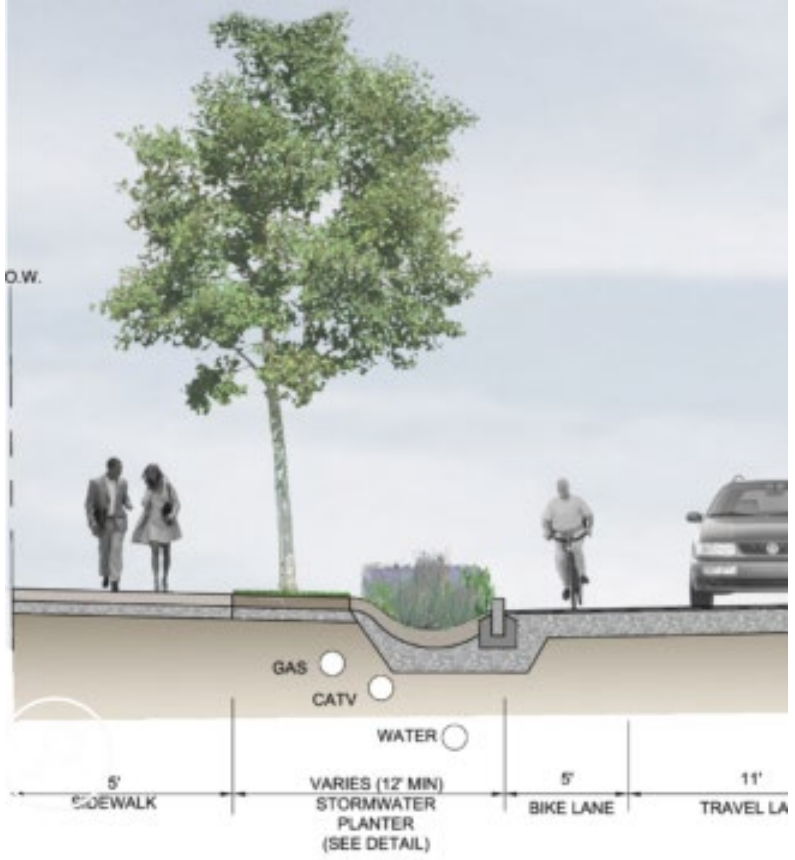
SHEET NO.

1/19/2022 2:24 PM N:\63005\63719 - FRAMINGHAM ON-CALL\GILBERT STREET\DRAWINGFILES\PLANSET\2022-01-19 PROPOSED.DWG (BETA STB BW.STB)

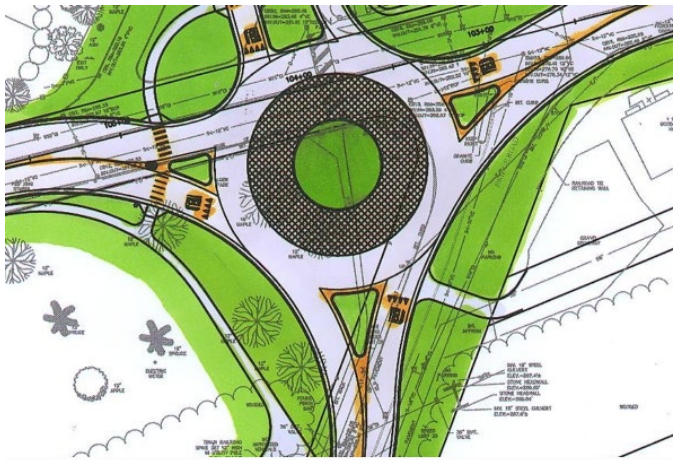












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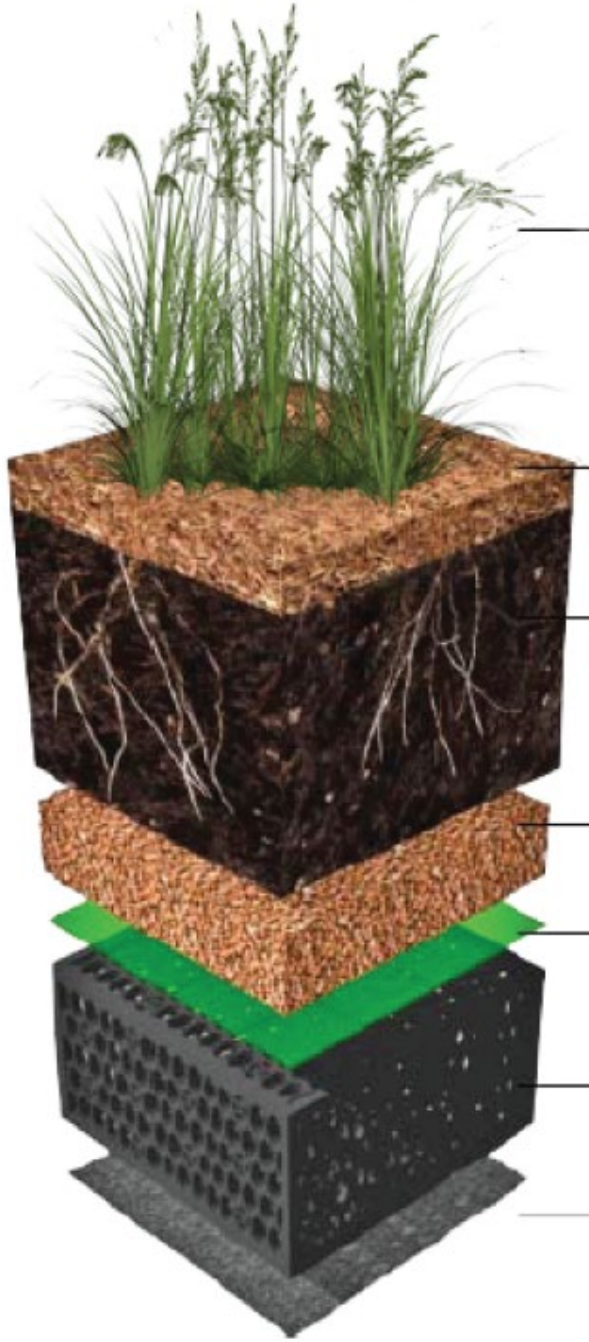


PLANTING

CLEAN, SHREDDED HARDWOOD MULCH

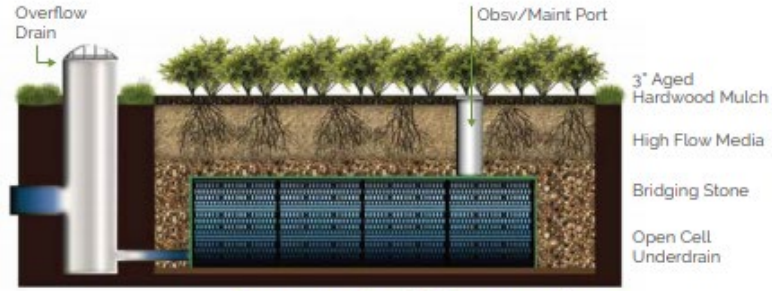
HIGH PERFORMANCE BIOFILTRATION MEDIA

CLEAN, BRIDGING STONE

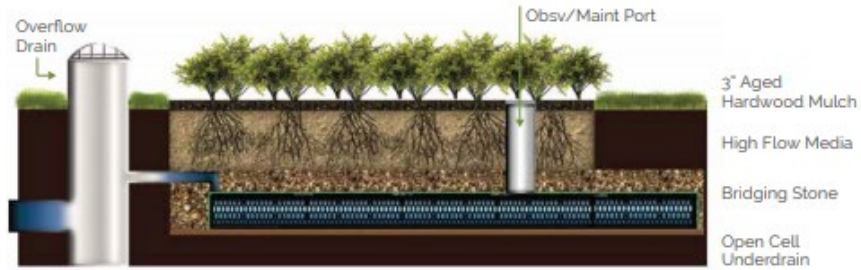
OPEN MESH SEPARATION FABRIC

MODULAR HIGH PERFORMANCE UNDERDRAIN

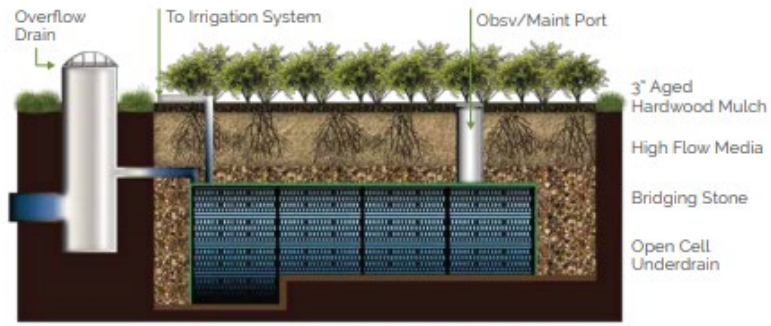
GEOTEXTILE OR LINER ENVELOPE



Expanded Detention



Expanded Infiltration



Rainwater Harvesting

ACF Environmental











ACF Environmental

Bioretention Areas & Rain Gardens



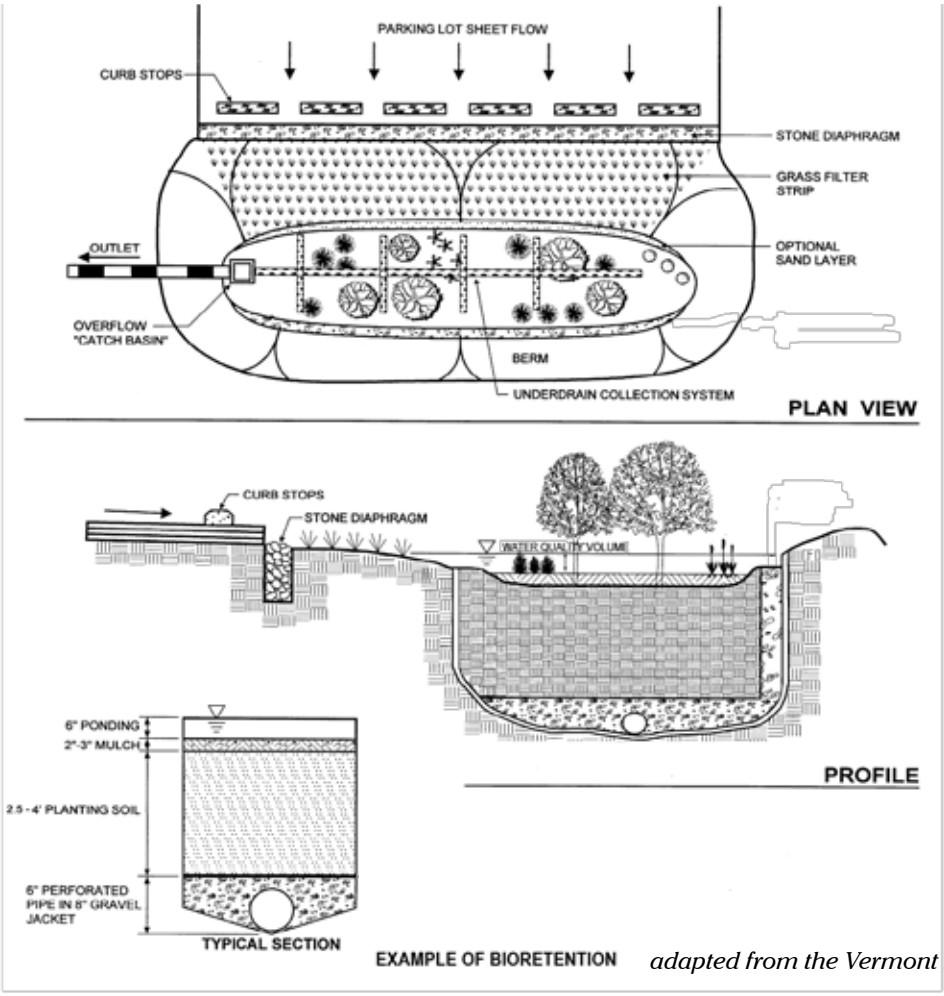
Description: Bioretention is a technique that uses soils, plants, and microbes to treat stormwater before it is infiltrated and/or discharged. Bioretention cells (also called rain gardens in residential applications) are shallow depressions filled with sandy soil topped with a thick layer of mulch and planted with dense native vegetation. Stormwater runoff is directed into the cell via piped or sheet flow. The runoff percolates through the soil media that acts as a filter.
There are two types of bioretention cells: those that are designed solely as an organic filter filtering bioretention areas and those configured to recharge groundwater in addition to acting as a filter exfiltrating bioretention areas. A filtering bioretention area includes an impermeable liner and underdrain that intercepts the runoff before it reaches the water table so that it may be conveyed to a discharge outlet, other best management practices, or the municipal storm drain system. An exfiltrating bioretention area has an underdrain that is designed to enhance exfiltration of runoff into the groundwater.

Ability to meet specific standards

Standard	Description
2 - Peak Flow	N/A
3 - Recharge	An exfiltrating bioretention area provides groundwater recharge.
4 - TSS Removal	90% TSS removal credit with adequate pretreatment
5 - Higher Pollutant Loading	Can be used for certain land uses with higher potential pollutant loads if lined and sealed until adequate pretreatment is provided. Adequate pretreatment must include 44% TSS removal prior to infiltration. For land uses that have the potential to generate runoff with high concentrations of oil and grease such as high intensity use parking lots and gas stations, adequate pretreatment may also include an oil grit separator, sand filter or equivalent. In lieu of an oil grit separator or sand filter, a filtering bioretention area also may be used as a pretreatment device for infiltration practices exfiltrating runoff from land uses with a potential to generate runoff with high concentrations of oil and grease.
6 - Discharges near or to Critical Areas	Good option for discharges near cold-water fisheries. Should not be used near bathing beaches and shellfish growing areas.
7 - Redevelopment	Suitable with appropriate pretreatment

Pollutant Removal Efficiencies

- Total Suspended Solids (TSS) — 90% with vegetated filter strip or equivalent
- Total Nitrogen — 30% to 50% if soil media at least 30 inches
- Total Phosphorus — 30% to 90%
- Metals (copper, lead, zinc, cadmium) — 40% to 90%
- Pathogens (coliform, e coli) — Insufficient data



EXAMPLE OF BIORETENTION *adapted from the Vermont Stormwater Manual*

Special Features:

- Can be lined and sealed to prevent recharge where appropriate
- Adequate pretreatment is essential
- Not recommended in areas with steep slope
- Depth of soil media depends on type of vegetation that is proposed
- Soil media must be 30 inches deep to achieve removal of nitrogen

Advantages/Benefits:

- Can be designed to provide groundwater recharge and preserves the natural water balance of the site
- Can be designed to prevent recharge where appropriate
- Supplies shade, absorbs noise, and provides windbreaks
- Can remove other pollutants besides TSS including phosphorus, nitrogen and metals
- Can be used as a stormwater retrofit by modifying existing landscape or if a parking lot is being resurfaced
- Can be used on small lots with space constraints
- Small rain gardens are mosquito death traps
- Little or no hazard for amphibians or other small animals

Disadvantages/Limitations:

- Requires careful landscaping and maintenance
- Not suitable for large drainage areas

Maintenance

Activity	Frequency
Inspect and remove trash	Monthly
Mow	2 to 12 times per year
Mulch	Annually
Fertilize	Annually
Remove dead vegetation	Annually
Prune	Annually

CITY OF FRAMINGHAM, MA

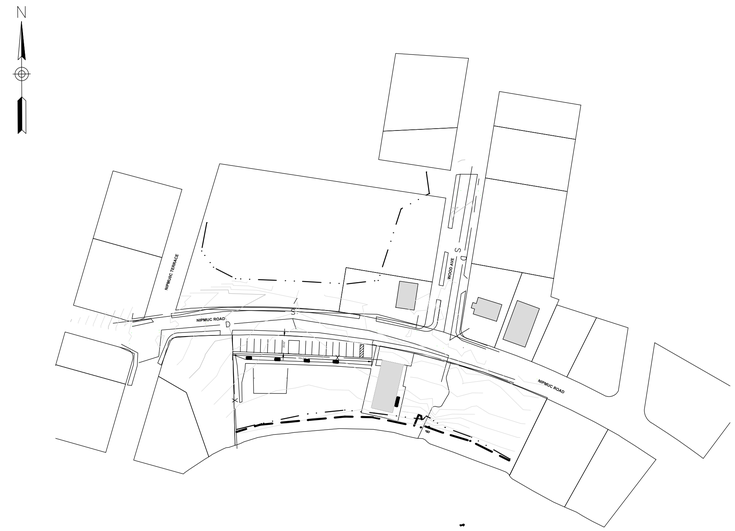
MAPC ACCELERATING CLIMATE RESILIENCY GRANT
LAKE WAUSHAKUM RESILIENCY DESIGN - 50% DRAWINGS
54 NIPMUC ROAD
FRAMINGHAM, MA 01702

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

DRAWING INDEX

SHEET	TITLE
C002	ABBREVIATIONS, NOTES AND LEGEND
C100	EXISTING CONDITIONS PLAN
CD100	SITE PREPARATION PLAN
C101	GRADING PLAN
C102	MATERIALS PLAN
L100	PLANTING PLAN
C500	CONSTRUCTION DETAILS
L500	PLANTING DETAILS
L501	PLANTING DETAILS



LOCUS MAP
1"=100'

ZONING INFORMATION

PARCEL ID: 140-62-8391-0000

OWNER: CITY OF FRAMINGHAM
DEPARTMENT OF PARKS AND RECREATION

Issued Date:

NOVEMBER 5, 2021

811 Know what's below. Call before you dig.

COA:

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Issued For:

DESIGN DEVELOPMENT - NOT FOR CONSTRUCTION

GENERAL NOTES

1. PLAN BEARINGS ARE BASED UPON THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM - MAINLAND ZONE (NAD83).
2. ELEVATIONS ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) PER GPS OBSERVATIONS.
3. ALL BIDDERS ARE REQUIRED TO INSPECT THE PROJECT SITE IN ITS ENTIRETY PRIOR TO SUBMITTING THEIR BID, AND BECOME FAMILIAR WITH ALL CONDITIONS AS THEY MAY AFFECT THEIR BID. CONTRACTOR AND SUB-CONTRACTOR SHALL BE FAMILIAR WITH ALL DRAWINGS AND SPECIFICATIONS PRIOR TO COMMENCING THE CONSTRUCTION.
4. LOCATIONS OF ANY UTILITIES SHOWN ON THESE PLANS ARE BASED UPON FIELD EVIDENCE AND READILY AVAILABLE RECORD INFORMATION. OTHER UTILITIES MAY EXIST WHICH ARE NOT SHOWN ON THESE PLANS.
5. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
6. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY OWNER AT NO ADDITIONAL COST TO THE CLIENT & OWNER.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING ALL DRAWINGS AND SPECIFICATIONS TO DETERMINE THE EXTENT OF EXCAVATION AND DEMOLITION REQUIRED TO RECEIVE SITE IMPROVEMENTS.
8. ANY DISCREPANCIES OR CONFLICTS BETWEEN THE DRAWINGS AND EXISTING CONDITIONS, EXISTING CONDITIONS TO REMAIN, TEMPORARY CONSTRUCTION, PERMANENT CONSTRUCTION AND WORK OF ADJACENT CONTRACTS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER BEFORE PROCEEDING. ITEMS ENCOUNTERED IN AREAS OF EXCAVATION THAT ARE NOT INDICATED ON THE DRAWINGS, BUT ARE VISIBLE ON SURFACE, SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE REMOVED AT NO ADDITIONAL COST TO THE CLIENT & OWNER.
9. ANY ALTERATIONS TO THESE DRAWINGS MADE IN THE FIELD DURING CONSTRUCTION SHALL BE RECORDED BY THE GENERAL CONTRACTOR ON "AS-BUILT" DRAWINGS.
10. ALL AREAS DISTURBED BY THE CONTRACTOR'S OPERATIONS OUTSIDE THE PROJECT LIMITS, SHALL BE RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST AND TO THE SATISFACTION OF THE CLIENT & OWNER.
11. ALL WORK SHOWN ON THE PLANS AS BOLD SHALL REPRESENT PROPOSED WORK. THE TERM "PROPOSED (PROP)" INDICATES WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET (R&R)", OR REMOVE, RELOCATE, RESET, (R,R&R).
12. ALL KNOWN EXISTING STATE, COUNTY AND CITY LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND ARE INDICATED ON THE PLANS.
13. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT HIS EMPLOYEES, AS WELL AS PUBLIC USERS FROM INJURY DURING THE ENTIRE CONSTRUCTION PERIOD USING ALL NECESSARY SAFEGUARDS, INCLUDING BUT NOT LIMITED TO, THE ERECTION OF TEMPORARY WALKS, STRUCTURES, PROTECTIVE BARRIERS, COVERING, OR FENCES AS NEEDED.
14. THE CONTRACTOR SHALL SUPPLY THE OWNER WITH THE NAME OF THE OSHA "COMPETENT PERSON" PRIOR TO CONSTRUCTION.
15. FILLING OF EXCAVATED AREAS SHALL NOT TAKE PLACE WITHOUT THE PRESENCE OR PERMISSION OF THE CLIENT.
16. EXISTING TREES TO REMAIN SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES. NO STOCKPILING OF MATERIAL, EQUIPMENT OR VEHICULAR TRAFFIC SHALL BE ALLOWED WITHIN THE DRIP LINE OF TREES TO REMAIN. NO GUYS SHALL BE ATTACHED TO ANY TREE TO REMAIN. WHEN NECESSARY OR AS DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL ERECT TEMPORARY BARRIERS FOR THE PROTECTION OF EXISTING TREES DURING CONSTRUCTION.
17. THE CONTRACTOR SHALL CALL DIGSAFE AT 811 AT LEAST 72 HOURS, SATURDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIGSAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE CLIENT PRIOR TO EXCAVATION.
18. CONTRACTOR IS RESPONSIBLE FOR STAKING CONSTRUCTION BASELINES, BLDG, STRUCTURES, ETC WITH A LICENSED SURVEYOR IN FIELD. NO CONSTRUCTION WILL BE PERFORMED WITHOUT THE PROPOSED BASELINES AND LAYOUTS APPROVED BY THE ENGINEER.
19. NO FILL SHALL CONTAIN HAZARDOUS MATERIALS.
20. CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AROUND PERIMETER OF WORK AREA (LIMIT OF WORK). FENCE SHALL NOT IMPEDE TRAVEL WAYS.
21. ANY QUANTITIES SHOWN ON PLANS ARE FOR COMPARATIVE BIDDING PURPOSES ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE PROJECT SITE TO VERIFY ALL QUANTITIES AND CONDITIONS PRIOR TO SUBMITTING BID.
22. ALL EXISTING DRAINAGE FACILITIES TO REMAIN SHALL BE MAINTAINED FREE OF DEBRIS, SOIL, SEDIMENT, AND FOREIGN MATERIAL AND OPERATIONAL THROUGHOUT THE LIFE OF THE CONTRACT. REMOVE ALL SOIL, SEDIMENT, DEBRIS AND FOREIGN MATERIAL FROM ALL DRAINAGE STRUCTURES, INCLUDING BUT NOT LIMITED TO, DRAINAGE INLETS, MANHOLES AND CATCH BASINS WITHIN THE LIMIT OF WORK AND DRAINAGE STRUCTURES OUTSIDE THE LIMIT OF WORK THAT ARE IMPACTED BY THE WORK FOR THE ENTIRE DURATION OF CONSTRUCTION.
23. CONTRACTOR'S STAGING AREA MUST BE WITHIN THE CONTRACT LIMIT LINE (LIMIT OF WORK AS IDENTIFIED ON THE PLANS).
24. THE CONTRACTOR SHALL KEEP ALL STREETS, PARKING LOTS AND WALKS THAT ARE NOT RESTRICTED FROM PUBLIC USE DURING CONSTRUCTION BROOM CLEAN AT ALL TIMES. THE CONTRACTOR SHALL USE ACCEPTABLE METHODS AND MATERIALS TO MAINTAIN ADEQUATE DUST CONTROL THROUGHOUT CONSTRUCTION.
25. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE CLIENT.
26. THE LIMIT OF WORK SHALL BE DELINEATED IN THE FIELD PRIOR TO THE START OF SITE CLEARING OR CONSTRUCTION.
27. HAULING OF EARTH MATERIALS TO AND FROM THE SITE SHALL BE RESTRICTED TO THE HOURS OF 7:00 AM TO 5:00 PM MONDAY THROUGH FRIDAY. HAULING SHALL ALSO BE PROHIBITED ON STATE AND FEDERAL HOLIDAYS.
28. ANY BOULDERS 3 CY OR SMALLER SHALL BE CONSIDERED UNDOCUMENTED FILL AND SHALL BE DISPOSED OF AT NO ADDITIONAL COST TO THE CLIENT.

EROSION AND SEDIMENT CONTROL NOTES

1. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE PUT INTO PLACE BY G.C. PRIOR TO BEGINNING ANY CONSTRUCTION OR DEMOLITION. REFER TO PLAN FOR APPROXIMATE LOCATION OF EROSION AND SEDIMENT CONTROL. REFER TO SPECS AND DETAILS FOR TYPE OF EROSION AND SEDIMENT CONTROL.
2. THE G.C. SHALL BE RESPONSIBLE FOR THE CONTINUAL MAINTENANCE OF ALL CONTROL DEVICES THROUGHOUT THE DURATION OF THE PROJECT.
3. CONTRACTOR SHALL MEET ALL OF THE STATE OF MASSACHUSETTS D.E.P. WETLAND ORDINANCE REGULATIONS FOR SEDIMENT AND EROSION CONTROL.
4. EXCAVATED MATERIAL STOCKPILED ON THE SITE SHALL BE SURROUNDED BY A RING OF UNBROKEN SEDIMENT AND EROSION CONTROL FENCE. THE LIMITS OF ALL GRADING AND DISTURBANCE SHALL BE KEPT TO A MINIMUM WITHIN THE APPROVED AREA OF CONSTRUCTION. ALL AREAS OUTSIDE OF THE LIMIT OF CONTRACT SHALL REMAIN TOTALLY UNDISTURBED UNLESS OTHERWISE APPROVED BY OWNER'S REPRESENTATIVE.
5. ALL CATCH BASINS AND DRAIN GRATES WITHIN LIMIT OF CONTRACT SHALL BE PROTECTED WITH FILTER FABRIC DURING THE ENTIRE DURATION OF CONSTRUCTION.
6. EROSION CONTROL BARRIERS TO BE INSTALLED AT THE TOE OF SLOPES. SEE SITE PREPARATION PLAN, NOTES, DETAILS AND SPECIFICATIONS.
7. ANY AREA OUTSIDE THE PROJECT LIMIT THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO THE CLIENT.
8. THE CONTRACTOR SHALL PROVIDE DUST CONTROL FOR CONSTRUCTION OPERATIONS AS APPROVED BY THE CLIENT.
9. ALL POINTS OF CONSTRUCTION EGRESS OR INGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ON TO PUBLIC/PRIVATE ROADS.

DEMOLITION & SITE PREPARATION NOTES

1. THE CONTRACTOR SHALL INCLUDE IN THE BID THE COST OF REMOVING ANY EXISTING SITE FEATURES AND APPURTENANCES NECESSARY TO ACCOMPLISH THE CONSTRUCTION OF THE PROPOSED SITE IMPROVEMENTS. THE CONTRACTOR SHALL ALSO INCLUDE IN THE BID THE COST NECESSARY TO RESTORE SUCH ITEMS IF THEY ARE SCHEDULED TO REMAIN AS PART OF THE FINAL SITE IMPROVEMENTS. REFER TO PLANS TO DETERMINE EXCAVATION, DEMOLITION AND TO DETERMINE THE LOCATION OF THE PROPOSED SITE IMPROVEMENTS.
2. THE OWNER RESERVES THE RIGHT TO REVIEW ALL MATERIALS DESIGNATED FOR REMOVAL AND TO RETAIN OWNERSHIP OF SUCH MATERIALS. IF THE OWNER RETAINS ANY MATERIAL THE CONTRACTOR SHALL ALLOW ARRANGEMENTS WITH THE OWNER TO HAVE THOSE MATERIALS REMOVED OFF SITE AT NO ADDITIONAL COST.
3. UNLESS SPECIFICALLY NOTED TO BE SAVED / STOCKPILED (R&S) OR REUSED / RELOCATED (R&R), ALL SITE FEATURES CALLED FOR REMOVAL (REM) SHALL BE REMOVED WITH THEIR FOOTINGS, ATTACHMENTS, BASE MATERIAL, ETC, TRANSPORTED FROM THE SITE TO BE DISPOSED OF IN A LAWFUL MANNER AT AN ACCEPTABLE DISPOSAL SITE AND AT NO COST TO THE OWNER.
4. ALL EXISTING SITE FEATURES TO REMAIN SHALL BE PROTECTED THROUGHOUT THE CONSTRUCTION PERIOD. ANY FEATURES DAMAGED DURING CONSTRUCTION OPERATIONS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE CLIENT'S REPRESENTATIVE AT NO ADDITIONAL COST.
5. DURING EARTHWORK OPERATIONS, CONTRACTOR SHALL TAKE CARE TO NOT DISTURB EXISTING MATERIALS TO REMAIN, OUTSIDE THE LIMITS OF EXCAVATION AND BACKFILL AND SHALL TAKE WHATEVER MEASURES NECESSARY, AT THE CONTRACTOR'S EXPENSE, TO PREVENT ANY EXCAVATED MATERIAL FROM COLLAPSING. ALL BACKFILL MATERIALS SHALL BE PLACED AND COMPACTED AS SPECIFIED TO THE SUBGRADE REQUIRED FOR THE INSTALLATION OF THE REMAINDER OF THE CONTRACT WORK.
6. ALL ITEMS CALLED FOR REMOVAL SHALL BE REMOVED TO FULL DEPTH INCLUDING ALL FOOTINGS, FOUNDATIONS, AND OTHER APPURTENANCES, EXCEPT AS SPECIFICALLY NOTED OTHERWISE.
7. THE STORAGE OF MATERIALS AND EQUIPMENT WILL BE PERMITTED AT LOCATIONS DESIGNATED BY THE CLIENT OR THE CLIENT'S REPRESENTATIVE. PROTECTION OF STORED MATERIALS AND EQUIPMENT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

GRADING & DRAINAGE NOTES

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GRADES ON THE GROUND AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE CLIENT.
2. CONTRACTOR SHALL ENSURE ALL AREAS ARE PROPERLY PITCHED TO DRAIN, WITH NO SURFACE WATER PONDING OR PUDDLING.
3. EXCAVATION REQUIRED WITHIN PROXIMITY OF KNOWN EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO COST TO THE CLENT.
4. WHERE NEW EARTHWORK MEETS EXISTING EARTHWORK, CONTRACTOR SHALL BLEND NEW EARTHWORK SMOOTHLY INTO EXISTING, PROVIDING VERTICAL CURVES OR ROUNDS AT ALL TOP AND BOTTOM OF SLOPES.
5. ALL FILL SHALL BE PLACED IN LIFTS & COMPACTED IN ACCORDANCE WITH THE EARTH WORK SPEC.
6. WHERE A SPECIFIC LIMIT OF WORK LINE IS NOT OBVIOUS OR IMPLIED, BLEND GRADES TO EXISTING CONDITIONS WITHIN 5 FEET OF PROPOSED CONTOURS.
7. RESTORE ALL DISTURBED AREAS AND LIMITS OF ALL REMOVALS TO LOAM AND SEED (L&S) UNLESS OTHERWISE NOTED.
8. SEE EARTHWORK SECTION OF SPECIFICATIONS FOR SPECIFIC EXCAVATION AND FILLING PROCEDURES.

LAYOUT & MATERIALS NOTES

1. REFER TO EXISTING CONDITIONS PLANS FOR SURVEY INFORMATION.
2. COORDINATE ALL LAYOUT ACTIVITIES WITH THE SCOPE OF WORK CALLED FOR BY DEMOLITION, GRADING AND UTILITIES OPERATIONS ENCOMPASSED BY THIS CONTRACT. SET, PROTECT AND REPLACE REFERENCE STAKES AS NECESSARY OR AS REQUIRED BY THE CLIENT'S REPRESENTATIVE.
3. ALL WORK SHALL BE PERFORMED BY CONTRACTOR UNLESS SPECIFICALLY INDICATED THAT THE WORK WILL BE PERFORMED "BY OTHERS".
4. TO FACILITATE LAYOUT OF PROPOSED SITE FEATURES AND FACILITIES, LAYOUT INFORMATION FOR CERTAIN FUTURE WORK, WHICH IS NOT INCLUDED WITHIN THE SCOPE OF THIS CONTRACT HAS BEEN PROVIDED ON THE LAYOUT AND MATERIALS PLAN FOR INFORMATION ONLY. THE LAYOUT OF SITE AMENITIES AND FENCES MUST BE APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION. SOME ITEMS ARE "NOT IN CONTRACT" (NIC) AND SHOWN FOR REFERENCE ONLY.
5. THE LAYOUT OF SITE AMENITIES AND FENCES MUST BE APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
6. ALL PROPOSED SITE FEATURES SHALL BE LAID OUT AND STAKED FOR REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCEMENT OF INSTALLATION. ANY REQUIRED ADJUSTMENTS TO THE LAYOUT SHALL BE UNDERTAKEN AS REQUIRED, AT NO ADDITIONAL COST TO THE OWNER.
7. ALL PROPOSED PAVEMENTS SHALL MEET THE LINE AND GRADE OF EXISTING ADJACENT PAVEMENT SURFACES AND SHALL BE TREATED WITH AN RS-1 TACK COAT AT POINT OF CONNECTION.
8. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GRADES ON THE GROUND AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE OWNER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD MEASUREMENT OF ALL PROPOSED FENCES AND GATES.
10. ALL REFERENCES TO LOAM AND SEED (L&S) REFER TO HYDROMULCH SEEDED LAWN, UNLESS NOTED OTHERWISE.
11. REFER TO DETAIL DRAWINGS FOR CONSTRUCTION DETAILS.
12. CONTRACTOR SHALL PERFORM ALL EARTHWORK IN CONFORMANCE WITH PROJECT GEOTECHNICAL SPECIFICATIONS.
13. EXCESS FILL MATERIAL SHALL BE REMOVED & DISPOSED OF BY THE CONTRACTOR AT NO ADDITIONAL COST.

ABBREVIATIONS

GENERAL

PROP	PROPOSED
ADJ	ADJUST
BIT. CONC.	BITUMINOUS CONCRETE
CEM. CONC.	CEMENT CONCRETE
℄	BASELINE
N.T.S.	NOT TO SCALE
B.M.	BENCH MARK
ABAN	ABANDON
MB	MAIL BOX
GRAN. CURB	GRANITE CURB
EXIST. (OR EX.)	EXISTING
FDN	FOUNDATION
F.L. (OR F)	FLOW LINE
P	PROPERTY LINE
PVMT	PAVEMENT
℄W.W.	PAVED WATERWAY
RC	REINFORCED CONCRETE
M.H.B.	MASSACHUSETTS HIGHWAY BOUND
REM	REMOVE
REMOD	REMODEL
RET	RETAIN
R.O.W.	RIGHT-OF-WAY
R&R	REMOVE AND RESET
R,R&R	REMOVE, RELOCATED AND RESET
R&S	REMOVE AND STACK
R&D	REMOVE AND DISPOSE
SB	STONE BOUND
NIC	NOT IN CONTRACT
H.C.	HANDICAP
WCR	WHEELCHAIR RAMP
FF	FINISHED FLOOR
HMA	HOT MIX ASPHALT
G.C.	GENERAL CONTRACTOR
E.C.	ELECTRICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
SWEL	SOLID WHITE EDGE LINE
BWLL	BROKEN WHITE LANE LINE
SYEL	SOLID YELLOW EDGE LINE
SB/DH	STONE BOUND/ DRILL HOLE
CLF	CHAIN LINK FENCE
TEMP.	TEMPORARY
TYP.	TYPICAL
EQ	EQUIPMENT
H.C.	HANDICAP
EOP	EDGE OF PAVEMENT
PROT	PROTECT
CTE	CONNECT TO EXISTING
RL	ROOF LEADER
L.O.W.	LIMIT OF WORK
VIF	VERIFY IN FIELD
APPROX.	APPROXIMATE
TBM	TEMPORARY BENCHMARK
ALT.	ALTERNATE
BVW	BORDERING VEGETATED WETLAND

UTILITIES

GICI	GUTTER INLET W/ CURB INLET
CBCI	CATCH BASIN W/ CURB INLET
CB	CATCH BASIN
C.I.T.	CHANGE IN TYPE
CTE	CONNECT TO EXISTING
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
CI	CURB INLET
CIP	CAST IRON PIPE
CMP	CORRUGATED METAL PIPE
DI	DUCTILE IRON PIPE
GI	GUTTER INLET
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
HYD	HYDRANT
INV. ELEV.	INVERT ELEVATION
UP	UTILITY POLE
SMH	SEWER MANHOLE
WG	WATER GATE
DS	DOWN SPOUT
HDPE	HIGH DENSITY POLYETHYLENE PIPE
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
DMH	DRAIN MANHOLE
LB	LEACHING BASIN
LG	LEACHING GALLEY
CI	CAST IRON
OCS	OUTLET CONTROL STRUCTURE
OGT	OIL AND GRIT TRAP
VC	VITRIFIED CLAY PIPE
LP	LIGHT POLE
OHW	OVERHEAD WIRE
UPLP	UTILITY POLE WITH LIGHT
SWTU	STORM WATER TREATMENT UNIT
HH	HANDHOLE
GW	GARAGE WASTE
CO	CLEANOUT
LC	LEACHING CHAMBER
GV	GATE VALVE

ALIGNMENT/GRADING

BW	BOTTOM OF WALL
BC	BOTTOM OF CURB
PI	POINT OF INTERSECTION
PC	POINT OF CURVATURE
PT	POINT OF TANGENCY
PRC	POINT OF REVERSE CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVC	POINT OF VERTICAL CURVATURE
PVT	POINT OF VERTICAL TANGENCY
ELEV	ELEVATION
CC	CENTER OF CURVE
H.P.	HIGH POINT
L.P.	LOW POINT
R	RADIUS OF CURVATURE
STA	STATION
S.S.D.	STOPPING SIGHT DISTANCE
TC	TOP OF CURB
TW	TOP OF WALL

GENERAL SYMBOLS

EXISTING	PROPOSED	
CB	CB	CATCH BASIN
CBCI		CATCH BASIN CURB INLET
		LEACHING GALLEY
		CURB (OR BERM)–TYPE NOTED
		EDGE OF ROAD
HH		HANDHOLE (NUMBER AS NOTED)
EMH		ELECTRIC MANHOLE
TMH		TELEPHONE MANHOLE
SMH		SEWER MANHOLE
DMH		DRAINAGE MANHOLE
GG		GAS GATE
WG		WATER GATE VALVE
		HYDRANT
		WELL
		HANDICAP
LP	OR LP	LIGHTPOLE
D	D	DRAIN PIPE
S	S S	SEWER MAIN
	S	SEWER MAIN BY P.C.
E	E E	ELECTRIC DUCT
C	T T	TELEPHONE/COMMUNICATIONS/FIRE ALARM
	GW GW	GARAGE WASTE LINE
	GW	GARAGE WASTE LINE BY P.C.
	V	VENTS BY P.C.
G	G G	GAS MAIN
W	W	WATER MAIN
OHW OHW	OHW	OVERHEAD WIRES
GUARD RAIL	OR	GUARD RAIL (SIZE AND TYPE NOTED)
LABEL / DATE		HIGHWAY / PROPERTY BOUND (TYPE NOTED)
NAME		CITY OR CITY OR COUNTY LAYOUT LINE
12 N00°00'00"E		CITY,CITY OR COUNTY BOUNDARY
+57.59 PC		BASE OR SURVEY LINE
		CENTERLINE OF CONSTRUCTION
		PROPERTY LINE
	WCR	WHEELCHAIR RAMP (WCR)
	SEE PLANS	TREE (SIZE AND TYPE NOTED)
CLF OR WOOD FENCE	SEE PLANS	FENCE (SIZE AND TYPE NOTED)
		EASEMENT LINE/ FUTURE CITY PROPERTY LINE
M#.#.#		MASSHIGHWAY STANDARD SPECIFICATION REFERENCE NUMBER
B3 TP1	TP–2 OR TP1	TEST PIT/BORINGS
MON WELL (TYP)		MONITORING WELL
UP 8	OHW OHW	UTILITY POLE
		GUY POLE
FLAG POLE		FLAG POLE
		SIGN
		TREE LINE
B	B	BOLLARD
		BIKE RACK
		SAWCUT
		EROSION CONTROL (SPECIFIED ON PLANS)
		OBSERVATION WELL
		LIMIT OF WORK
CBF		TEMPORARY FENCE
		CONCRETE BOUND FOUND
		TEMPORARY BENCHMARK (TBM)
		DI WATER REDUCER
BVW–A1		WETLAND FLAG

Project:

LAKE WAUSHAKUM RESILIENCY DESIGN 50% DESIGN SET

CITY OF FRAMINGHAM 150 CONCORD ST FRAMINGHAM, MA 01702

Weston & Sampson

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50% Design Development

Abbreviations, Notes & Legend

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C002

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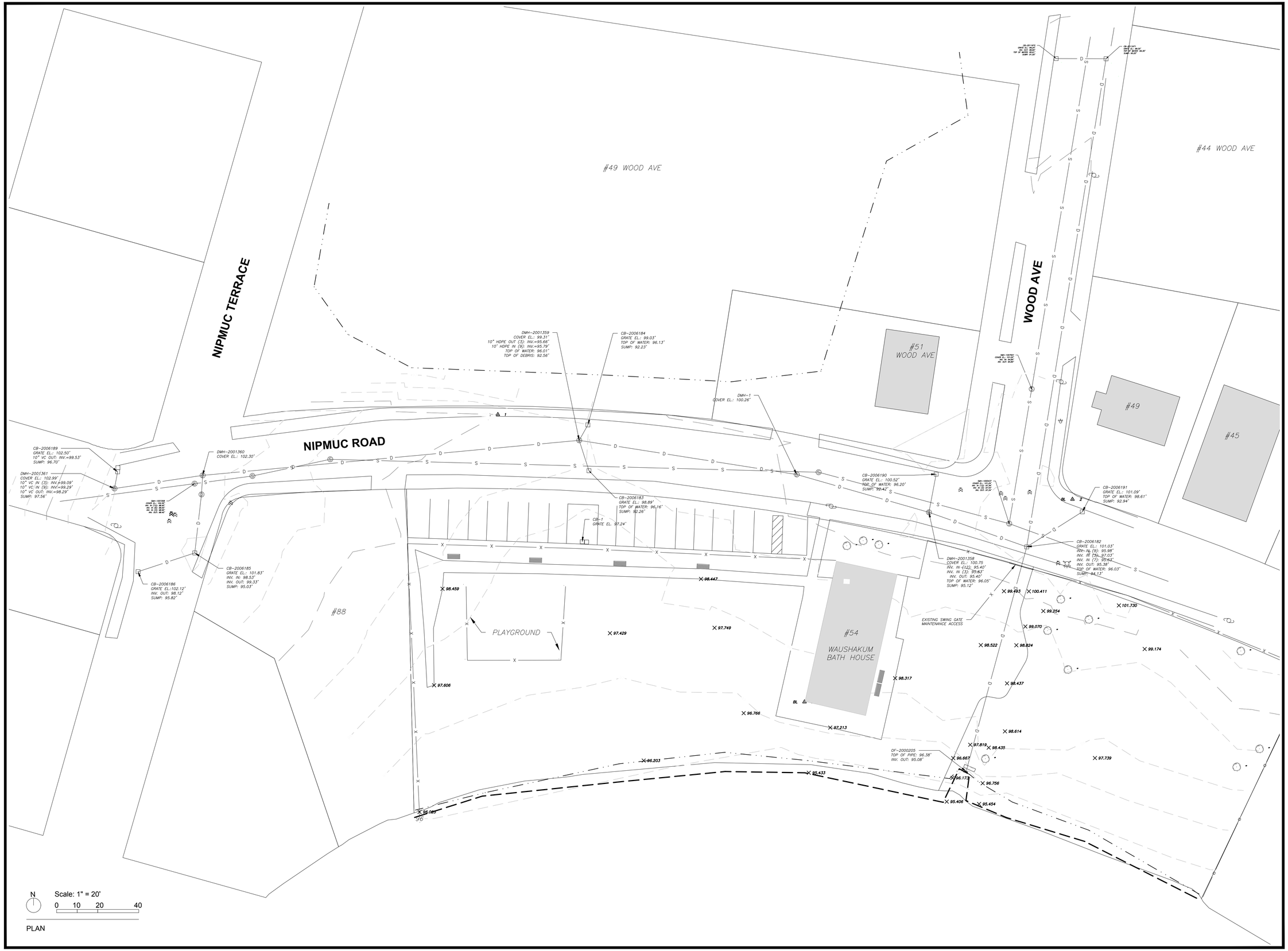

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Existing Conditions Plan

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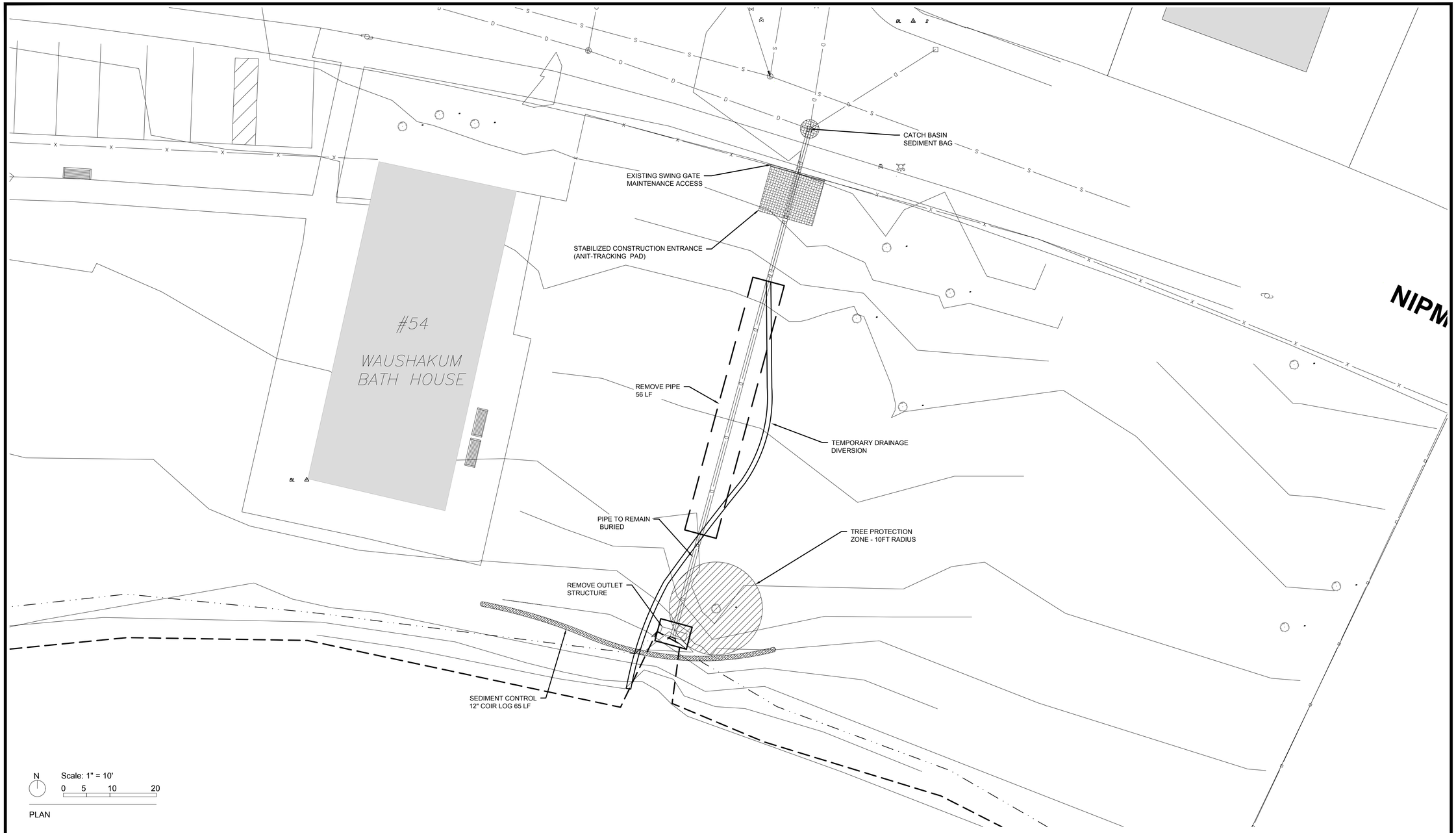
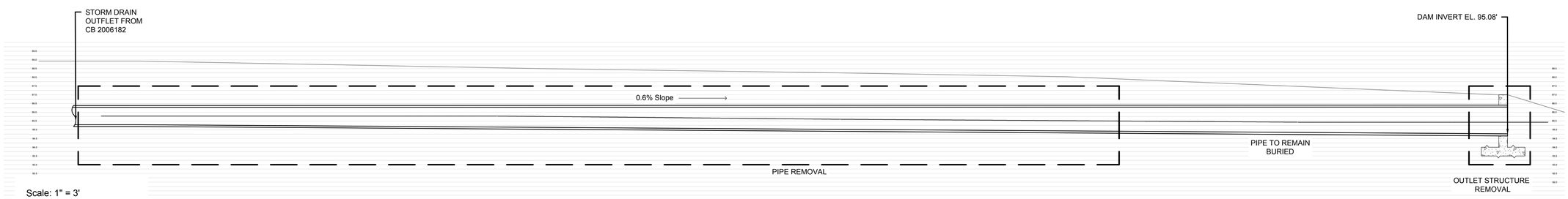


PLAN



PROFILE

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Site Preparation Plan

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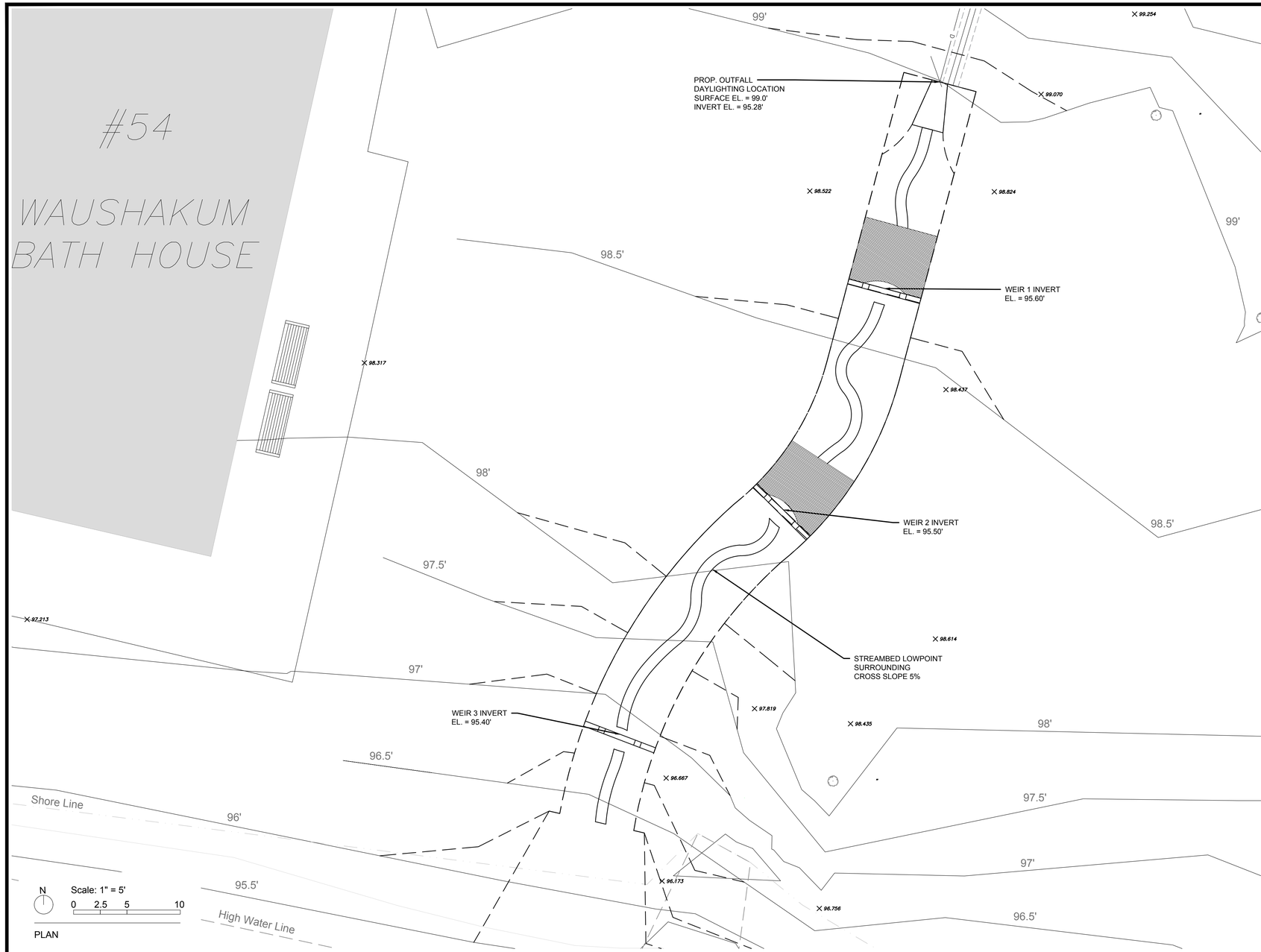

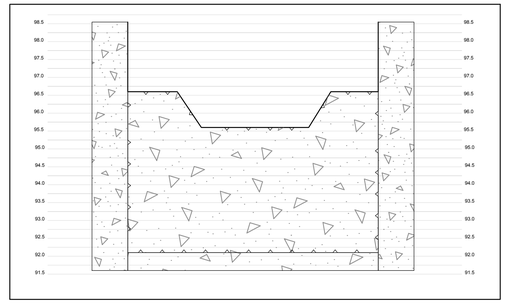

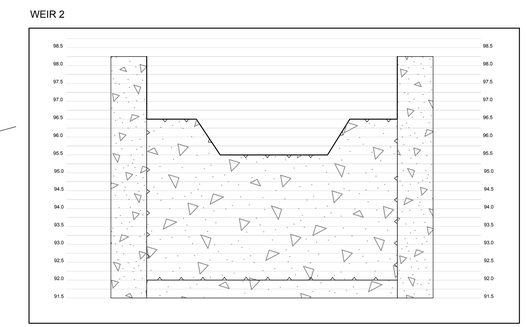

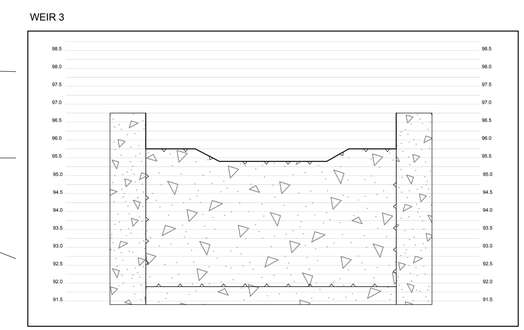

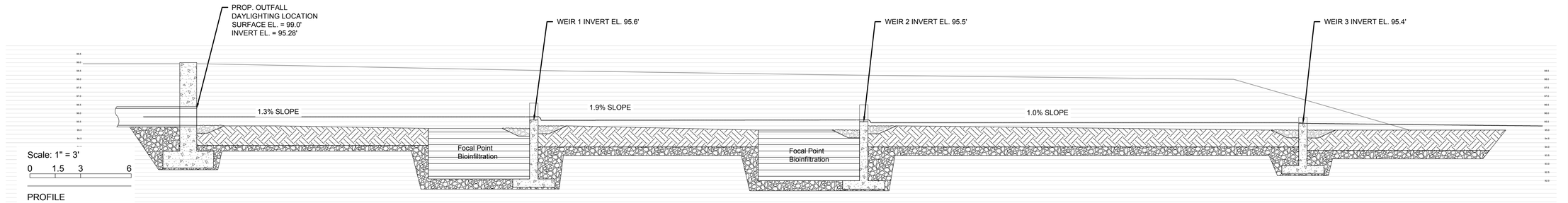

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50% Design Development

Grading

Sheet Number:

C101

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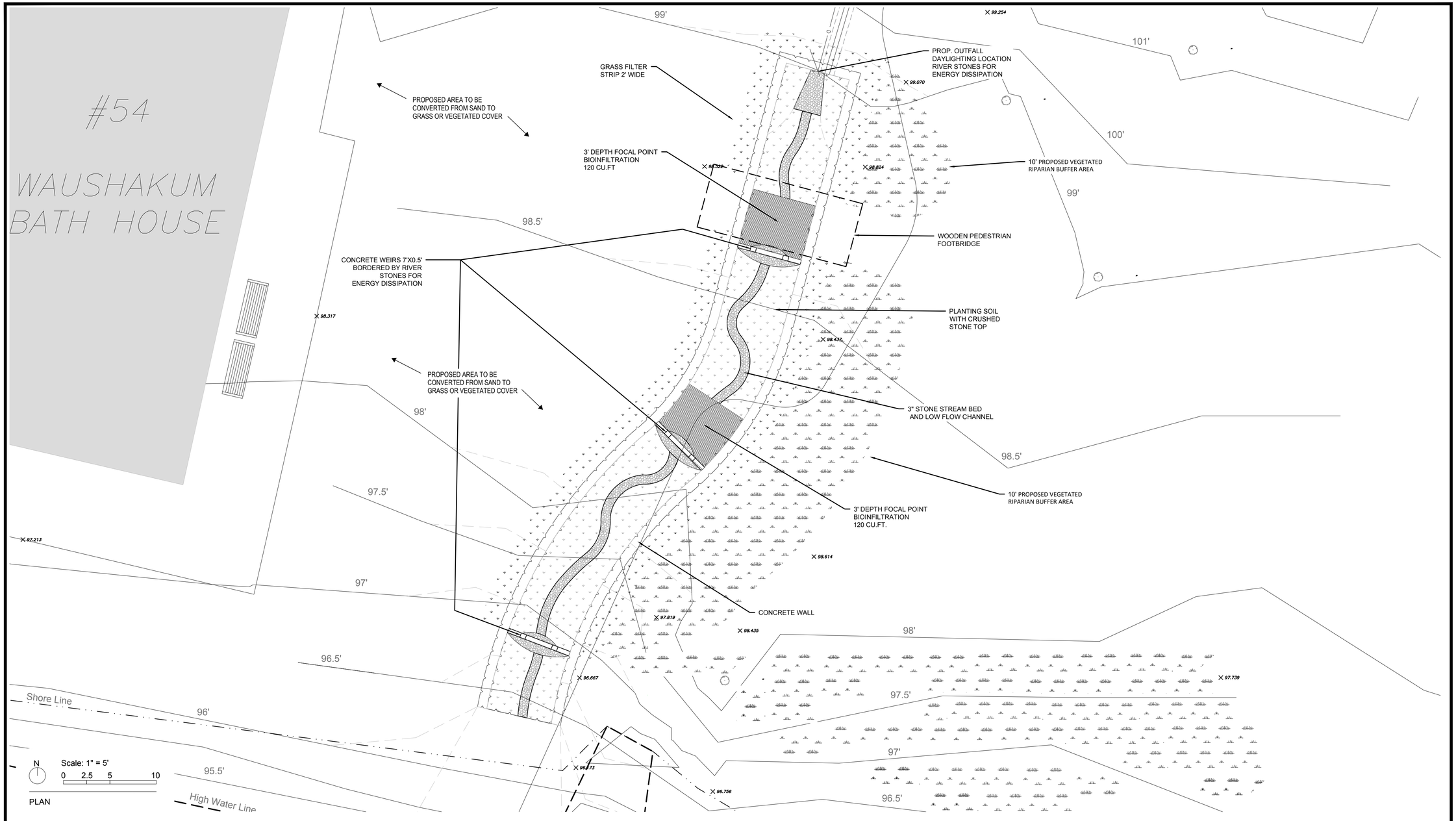

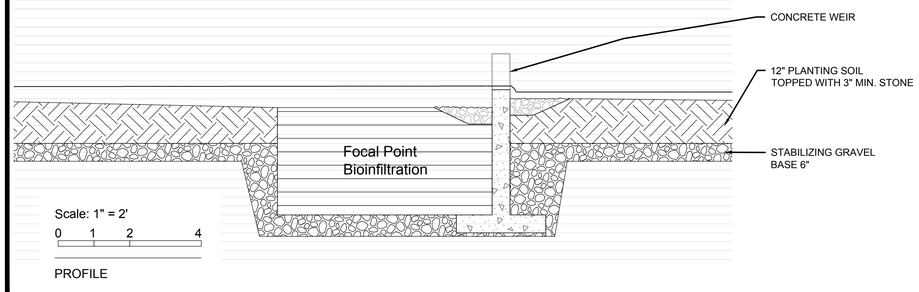

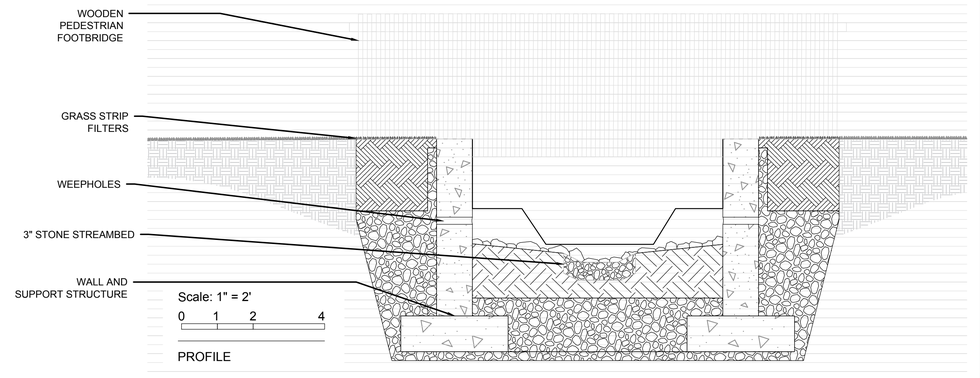

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50% Design Development

Materials Plan

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C102

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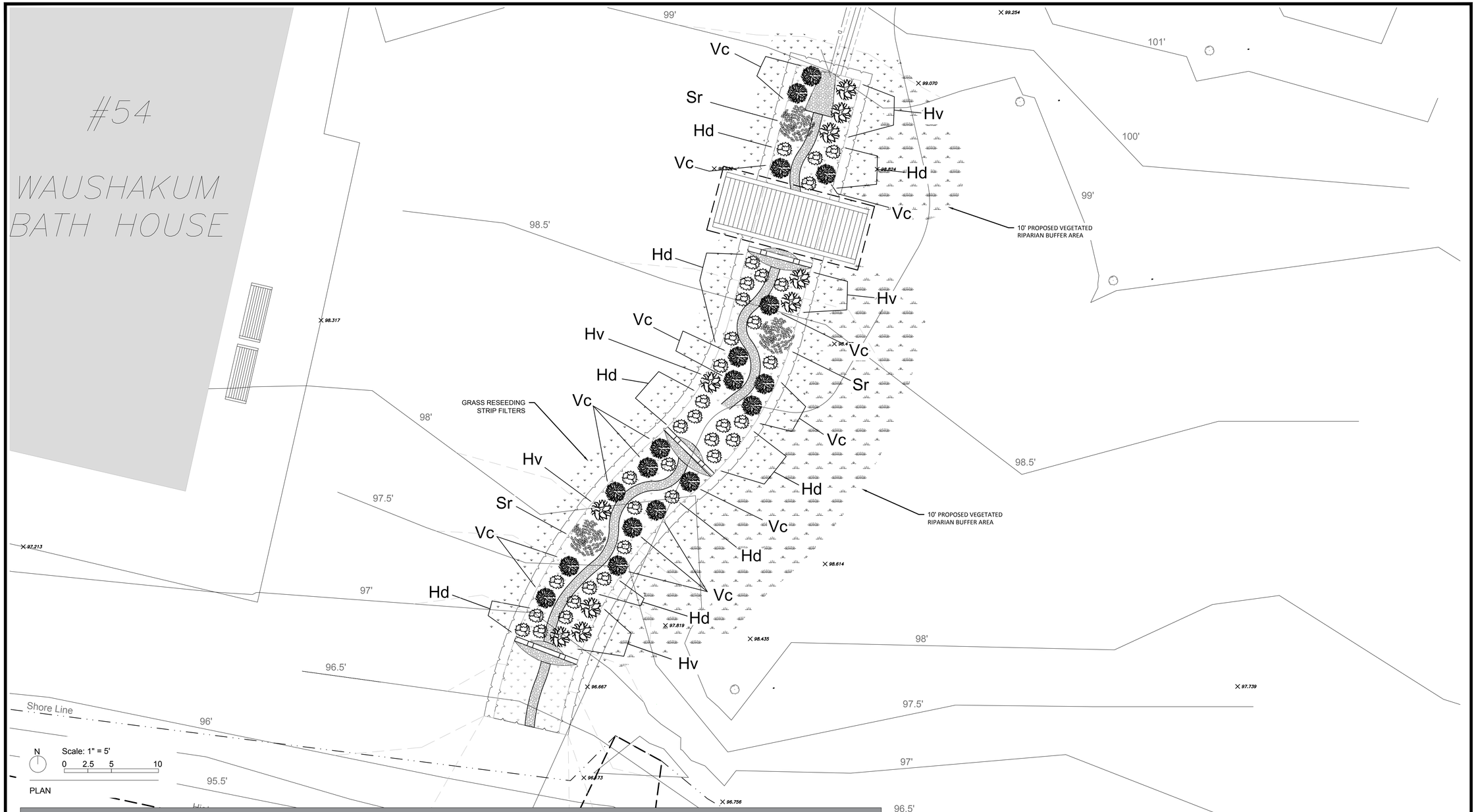
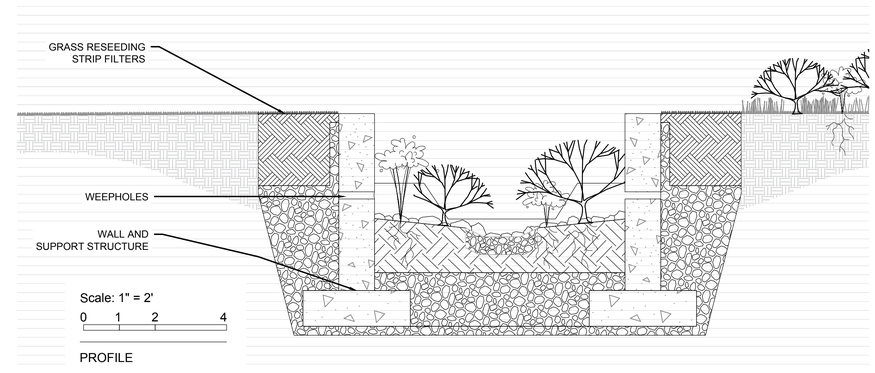


Planting Inventory						
Symbol	Type	Latin Name	Common Name	Quantity	Size	Height/Caliper
Shrubs						
	Hd	Hypericum densiflorum	Common St. John's Wort	34	3 Gal.	2'–0" O.C.
	Vc	Viburnum cassinoides	Northern Wild Raisin	18	5 Gal.	3'–0" O.C.
	Hv	Hamamelis virginiana	Witch Hazel	10	5 Gal.	3'–0" O.C.
	Sr	Sambucus racemose	Red Elderberry	3	5 Gal.	3'–0" O.C.
Groundcover						
	Grass Seed Mix		290.0 sq.ft.		1–2 lb bag	
	10' Vegetated Riparian Buffer		600.0 sq.ft.			



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Planting Plan

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L100

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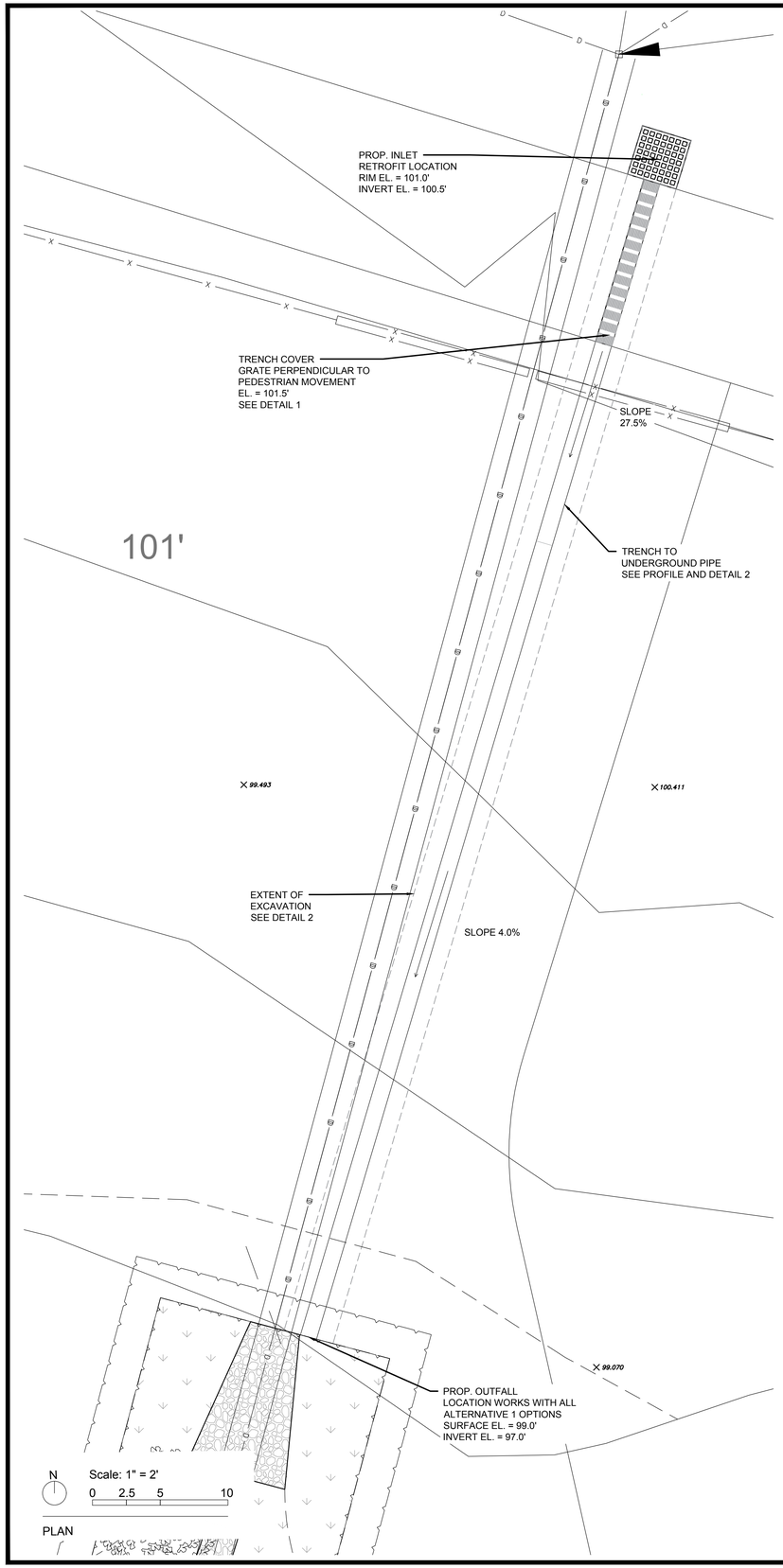
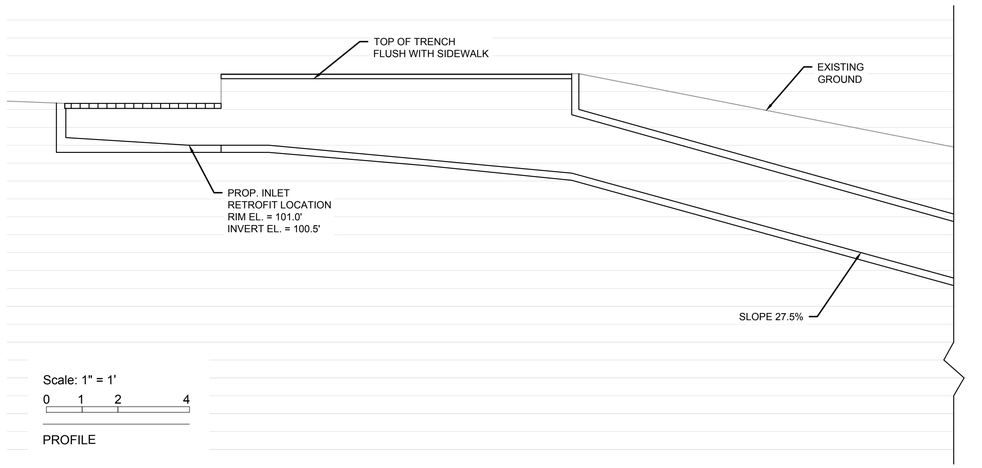
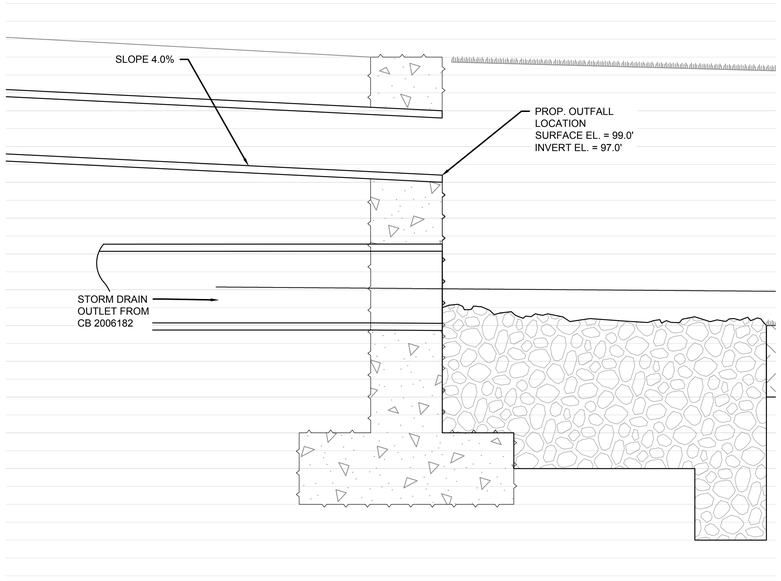
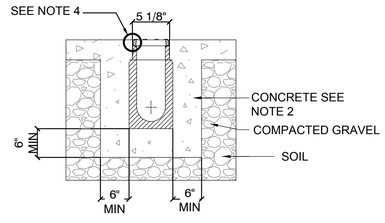




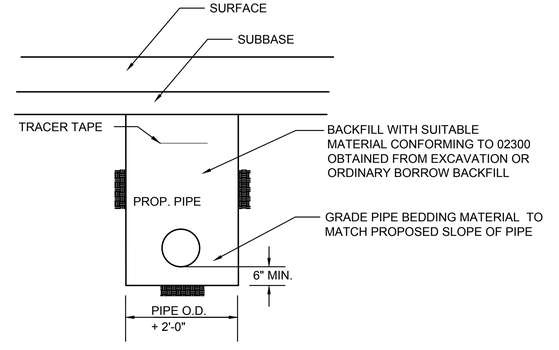




NOTES:

1. CONTRACTOR TO ENSURE THE MINIMUM DIMENSIONS SHOWN ARE SUITABLE FOR THE EXISTING GROUND CONDITIONS. NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
2. MINIMUM CONCRETE STRENGTH OF 3000 PSI. THE CONCRETE SHALL BE VIBRATED TO ELIMINATE AIR POCKETS.
3. THE FINISHED LEVEL OF THE CONCRETE SURROUND MUST BE APPROX. 1/8" ABOVE THE TOP OF THE CHANNEL EDGE.
4. TRENCH DRAIN SHALL BE MANUFACTURED BY ACO OR APPROVED EQUAL. REFER TO MANUFACTURER'S LATEST INSTALLATION INSTRUCTIONS FOR COMPLETE DETAILS.

1 TRENCH DRAIN
SCALE: N.T.S.



2 DRAINAGE TRENCH DETAIL
SCALE: N.T.S.

Project:

LAKE WAUSHAKUM RESILIENCY DESIGN 50% DESIGN SET

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ALTERNATIVE 2
DIVERT NIPMUC
ROAD SHEET
FLOW TO BMP
RETROFIT

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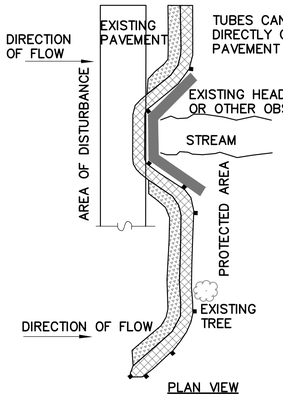


PLAN VIEW

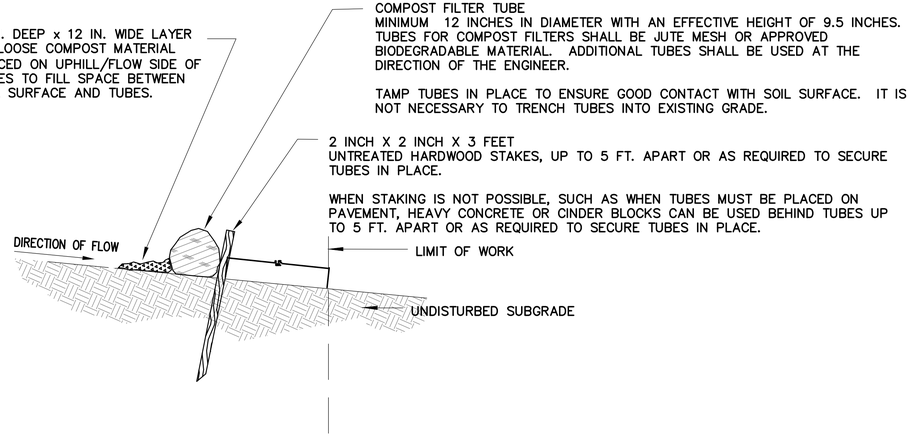
TUBES CAN BE PLACED DIRECTLY ON EXISTING PAVEMENT WHEN NECESSARY.

PLACING TUBES AGAINST THE UPHILL SIDE OF WELL– ANCHORED, STATIONARY FEATURES SUCH AS EXISTING TREES CAN PROVIDE ADDITIONAL BRACING.

CURVE ENDS UPHILL TO PREVENT DIVERSION OF UNFILTERED RUN–OFF.

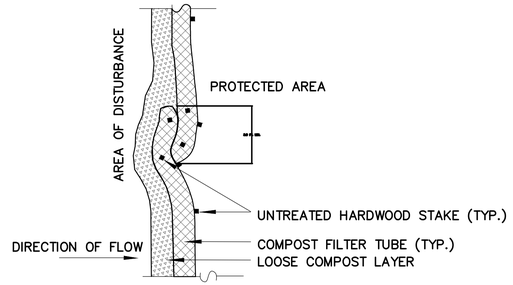
GENERAL NOTES:

1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN–OFF.
5. MULCH MATERIAL FOR THE FILTER TUBES SHALL BE WEED–FREE STRAW, WOOD EXCELSIOR, COMPOST, OR WOOD CHIPS, OR COIR. STRAW SHALL BE WEED FREE AND DERIVED FROM THRESHING OF GRAIN CROP.



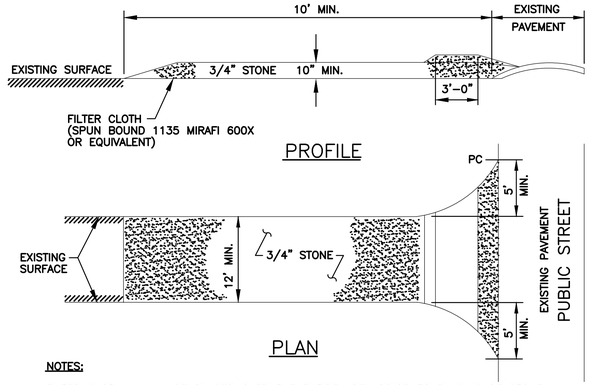
PROVIDE A 3 FT. MINIMUM OVERLAP AT ENDS OF TUBES TO JOIN IN A CONTINUOUS BARRIER AND MINIMIZE UNIMPEDED FLOW.
STAKE JOINING TUBES SNUGLY AGAINST EACH OTHER TO PREVENT UNFILTERED FLOW BETWEEN THEM.

SECURE ENDS OF TUBES WITH STAKES SPACED 18 IN. APART THROUGH TOPS OF TUBES.



PLAN VIEW – JOINING DETAIL

1 EROSION CONTROL MEASURE: SINGLE COMPOST FILTER TUBE DETAIL
SCALE: N.T.S.



NOTES:

1. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
2. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
3. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
4. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
5. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
6. STONE SHALL BE REMOVED AT THE CONCLUSION OF PROJECT AND ACCUMULATED SEDIMENT DISPOSED OF IN ACCORDANCE WITH SPEC SECTION 02282. REMOVAL OF STONE SHALL BE AT NO ADDITIONAL COST TO THE OWNER.

2 STABILIZED CONSTRUCTION ENTRANCE (ANTI-TRACKING PAD)
SCALE: N.T.S.

Project:

LAKE WAUSHAKUM RESILIENCY DESIGN 50% DESIGN SET

CITY OF FRAMINGHAM 150 CONCORD ST FRAMINGHAM, MA 01702

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

COA:
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Issued For:

DRAFT

Scale:	AS SHOWN
Date:	NOVEMBER 5, 2021
Drawn By:	JSF
Reviewed By:	XX
Approved By:	XX
W&S Project No:	-
W&S File No:	-

Drawing Title:

LANDSCAPE DETAILS

EROSION & SEDIMENT CONTROLS

Sheet Number:

L501

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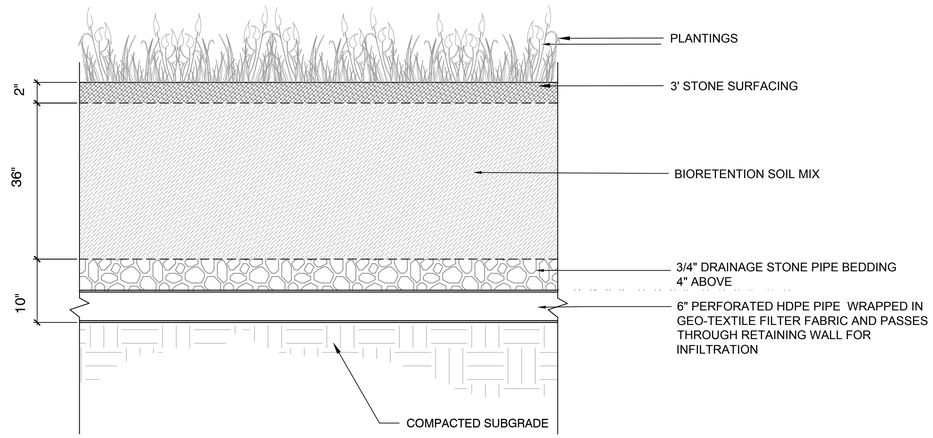
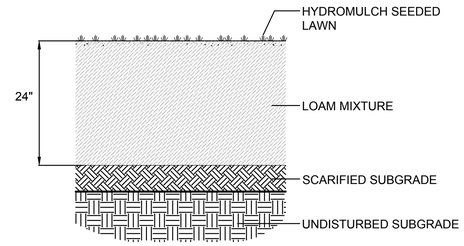
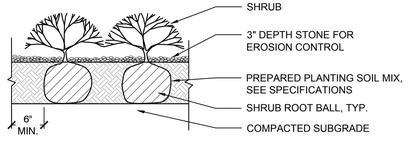


3 BIORETENTION AREA CROSS SECTION
SCALE: N.T.S.



4 LOAM & SEED
SCALE: N.T.S.



5 SHRUB PLANTING
SCALE: N.T.S.

Project:

LAKE WAUSHAKUM RESILIENCY DESIGN 50% DESIGN SET

CITY OF FRAMINGHAM
150 CONCORD ST
FRAMINGHAM, MA 01702

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Date:	NOVEMBER 5, 2021
Drawn By:	JSF
Reviewed By:	XX
Approved By:	XX
W&S Project No:	-
W&S File No:	-

Drawing Title:

LANDSCAPE DETAILS

PLANTING DETAILS

Sheet Number:

L502

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sediment, trash and debris. Eventually a layer of sediment will accumulate on the top of the sand, which can be easily scraped off using rakes or other devices. Finer sediments will penetrate deeper into the sand over time, necessitating replacement of some (several inches) or all of the sand. Discolored sand indicates the presence of fine sediments. Dewater and properly dispose of sand removed from the filter.

References

Erickson, Andrew J., et al., Enhanced Sand Filtration for Storm Water Phosphorus Removal, Journal of Environmental Engineering. Volume 133, Issue 5, pp. 485-497, May 2007.

Tree Box Filter

Description: The Tree Box Filter consists of an open bottom concrete barrel filled with a porous soil media, an underdrain in crushed gravel, and a tree. Stormwater is directed from surrounding impervious surfaces through the top of the soil media. Stormwater percolates through the media to the underlying ground. Treated stormwater beyond the design capacity is directed to the underdrain where it may be directed to a storm drain, other device, or surface water discharge.



Advantages/Benefits:

- May be used as a pretreatment device
- Provides decentralized stormwater treatment
- Ideal for redevelopment or in the ultra-urban setting

Disadvantages/Limitations:

- Treats small volumes

Special Features

Reduces volume and rate of runoff.

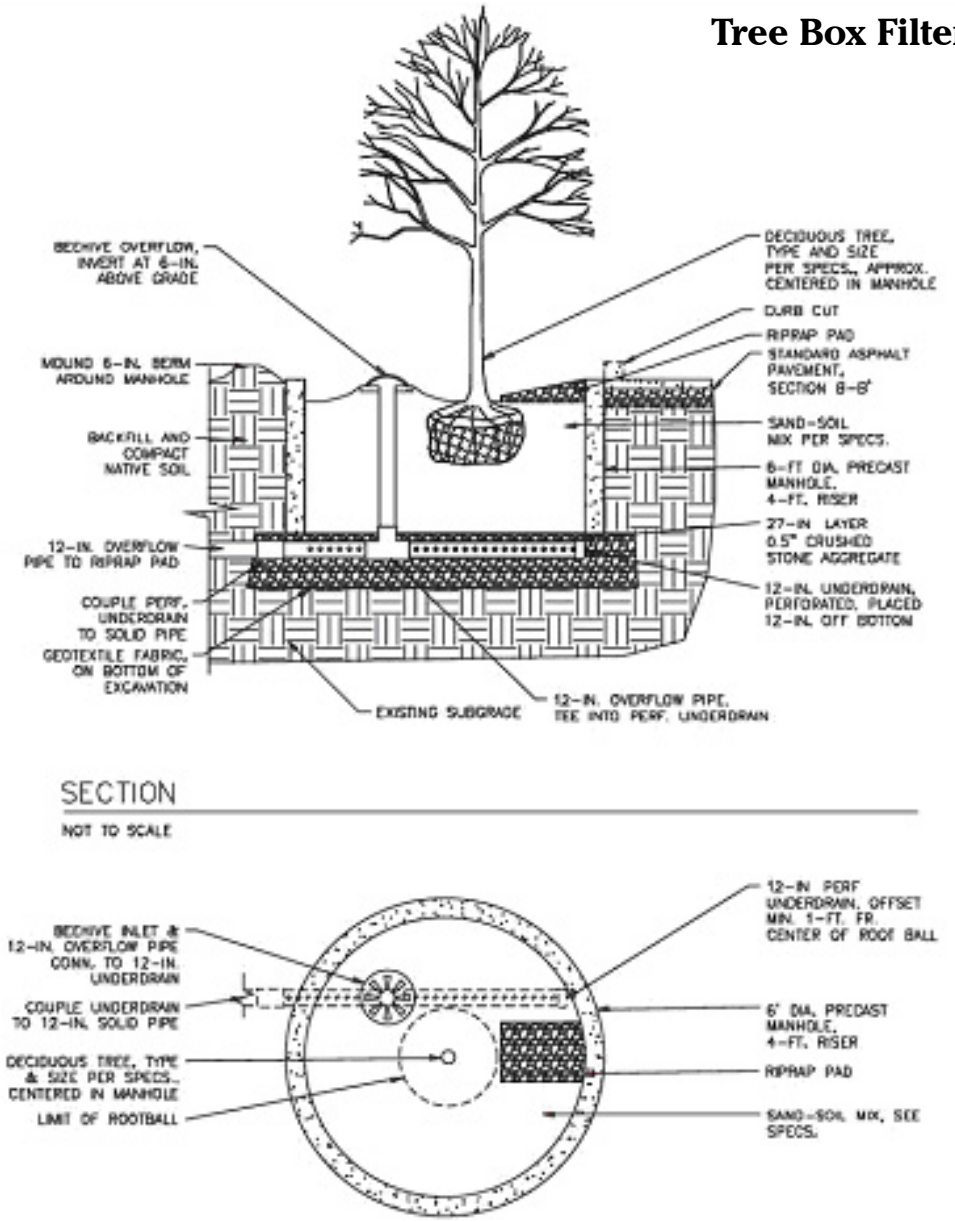
Ability to meet specific standards

Standard	Description
2 - Peak Flow	N/A
3 - Recharge	No infiltration credit
4 - TSS Removal	Presumed to remove 80% TSS
5 - Higher Pollutant Loading	May be used as pretreatment device if lined
6 - Discharges to near or to Critical Areas	Not suitable for vernal pools or swimming areas. At other critical areas, may be used as a pretreatment device.
7 - Redevelopment	May be used for retrofit.

Pollutant Removal Efficiencies

- Total Suspended Solids (TSS)- 80% presumed for regulatory purposes
- Total phosphorus (TP)- Not Reported
- Dissolved Inorganic Nitrogen- Not Reported
- Zinc- Not Reported
- Pathogens (coliform, e. coli)- Not Reported

Tree Box Filter



adapted from the Vermont Stormwater Manual

Maintenance

Activity	Frequency
Check tree	Annually. Expected tree life is 5-10 years.
Rake media surface to maintain permeability	Twice a year
Replace media	When tree is replaced

APPENDIX E

CITY OF FRAMINGHAM BYLAWS AND REGULATIONS

Local Bylaws and Regulations can be found on the City's website: http://www.framinghamma.gov/.

Illicit Discharges to Municipal Separate Storm Sewer System

Article V - Health and Safety, Section 26 - Illicit Discharges to Municipal Separate Storm Sewer System
https://www.framinghamma.gov/DocumentCenter/View/268/Article-5?bidId=

Illicit Discharge Into Storm Drain Regulations
https://www.framinghamma.gov/DocumentCenter/View/22049/Regulation-NonCriminal-Dispostion-PDF2016?bidId=

Construction and Post-Construction

Rules and Regulations Governing Subdivision of Land in the City of Framingham
https://webapps.framinghamma.gov/WebLink/ElectronicFile.aspx?docid=1290419&dbid=0&repo=Framingham

Zoning Ordinance
https://www.framinghamma.gov/1823/By-lawsRegulationsZoning-Map

City Construction Standards

http://www.framinghamma.gov/1116/Public-Works-Construction-Standards

Article V

Health and Safety

Article V: Health and Safety

Section 1. Alcoholic Beverages

1.1 Introduction

1.1.1 This Ordinance relative to Alcoholic Beverages ("Bylaw") is promulgated to memorialize, enumerate and describe the authority of the Board of License Commissioners, serving as the City of Framingham's Liquor Licensing Authority (hereinafter, the "Board" or "licensing authority"), to the fullest extent permitted by Chapter 138 ("Chapter 138") of the Massachusetts General Laws, as amended, and other powers or provisions of the Massachusetts General Laws. This Ordinance and the City of Framingham's Rules and Regulations Governing Alcoholic Beverages ("Rules and Regulations") that may be promulgated by the Board from time to time shall supersede all previous regulations or policies issued by the City of Framingham.

1.1.2 The Board shall have the full power available under Chapter 138, the Massachusetts General Laws to issue all liquor licenses allowed by law or this Ordinance, and to establish reasonable fees therefore. The Board may from time to time adopt Rules and Regulations relative to the business of persons licensed by them under the General Laws or this Ordinance and to the supervision thereof, including the imposition of lawful penalties for violations of such rules, regulations and restrictions. The rules, regulations and restrictions adopted by the Board shall be provided in writing to all applicants for such licenses. The Board shall have the power to modify the Rules and Regulations from time to time, and shall provide licensees with copies of any future amendments to the Rules and Regulations at least seven (7) days prior to the date such amendments go into effect.

1.1.3 Any license issued for the sale in any manner of any alcoholic beverage shall be issued on the condition that there will be strict compliance with Chapter 138, the Massachusetts General Laws, this Ordinance and the Rules and Regulations as described herein. Failure to comply with Chapter 138, the Massachusetts General Laws, this Ordinance and the Rules and Regulations described herein shall be sufficient grounds for refusing to grant the license, or for suspending, canceling, or revoking an existing license.

1.2 Application of Ordinance:

a) License transfers involving a change of location, ownership, or business;

b) New Licenses;

c) One Day or Special Licenses; and

d) Current Alcohol Licenses (of any type) within the City of Framingham.

1.3 Applicability of State and Local Laws

1.3.1 Applicability of State and local laws and regulations, and permit requirements. All Alcoholic beverage licenses shall also be issued contingent upon continued compliance with all appropriate state and local laws and regulations and all permits and licenses which may pertain to the operation of the premises, including, but not limited to, the State Building Code, State or Board of Health Regulations, common victualer license requirements, entertainment and/or amusement licenses and the City of Framingham Ordinances.

1.3.2 Availability of rules and regulations. All licensees shall ensure that a copy of the City's Rules and Regulations and the applicable regulations promulgated by the Alcoholic Beverages Control Commission are kept on the premises at all times and are immediately available for inspection upon request by a member of the

public or an agent of the Board. Licensees also shall ensure that copies of the Board's Rules and Regulations shall be given to each employee who is responsible for the sale or service of alcoholic beverages.

1.3.3 Responsibility for knowledge of rules and regulations. Licensees must be familiar with Chapter 138, this Ordinance and the corresponding Rules and Regulations, as well as applicable state statutes and regulations promulgated by the Alcoholic Beverages Control Commission. A plea of ignorance will not be considered a justification or defense for a violation.

1.4 Prohibition of Consumption of Alcoholic Beverages in Public Places

1.4.1 No person shall drink any alcoholic beverages as defined in Chapter 138, Section 1 of the Massachusetts General Laws while on, in or upon any public way or upon any way to which the public has a right of access, or any place to which members of the public have access as invitees or licensees, park or playground, or private land or place without consent of the owner or person in control thereof except that the sampling and sale of wine and beer during an event held on City property is permitted if the vendor is duly licensed for such event by the Board of License and in accordance with the applicable provisions of state law, including General Laws, Chapter 138, Section 15F. All alcoholic beverages being used in violation of this section shall be seized and safely held until final adjudication of the charge against the person or persons arrested or summoned before the court, at which time they shall be returned to the person entitled to lawful possession.

1.5 Prohibition of Consumption or Ingestion of Marijuana or Tetrahydrocannabinol (as defined in G.L. c. 94C, § 1, as amended), Cannabinoids or Products Containing the Same in Public Places

1.5.1 Ingestion of marijuana in public places is prohibited

Smoking, ingesting, or otherwise using or consuming marijuana or tetrahydrocannabinol (as defined in M.G.L. c. 94C, §1, as amended), cannabinoids or products containing the same is hereby prohibited in Framingham in enclosed or outdoor space belonging to, or maintained by, healthcare facilities, public places, public transportation vehicles, retail stores, retail food stores, smoking bars, retail tobacco stores, membership associations also known as private clubs, food establishments licensed and/or permitted by the Board of Health of the City of Framingham, or bar rooms licensed and/or permitted by the Board of Health and/or council of the City of Framingham, in accordance with M.G.L. c. 270, §22, or while in or upon any street, sidewalk, public way, footway, passageway, stairs, bridge, park, playground, beach, recreation area, boat landing, pond, lake, river, waterway, public building, schoolhouse, school grounds, cemetery, parking lot, parking garage, or parking area or any area owned by or under the control of the town; or in or upon any bus or other passenger conveyance operated by a common carrier; or in any place accessible to the public.

1.5.2 Marijuana kept or cultivated for personal use shall be secured by lock

Marijuana or tetrahydrocannabinol (as defined in M.G.L. c. 94C, § 1, as amended), cannabinoids or products containing the same shall be kept in a locked container. Marijuana plants cultivated for personal use shall be kept in an enclosed area that is secured by lock.

1.5.3 Non-criminal Disposition

This Ordinance may be enforced through any lawful means in law or in equity including, but not limited to, enforcement by criminal indictment or complaint pursuant to M.G.L. c. 40 § 21, or by noncriminal disposition pursuant to M.G.L. c. 40 § 21D, by the mayor, council, or their duly authorized agents, or any police officer. The fine for violation of this bylaw shall be three hundred dollars ($300) for each offense. Any penalty imposed under this bylaw shall be in addition to any civil penalty imposed under M.G.L. c. 94C, § 32L.

1.5.4 [Reserved]

Section 2. Water Discharge

No person shall knowingly permit or suffer any water or other liquid to run or be discharged from any building owned by him, or under his control, so as to flow on any sidewalk, except that a person may wash windows with hose before the hour of 10:00 A.M. when the temperature is above the freezing point.

Section 3. Erection of Barriers

The owner of land which has been excavated shall erect barriers or take other suitable measures to avoid hazard to public safety. If within five days after such owner has been notified in writing by the mayor, at the recommendation of the Building Commissioner, that in their opinion the excavation constitutes a hazard to public safety the owner shall fail or refuse to erect barriers or take other suitable measures to avoid such hazard, the owner shall be punishable by a fine of not more than two hundred dollars ($200) for such violation.

Section 4. Framingham Emergency Management Agency

4.1 There is hereby established the Framingham Emergency Management Agency (FEMA). It shall be the function of this Agency to have charge of civil defense, the Local Emergency Planning Committee, and the Emergency Operations Center for the City of Framingham.

4.1.1 Civil Defense

It shall be the function of the Framingham Emergency Management Agency to have charge of Civil Defense as defined in Chapter 639, Section 1 of the Acts of 1950 and to perform civil defense functions as authorized or directed by said chapter or by any and all executive orders or general regulations promulgated thereunder, and to exercise any authority delegated to it by the governor under said Chapter 639.

4.1.2 Local Emergency Planning Committee (LEPC)/Regional Emergency Planning Committee (REPC)

It shall be the function of the Framingham Emergency Management Agency to have charge of the Local Emergency Planning Committee (LEPC) or to affiliate with a Regional Emergency Planning Committee (REPC) in accordance with the federal Emergency Planning and Community Right-to-Know Act, Public Law 99-499, commonly known as EPCRA or SARA Title III. The mission of Framingham Local Emergency Planning Committee or Regional Emergency Planning Committee shall be to enhance and create plans directing the response to hazardous materials incidents, increase compliance with hazardous materials reporting requirements and to continue to offer access to information on the storage of such materials, for the benefit of the city's residents and businesses.

4.1.3 Framingham Emergency Operations Center (EOC)

It shall be the function of the Framingham Emergency Management Agency to have charge of the Emergency Operations Center (EOC) for the City of Framingham

4.2 Director of Framingham Emergency Management Agency

Framingham Emergency Management Agency shall be under the direction of the Director of Emergency Management (hereinafter called the "Director"), who shall be appointed by the mayor.

The Director shall have direct responsibility for the organization and for the administration of the Agency, subject to the direction and control of the mayor. The Director may, within the limits of the amount appropriated therefore, and subject to the approval of the mayor, appoint such experts, clerks and other assistants as the work of the department may require and may remove them, and may make such expenditures as may be necessary to execute effectively the purpose of Chapter 639 of the Acts of 1950 and the Emergency Management Agency.

The Director shall also have authority, subject to the approval of the mayor, to appoint district coordinators and may accept and may receive, on behalf of the City, services, equipment, supplies, materials or funds by way of gifts, grant or loan, for purposes of emergency management, offered by the federal government or any agency or officer thereof or any person, firm or corporation, subject of the terms of the offer and the rules.

Section 5. Deleted (Article 17 of the 2007 Annual Town Meeting)

Section 6. Fire Lanes

It shall be unlawful to obstruct or park a vehicle in any fire lane, such fire lane to be designated by the mayor upon the recommendation of the Chief of the Fire Department and posted as such, said Fire Lane to be a distance of twelve (12) feet from the curbing of a sidewalk in a shopping center, bowling establishment, theater or similar locations. Where no sidewalk with curbing exists, the distance shall be eighteen (18) feet from the building.

Section 7. Fortune Telling

No person shall tell fortunes for money unless a license therefore has been issued by the Board of License Commissioners. The fee for each license granted under this section shall be fifty dollars ($50) per year, commencing January 1 of each year.

Section 8. Personal Privacy

No person other than an officer of the law acting in the performance of his legal duty shall enter upon the premises of any person with the intention of peeping into a dwelling or spying upon any person therein.

Section 9. Accessible Parking

9.1 Designated parking spaces shall be provided in public and private off street parking areas for vehicles owned and operated by persons with disabilities, or for any vehicle transporting a person with a disability. Such vehicle shall bear the distinctive number plates or placard authorized by Massachusetts General Law Chapter 90, Section 2.

9.1.1 Any person or body who has lawful control of a public or private way, or of improved or enclosed property used as off street parking areas for businesses, shopping, malls, theaters, auditoriums, sporting or recreational facilities, cultural centers, or for any other place where the public has the right of access as invitees or licensees, shall reserve parking spaces in said off street parking areas for any vehicle owned and/or operated by a person with a disability whose vehicle bears the distinguishing license plate or placard authorized by Chapter 90, Section 2 according to the following formula:

Total Spaces	**Required Accessible Spaces**
1-25	1 Space
26-50	2 Spaces
51-75	3 Spaces
76-100	4 Spaces
101-150	5 Spaces

151-200	6 Spaces
201-300	7 Spaces
301-400	8 Spaces
401-500	9 Spaces
501-1,000	2% of Total Spaces
1,001 and over	20 plus 1 for each 100 over 1000

- One in six (6) designated accessible spaces but not less than one shall be van accessible.
- Outpatient Medical Facilities: 10% of Total Spaces
- Facilities specializing in the treatment or services for people with mobility impairments: 20% of Total Spaces
- Parking for multiple dwellings, including residential condominiums, are subject to all provisions of the Architectural Access Board regulations (521 CMR) and this ordinance.

9.1.2 Each parking space designated as reserved under the provisions of subsection 9.1.1. shall be identified by the use of an above grade sign located at the head of each space and no more than ten feet away, and be permanently affixed to the ground or structure. The top of the sign shall not be lower than 5 feet from the ground, nor more than 8 feet from the ground. Signs shall show the "International Symbol of Access" and may have the words "Accessible Parking: Special Plate Required, Unauthorized Vehicles May Be Removed At Owners Expense" in white on a blue background. A smaller sign may be added indicating the fine amount in Section 9.3.2.

The spaces shall be as near as possible to a building entrance or walkway; shall be adjacent to curb ramps or other unobstructive methods permitting sidewalk access to a person with a disability, and shall be eight feet wide plus a 5 foot aisle with diagonal striping. Two accessible spaces may share a common access aisle.

Van accessible spaces shall be 8 feet wide with a striped access aisle 8 feet wide allowing a van to operate a lift. Each such space shall have a sign designating it van accessible.

Centered at the head of the eight (8) foot striped access aisle an additional sign shall be posted stating “No Parking Anytime”. The sign shall not obstruct the accessible route at the head of the access aisle.

Alternatively, all spaces may be universal spaces, 11 feet wide with an access aisle 5 feet wide.

Accessible spaces shall be marked by high contrast painted lines or other high contrast delineation. Access aisles shall be clearly marked by means of diagonal stripes. The signs and pavement marking shall be maintained in a timely manner.

9.2

9.2.1 No person shall leave any unauthorized vehicle within parking spaces designated for use by persons with disabilities as authorized by Section 9. 1 hereof or in such a manner as to obstruct a curb ramp designated for use by persons with disabilities as a means of egress to a street or public way. The cross hatch area abutting an Accessible Parking space shall, for the purposes of this section, be considered a part of the Accessible Parking space.

9.2.2 Furthermore, any person or body who has lawful control of a public or private way or of improved or enclosed property used as off street parking for authorized vehicles bearing Handicap Parking (HP) plates or placards shall be responsible for exercising reasonable

care to see that the spaces and access ramps be kept clear of, but not limited to, snow, debris, refuse and shopping carts so the spaces are accessible and usable. If snow stops falling after sunrise (during daylight hours), property owners will have until 10 p.m. that same day to clear the HP parking spaces, sidewalks, and curb cuts. If snow stops falling after sunset (overnight), property owners will have until 10 a.m. the next day to clear the HP parking spaces, sidewalks, and curb cuts.

9.3 The penalty for violation of this Ordinance shall be as follows:

9.3.1 Violations of Section 9.1.1 or 9.1.2 shall be fifty dollars ($50) dollars per day per violation after the person or body having lawful control of the ways or property has been given written notice and not less than 30 days to comply.

9.3.2 Violations of Section 9.2.1 shall be three hundred dollars ($300) for each offense, and the vehicle may be removed according to the provisions of Massachusetts General Law Chapter 266, Section 120D.

9.3.3 Violations of Section 9.2.2 shall be one hundred dollars ($100) for each day the violation remains after a written warning has been issued. The written warning shall be good for ninety (90) days.

9.4 Violations of Section 9.1.1 and 9.1.2 and 9.2.2 shall be enforced by the Inspectional Services Department. Violations of Section 9.2.1 shall be enforced by the Police Department.

9.5 Appeals may be made to the Massachusetts Architectural Access Board (AAB) for Variances from AAB rules and regulations. For relief from the current American with Disabilities Act (ADA), contact the Department of Justice for their Variance process.

9.6 All funds received from fines for Accessible Parking violations shall be deposited by the City Treasurer into a separate account and shall be solely used for the benefit of persons with disabilities. Said account shall be established by the City Treasurer and kept separate and apart from all other funds. Expenditures from said account, including all interest, if any, shall be made upon the recommendation of the Disability Commission with approval of the council and mayor. The City Accountant shall submit annually a report of said account to the mayor and council for review.

Section 10. Hunting Ordinances

10.1 Definitions

1. Amphibious Animal - Animals capable of living either on land or in water.

2. Archery - Bow and Arrow - to include any type of bow and arrow, such as; long bow, compound bow, cross bow, recurve bow or bows drawn by mechanical means.

3. Birds - Wild or Undomesticated Birds.

4. Firearms - Firearm shall mean a pistol, revolver or other weapon of any description loaded or unloaded, from which a shot or bullet can be discharged and of which the length of the barrel or barrels is less than 16" or 18" in the case of a shotgun as originally manufactured, and the term "length of barrel" shall mean that portion of a firearm, rifle, shotgun through which a shot or bullet is driven, guided, or stabilized, and shall include the chamber. A rifle is a weapon having a rifled bore with a barrel length equaled to or greater than 16", capable of discharging a shot or bullet for each pull of the trigger. A shotgun is a weapon having a smooth bore or a rifled bore with a barrel length equaled to or greater than 18" with an overall length to or greater than 26", capable of discharging a shot or bullet with each pull of the trigger.

5. Game - any wild bird, mammal, amphibian or reptile commonly hunted for food or sport.

6. Hunt - the verb "to hunt", in all of its moods and tenses, included pursuing, shooting by firearms or archery, killing and capturing mammals, birds, amphibious animals and

reptiles and all lesser acts such as disturbing, harrying or worrying, or placing, setting, drawing or using any device commonly used to take mammals, birds, amphibious animals and reptiles whether or not such acts result in taking; and includes every attempt to take and every act of assistance to any other person in taking or attempting to take mammals, birds amphibious animals and reptiles.

7. Mammals - Wild or Undomesticated mammals.

8. Primitive Firearms (muzzle loading) - any firearm, rifle or shotgun with matchlock, flintlock, percussion cap or similar type of ignition system, such firearm, rifle or shotgun loads from the muzzle.

10.2 No person shall hunt within the limits of any highway, park or other property owned or controlled by the City of Framingham, except with the consent of the mayor and any other appropriate public authority; or on any private property, except with the written consent of the owner or legal occupant thereof, which consent shall be dated not more than one year prior to the act complained of.

10.3 No person shall fire or discharge any firearm or explosive of any kind within the limits of the City of Framingham, except on a range or in an area designated for such purpose and approved by the Chief of police in writing, or with the written consent of the owner or legal occupant thereof, which written consent shall be dated not more than one year prior to the act complained of.

10.4 Nothing in this Ordinance shall prohibit the protection of one's property or use of firearms by police or other law enforcement officers.

10.5 It shall be unlawful for any person to set, trigger, activate, or otherwise use, or cause to be set, triggered, activated or used, any type of steel-jaw or leghold trap including, but not limited to, padded or unpadded leghold traps of conibear or killer-type traps within the limits of any highway, park, or public property or on any private property in the City of Framingham. Trapping on posted or unposted private property, with any type of trap not already prohibited by this section, shall only be permitted with a box-trap if written permission Is obtained from the owner or legal occupant or person having the right of control thereof

10.6 A violation of this Ordinance shall be punished by a fine not to exceed three hundred dollars ($300).

Section 11. Mechanical Protection Devices

It shall be unlawful to install a mechanical protection device that is automatically keyed to and/or activates the telephone numbers) lines controlled by and/or listed to the Framingham Fire Department; all such devices installed before the effective date of this section shall be removed within sixty days. Mechanical protection devices shall be devices defined as- An electrically operated instrument composed of sensory apparatus and related hardware which automatically sends over regular telephone lines, by direct connection or otherwise, a pre-recorded voice alarm upon receipt of a stimulus from the sensory apparatus that has detected a physical force or condition inherently characteristic of a fire or unauthorized intrusion.

Section 12. Motor Boats

12.1 All motor boats must (except when prevented by a narrow or other boats or passing under bridges or rounding sharp bends) keep one-hundred and fifty (150) feet distant from anchored or moored boats, piers, rafts, floats, a line of floats outlining swimming areas, skin divers flags, or the shore.

In all such cases the speed of such motor boats shall be reduced to headway speed, so as to provide full visibility and control, and prevent their wash from being thrown into, or causing excessive rocking to other boats, barges, aquaplanes, and other devices being towed by power. The operator of the towing boat shall be responsible for compliance therewith.

12.2 The use of powered craft generally described as a "JET SKI", "SURF JET", "WET BIKE" or otherwise described as a "PERSONAL WATERCRAFT" is prohibited except when used by Law Enforcement personnel in the course of their duties.

Any violation of Section 12.2 shall be punished by a fine of not more than one hundred dollars ($100) for each offense.

DEFINITIONS: Personal Water Craft - means a small vessel which uses an inboard motor powering a water jet pump as its primary source of motive power and which is designed to be operated by persons sitting, standing, or kneeling on the vessel. The term includes but is not limited to a jet ski, wet bike, or surfjet, so called.

Section 13. Retail Food Sales

13.1 No person shall sell any food at retail between the hours of 1:00 a.m. and 6:00 a.m. The term food as used in this Ordinance shall include any article or commodity, however stored or packaged, intended for human consumption, and shall include alcoholic beverages to be consumed off the premises at which they are sold, unless any other law or permit or license granted to the seller of such beverages shall otherwise provide.

This Ordinance shall not apply to the sale of food or alcoholic beverages to be consumed on the premises at which they are sold or to be consumed off the premises on which they are sold when such sale is by a licensed common victualer primarily engaged in the sale of food to be consumed on such premises.

Persons found guilty of violating this section shall pay a fine of fifty dollars ($50). For purposes of this Ordinance, each separate sale shall be deemed a separate offense. In the event of a sale of several items or articles at one time to one customer, only one sale shall be deemed to have taken place.

13.2 No store or place of business engaged in the retail sale of food shall be open for the transaction of retail business between the hours of 1:00 a.m. and 6:00 a.m.

This Ordinance shall not apply to the sale of food or alcoholic beverages to be consumed on the premises at which they are sold or to be consumed off the premises on which they are sold when such a sale is by a licensed common victualer primarily engaged in the sale of food to be consumed on such premises.

Violators of this section shall be subject to a fine of fifty dollars ($50) for each violation. In case of continuing violation, every calendar day upon which a store shall remain open in violation of this Ordinance shall be deemed a separate offense.

13.3 The provisions of this Ordinance may be waived by the mayor if they determine that it is in the public interest to do so.

Section 14. Sale of Indecent Publications

14.1 Whoever disseminates to a minor any matter harmful to minors, knowing it to be harmful to minors, or has in his possession any such matter with the intent to disseminate the same to minors, shall be punished by a fine not exceeding two hundred dollars ($200) for each offense and to a like fine for each day's continuance of such violation. It shall be an affirmative defense in any prosecution under this section that the defendant was in a parental or guardianship relationship with the minor. It shall be an affirmative defense under this section if the evidence proves that the defendant was a bona fide school, museum or library, or was acting in the course of his employment as an employee of such organization or of a retail outlet affiliated with and serving the educational purpose of such organization.

14.2 The definitions of the words in this Ordinance shall be the same as those specified in the Massachusetts General Laws, Chapter 272, as amended by Chapter 430 of the Acts of 1974.

Section 15. Snow Removal

15.1 Every building owner shall erect or cause to be erected upon any building which he owns or of which he has charge, and which is near the line of a sidewalk or street, a barrier or other suitable

provisions sufficient to prevent the falling of snow and ice from the roof of such building upon persons traveling on such sidewalk or street.

15.2 The Director of Public Works or other officers having charge of ways of the City shall have the authority, for the purposes of removing or plowing snow, or removing ice from any way in the City, to remove or cause to be removed to some convenient place, including in such term a public garage, any vehicle interfering with such work.

15.3 The owner of any such vehicle so removed shall be liable for the reasonable cost of such removal and storage, and delivery of the vehicle to said owner may be withheld by the Director of Public Works or other officer having charge of ways in the City, until such reasonable costs shall be paid.

15.4 Whenever any vehicle is so removed, the Framingham Police Department shall be notified and said department shall render all necessary assistance to the Director of Public Works or other officer having charge of ways, in enforcing this Ordinance.

15.5

15.5.1 No person or entity, regardless of their ownership, tenancy, or other status or relationship to any property, nor any agent, employee, contractor or servant of any person or entity shall place, throw, plow or in any way move any snow or ice onto any portion of the City's streets, ways, sidewalks, or land, except with the approval of the director of Public Works or his designee. Notwithstanding the foregoing, this Ordinance shall not be construed to prohibit owners or lawful occupants of residential premises from place snow and ice on the sidewalk while leaving unobstructed room for pedestrian passage, and from placing snow or ice from pavement edge to no more than one foot (12") out into the street, immediately adjacent to the driveway opening.

15.5.2 Anyone violating the prohibitions of this Ordinance shall be subject to a specific penalty of a fine in an amount up to three-hundred dollars ($300) for each offense. The fine structure shall be as follows:

Residential (Less than 6 dwelling units)

First violation.....$ 25.00

Second violation .....$ 50.00

Third or more violations $100.00

Commercial and 6 or more residential units

First violation.....$ 50.00

Second violation $100.00

Third or more violations $300.00

15.5.3 The Director of Public Works, the Assistant Director of Public Works, Superintendent of Highways, all Highway Department Construction Supervisors, all Framingham Police Officers, and other City employees from time to time designated by the Director of Public Works are empowered and authorized to enforce this Ordinance.

Section 16. Vinyl Chloride Ordinance

16.1 No person shall temporarily store rail cars containing liquefied vinyl chloride within the City of Framingham without first obtaining a license for said purpose from the Board of License Commissioners. For purposes of this Ordinance, (i) a rail car will be deemed stored or in storage if it remains within the City for more than 24 hours prior to being shipped or sent to its next destination, (ii) temporary storage will be deemed to be any storage of a rail car containing liquefied vinyl chloride which has not been delivered to its place of unloading, and (iii) "person" shall include any individual, corporation, partnership, association or other entity. Such a license

shall be granted by the Board of License Commissioners upon the applicant's fulfillment of the following conditions:

16.1.1 The applicant sets aside an area for the storage of such rail cars containing liquefied vinyl chloride;

16.1.2 The area set aside is bounded by an eight-foot high, chain link fence topped by at least three strands of barbed wire, and having a gate with a heavy-duty chain lock;

16.1.3 Lights are installed which are capable of illuminating at night the entire area set aside for storage;

16.1.4 The designated area contains a paved access lane to and around the storage location(s) therein sufficient to permit unimpeded access to all parts of the stored rail cars by fire trucks and related emergency apparatus;

16.1.5 The applicant provides water service to a point neither less than 100 feet nor more than 150 feet from the designated area sufficient to furnish a flow of 1,000 gallons of water per minute;

16.1.6 The applicant provides an additional water supply connected to and servicing two elevated stationary water nozzles capable of delivering water to any point within the area set aside at a minimum flow of 500 gallons of water per minute; and

16.1.7 The applicant installs an emergency signaling system at the area set aside for storage capable of sounding an audible alarm to members of the general public at least 2,500 feet from any point in the storage area.

16.2 The license described in subsection 16.1 of this Ordinance may be suspended or revoked by the Board of License Commissioners upon the licensee's failure to:

16.2.1 Keep all temporarily stored rail cars containing liquefied vinyl chloride under its custody or control inside the area set aside for storage;

16.2.2 Keep fewer than eleven of such rail cars in the storage area;

16.2.3 Keep the fence surrounding the storage area locked at all times, except to permit the movement of such rail cars and the inspection or testing of rail cars and equipment therein;

16.2.4 Keep stored in the area set aside (i) no rail cars other than rail cars containing liquefied vinyl chloride, or (ii) no other materials or equipment;

16.2.5 Maintain the reasonable security of the storage area, the entrance and lock thereto, the lighting and water supplied thereto, the emergency signal system, and the paved access lane, including keeping this lane free of obstructions and snow and ice;

16.2.6 Obtain the consent of the Board of License Commissioners prior to making any change to or in the storage area (including the tracks, fence, switches, lighting, water supply and emergency signal system);

16.2.7 Cause the storage area to be under on-site observation 24 hours a day;

16.2.8 Cause all such rail cars and the storage area to be inspected at least twice daily (for this purpose, two or more inspections within any ten-hour period shall be counted as one inspection) by an individual familiar with the type of rail cars used to store vinyl chloride, and trained in the manner of detecting leaks, spills and excessive or unusual venting therefrom, and cause a log to be kept which shall state therein the date of inspection, the name of the individual making the inspection, the identity by number of each car inspected, and the time of the inspection;

16.2.9 Cause a copy of the foregoing log (kept since the previous submission as provided for herein) to be submitted to the Fire Department at least weekly:

16.2.10 Notify the Fire Department in writing by noon of each day of any arrivals to or departures from the storage area which occurred on the previous day;

16.2.11 Notify the Fire Department immediately of any leak, spill, excessive or unusual venting, explosion or fire involving vinyl chloride; any dents in or other damage to the rail cars; and malfunctioning, defect or need for adjustment or repair in the tracks into or within the storage area and any switches thereon, fence, lock, lighting, water supplies, nozzles or emergency signal system; or any derailment or collision involving any such rail car;

16.2.12 Keep the storage area illuminated at night;

16.2.13 Notify the next intended delivery or storage point of the time of arrival within the City of Framingham of any such rail car under the licensee's custody or control within 24 hours after such arrival;

16.2.14 Keep combustible and explosive materials out of the storage area;

16.2.15 Test the emergency signal system, the water systems and the lighting system at least once every 60 days, and report to the Fire Chief any failure to pass any of such tests;

16.2.16 Permit the Fire Chief or his designee to inspect at any time the storage area and the protective systems and any such rail cars therein; and

16.2.17 Cause the emergency signal to be employed in accordance with procedures established by the Fire Chief.

16.3 In lieu of or in addition to suspending or revoking a license, the City may assess a fine of two hundred dollars ($200) for each violation of subsection 16.2 hereof.

16.4 Provisions of this Vinyl Chloride Ordinance requiring a valid, effective license to store temporarily rail cars containing liquefied vinyl chloride after they have been in the City more than twenty-four hours, restricting the storage to fewer than eleven cars and instituting local reporting requirements together with such other provisions that may be deemed inconsistent with the Hazardous Materials Transportation Act, 49 U.S.C. ss1801, et seq., will not be implemented or enforced after the effective date of the Ordinance until the United States Secretary of Transportation determines those requirements of the Ordinance that are not preempted by the aforesaid Act. 49 U.S.C. s 1811 (b). 49 CFR 107.215-.225

Section 17. Activities on City Property

No person shall engage in golfing on any City-owned property except with the express written consent of the board or commission which has jurisdiction over said property.

The penalty for violation of this Ordinance shall be fifty dollars ($50).

Section 18. Framingham Wetlands Protection Ordinance

Preamble

NO NET LOSS OF WETLANDS POLICY: There shall be no net loss of wetlands or wetland resource areas in Framingham. It is presumed that non-water dependent projects can always be designed to avoid loss of wetland areas. Projects having no feasible alternative to alteration impacts must be minimized and mitigated.

18.1 Purpose

The purpose of this Ordinance is to protect the wetlands, related water resources, and adjoining land areas, and provide Open Space for passive recreation and education in the City of Framingham by prior review and control of the activities deemed by the Conservation Commission likely to have a significant effect upon values and functions including, but not limited to, the

following: public or private water supply, groundwater, storm damage prevention, flood control, erosion and sedimentation control, water pollution prevention, fisheries, wildlife, wildlife habitat, passive recreation, aesthetics, agriculture, and aquaculture (collectively, the "interests and values protected by this Ordinance").

18.2 Jurisdiction

Except as permitted by the Conservation Commission or as provided by this Ordinance, no person shall remove, fill, dredge, build upon, degrade, discharge into or otherwise alter the following resource areas: freshwater wetland, vernal pool, marsh, wet meadow, bog or swamp; any bank, beach, or flat; any lake, river, pond, or stream: any land under said waters; any land subject to flooding: Riverfront Area; or land subject to inundation by surface water during the 100 year event. Said resource areas shall be protected whether or not they border surface waters. The Commission may establish a no work/no alteration zone as appropriate to each application.

Except as otherwise provided in the Ordinance, any activity to be undertaken within the Buffer Zone as defined in Section 18.9 requires the filing of an application.

18.3 Exceptions

No provision of this Ordinance shall apply to: (1) activities lawfully completed prior to the effective date of this Ordinance, or (2) activities subject to a negative Determination of Applicability or an Order of Conditions issued pursuant to the Wetlands Protection Act, M.G.L.Ch. 131, Section 40, prior to July 1, 1992.

The permit and application required by this Ordinance shall not be required for maintaining, repairing, or replacing, but, not substantially enlarging or changing an existing and lawfully located structure or facility used in the service of the public to provide electric, gas, sewer, water, telephone, telegraph, or other telecommunications services, provided that written notice has been given to the Commission prior to the commencement of work, and provided that the work conforms to performance standards and design specifications in regulations adopted by this Commission.

The permit and application required by this Ordinance shall not apply to emergency projects necessary for the protection of the health or safety of the public, provided that the work is to be performed by or has been ordered to be performed by an agency of the Commonwealth or subdivision of, provided that advance written notice has been given to the Commission, prior to the commencement of work or within twenty four (24) hours after commencement, provided that the work is performed only for the time and place agreed to by the Conservation Commission for the limited purposes necessary to abate the emergency, and provided that within 14 days of commencement of an emergency project a permit application (Abbreviated Notice of Intent or Notice of Intent) shall be filed with the Conservation Commission for review under the provisions of this Ordinance. Failure to meet these and other requirements of the Conservation Commission may, after appropriate process as provided by this Ordinance and applicable regulations, result in revocation or modification of the emergency project approval and require restoration and application of mitigating measures.

The permit and application required by this Ordinance shall not apply to certain “minor activities” (as defined below) in the Buffer Zone or Riverfront Area, provided that the activity is not within any other resource area:

(a) Unpaved and pervious pedestrian walkways for private use.

(b) Fencing that does not bar wildlife movement; stone walls; stakes of cordwood.

(c) Vista pruning of non-landscaped areas (pruning of landscaped area is exempt), provided that the activity is located more than fifty (50) feet from the mean annual high water line within a Riverfront Area or from Bordering Vegetated Wetland, whichever is further.

(d) Planting of native trees, shrubs, or groundcover, but no turf lawns.

(e) Conversion of lawn to uses accessory to existing single family houses (e.g. decks, sheds and gazebos) if the house existed on August 7, 1996, and provided that the activity is located more than fifty (50) feet from the mean annual high water line within a Riverfront Area or from Bordering Vegetated Wetland, whichever is further. Erosion and sedimentation controls are to be used during construction.

(f) Conversion of impervious surface to vegetated surfaces provided that erosion and sedimentation controls are used during construction.

(g) Activities that are temporary, have negligible impacts and are necessary for planning and design purposes (e.g. installation of monitoring wells, exploratory borings, sediment sampling, and surveying).

Activities not meeting the requirements for a "minor activity" as listed above in this section will continue to require a filing before the Commission and may be allowed through a Determination of Applicability or an Order of Conditions.

In the event that any of the above-listed activities are proposed within other wetland resource areas, as defined under this Ordinance, such activities are NOT exempt from the permit and application requirements of the Ordinance.

Other than as stated in this section the exceptions provided in the Wetlands Protection Act, M.G.L.Ch. 131, s. 40, will not apply.

18.4 Application for Permits and Requests for Determination

PERMITS: Written application shall be filed with the Conservation Commission to perform activities regulated by this Ordinance affecting resource areas protected by this Ordinance. The application shall include such information and plans as required by the regulations and as are deemed necessary by the Conservation Commission to describe the proposed activities and their effects on the environment. No activities shall commence without receiving a permit issued pursuant to this Ordinance.

DETERMINATIONS: Any person desiring to know whether or not a proposed activity and/or an area is subject to this Ordinance may submit a Request for Determination to the Conservation Commission on the appropriate form. The request shall contain all necessary information, plans, data calculations, etc., as specified by the regulations.

The Conservation Commission, as it deems appropriate, may accept as the application and plans under this Ordinance the Notice of Intent/Request for Determination and plans filed under the Wetlands Protection Act, M.G.L. Ch. 131, s.40.

Applications filed under this Ordinance are to be delivered via Certified Mail, Return Receipt or hand-delivered to the Commission and shall be accompanied by the filing fee prescribed in 310 CMR 10.03:(7) and in accordance with Chapter 287, Act of 1989, Section 54 Revised July 26, 1989.

At the time of the permit application, Request for Determination, or application for Certificate of Compliance, the Applicant shall pay a filing fee according to the schedule in the associated *Framingham Wetlands Ordinance Regulations*.

This fee is not refundable. The fee is in addition to that required by the Wetlands Protection Act., G.L., Ch. 131 §40, and Regulations, 310 CMR 10.00. Town, county, state and federal projects are exempt from the filing fee. The fee for an application for a modification of a permit will be the fee as calculated in the Framingham Wetlands Ordinance Regulations.

All fees collected pursuant to this Ordinance shall be deposited into the Conservation Commission Revolving Fund, established pursuant to G.L.c.44, §53E ½.

18.5 Notice of Hearings

The applicant filing a Notice of Intent application for a permit under the provisions of this Ordinance shall give written notice by Certified Mail, Return Receipt Request, Certificate of Mailing, or by hand-delivery to all abutters within one hundred feet from the property lines of the property in which the project is to occur according to the current Assessors records five (5) days in advance of the scheduled hearing in accordance with provisions of this Ordinance and its regulations. The Conservation Commission is responsible for notifying the applicant and owner, if not the same, of the time and place of the scheduled hearing. Also, the Conservation Commission is responsible for placing a notification of the subject hearing in a local newspaper at least five (5) days prior to the hearing. The Conservation Commission shall conduct a public hearing within twenty one (21) days of the receipt of a completed application for permit or request for determination unless unusual circumstances prevent this scheduling.

In this event the hearing will be scheduled at the next regularly scheduled Conservation Commission meeting having time available.

The Conservation Commission may, at its option, combine the hearing under this Ordinance and the hearing conducted under the Wetlands Protection Act, M.G.L. Ch. 131, s.40.

The Conservation Commission shall have the authority to continue the hearing to a specific date, agreeable to the applicant, announced at the hearing without further notification, for reasons stated at the hearing. Those reasons may include, but are not limited to, requests from other boards, officials, or attendees. In the event that the applicant objects to a continuance, the hearing will be closed and the Conservation Commission will take action on available information.

18.6 Coordination with other Boards and Departments

The Conservation Commission will notify appropriate Boards and Departments not less than ten (10) days prior to the hearing in order to allow their review of the submittal on file located in the Administrators office. Written comments from these Boards and Departments should be submitted to the Conservation Administrator at least three (3) days before the hearing. The applicant shall have the right to receive any such comments and recommendations, and to respond to them at the hearing.

18.7 Permits, Determinations, and Conditions

If the Conservation Commission after a public hearing determines that the activities which are the subject of the application are likely to have a significant or cumulative effect upon the wetland values protected by this Ordinance, the Conservation Commission, within twenty one (21) days of the close of the hearing, unless unusual circumstances prevent it, shall issue or deny a permit for the activities requested. Determinations of Applicability will be issued within 21 days of receipt of the request. If the Conservation Commission issues a permit, conditions shall be imposed which are deemed necessary to protect the "interests and values", and all activities shall be performed in accordance with those conditions. The Conservation Commission is empowered to deny a permit for failure to meet the requirements of this Ordinance; for failure to submit necessary information and plans requested by the Conservation Commission; for failure to avoid or prevent unacceptable significant or cumulative effects to avoid or prevent unacceptable significant or cumulative effects upon the wetland values protected by this Ordinance; and where no conditions are adequate to protect those values.

A permit shall expire three years from the date of issuance. The Conservation Commission may issue a permit expiring five years from the date of issuance for recurring or continuous maintenance work, provided that annual notification of time and location of work is given to the Conservation Commission. Any permit may be renewed once for an additional one year period, provided that a request for renewal is received in writing by the Conservation Commission thirty days prior to expiration. The Conservation Commission, for good cause, may revoke or modify a permit issued under this Ordinance after notice to the holder of the permit, notice to the public, abutters, and town boards pursuant to the preceding section 5, and a public hearing.

The Conservation Commission in an appropriate case may combine the permit or other action on an application issued under this Ordinance with the Order of Conditions issued under the Massachusetts Wetlands Protection Act, M.G.L. Ch. 31, s.40.

The Commission may deny the request for an extension and require the filing of a new permit request under the following circumstances: no work has begun on the project, except where such failure is due to unavoidable delays, such as appeals, or obtaining other necessary permits; new information has become available and indicates that the Order is not adequate to protect the interests covered by this Ordinance.

No work proposed in any permit application shall be undertaken until the permit issued by the Commission with respect to such work has been recorded in the registry of deeds or, if the land affected thereby be registered land, in the registry section of the land court for the district wherein the land lies, and until the holder of the permit certifies in writing to the Commission that the permit has been recorded.

18.8 Regulations

After public notice and public hearing the Conservation Commission shall promulgate rules and regulations to effectuate the purposes of this Ordinance. Failure of the Conservation Commission to promulgate such rules and regulations or a legal declaration of their invalidity by a court of law shall not act to suspend or invalidate the effect of this Ordinance.

18.9 Definitions

Except as specifically provided by these Regulations and the Ordinance, terms used in the regulations and the Ordinance have the meanings defined in the Wetlands Protection Act, M.G.L. Ch. 131, Section 40, ("The Act") and in Regulations currently codified at 310 CMR 10.00, issued pursuant to the Act by the Department of Environmental Protection, as amended November 10, 1989.

The following definitions shall apply in the interpretation and implementation of this Ordinance.

Abutter means the same as the owner of land abutting the activity.

Act means the Wetlands Protection Act, M.G.L. c. 131, s.40.

Activity means any form of draining, dumping, dredging, damming, discharging, excavating, filling or grading; the erection, reconstruction or expansion of any buildings or structures; the driving of pilings; the construction or improvement of roads and other ways; the changing of run-off characteristics; the intercepting or diverging of ground or surface water; the installation of drainage, sewage and water systems; the discharging of pollutants; the destruction of plant life; and any other changing of the physical characteristics of land.

Aggrieved means the same as persons aggrieved.

Agriculture

A. Land in agricultural use means land presently and primarily used in the raising of animals including, but not limited to, dairy cattle, beef cattle, poultry, sheep, swine, horses, ponies, mules, goats, bees and fur-bearing animals, or land presently and primarily used in a related manner which is incidental thereto and represents a customary and necessary use in raising such animals.

   Additionally, land in agricultural use means land presently and primarily used in the raising of fruits, vegetables, berries, nuts and other foods for human consumption, feed for animals, tobacco, flowers, sod, trees, nursery or greenhouse products, and ornamental plants and shrubs; or land presently and primarily used in raising forest products under a planned program to improve the quantity and quality of a continuous crop; or land presently and primarily used in a related manner which is incidental thereto and represents a customary and necessary use in raising such products.

Land in agricultural use may lie fallow for a period of time if it has been used for agriculture at least three (3) of the five (5) immediately preceding years.

B. Normal maintenance or improvement of land in agricultural use means the following activities:

1. All tilling and harvesting practices customarily employed to enhance existing growing conditions

2. The pasturing of animals, including the construction and maintenance of such fences as may be required;

3. The use of fertilizers, pesticides, herbicides, and other materials, subject to all state and federal laws and regulations governing their use;

4. The constructing, grading or restoring of field ditches, subsurface drains, grass waterways, vents, access roads, farm ponds and similar projects to improve drainage, prevent erosion, provide more effective uses of rainfall and improve equipment operation and efficiency, all in order to improve conditions for the growing of existing crops or raising of animals;

5. The cultivation of cranberries, including the following practices:

   a. sanding operations using existing sand pits;

   b. cleaning of cross ditches, canals and natural waterways;

   c. repair and replacement but not enlargement of water control structures, including flumes, pumps, dikes, and piping above and below ground;

   d. repair, replacement and regrading of existing cranberry bogs, and

   e. repair and cleaning of reservoirs, dams and water storage systems within the limits of existing water rights.

   All maintenance and improvement activities shall be undertaken in such a manner as to prevent erosion and siltation of adjacent water bodies and wetlands, as specified by the U.S.D.A. Soil Conservation Service "Guidelines for Soil and Water Conservation".

6. The cutting and removal of trees for the purpose of selling said trees or any products derived therefrom, when carried out in the following manner:

   a. Every reasonable effort shall be made to avoid or minimize access through Areas Subject to Protection Under the Act;

   b. Where access through Areas Subject to Protection Under the Act is necessary, every reasonable effort shall be made to gain said access without constructing new access ways including, but not limited to, maintaining and improving (but not substantially enlarging) existing accessways, and operations shall be conducted when the soil is frozen, dry or otherwise stable;

   c. Where access is determined impracticable without constructing new accessways, said accessways shall be designed, constructed and maintained in accordance with U.S. Forest Service logging road standards, and shall be removed and the site returned to previously existing conditions within one (1) year;

   d. All channel crossings shall be stabilized to prevent erosion, using standard U.S. Forest Service methods. When crossings involve fill or other closed or semi-closed structures which will obstruct flow, they shall be designed, constructed and maintained in accordance with U.S.

Forest Service standards, shall allow unobstructed passage of the existing flows for at least the 10-year storm, and shall be removed and the site returned to existing conditions within one (1) year of construction;

e. All soils which are exposed during and after work shall be stabilized to prevent said soils from eroding into open water bodies, in accordance with standard U.S. Forest Service methods;

f. All operations shall be conducted in accordance with a cutting plan approved by the Massachusetts Department of Environmental Management District Forester; and

g. A written notice describing the proposed cutting and removal of trees shall be submitted to the Conservation Commission not less than ten (10) days prior to the commencement of operations.

7. The selective cutting of trees by owners for their own use, when carried out in the following manner:

a. No more than 25,000 board feet or 50 cords shall be harvested;

b. After the cutting, the crown area of the remaining trees shall be evenly distributed throughout the site and shall cover no less than 50 percent of the surface area of the site;

c. The removal of the selectively cut trees shall occur only during those periods when the ground is sufficiently frozen, dry otherwise stable to support the equipment used;

d. the cutting, removal or other destruction of trees and the understory vegetation shall not occur within twenty-five (25) feet of the bank of a water body;

e. the placement of slash, branches and limbs resulting from the cutting and removal operations shall not occur within twenty-five (25) feet of the bank of a water body; and

f. there shall occur no filling, excavation or other change in the existing topography.

Alter means to change the condition of any Area Subject to Protection Under the Act. Examples of alterations include, but are not limited to, the following:

A. the changing of pre-existing drainage characteristics, flushing characteristics, salinity distribution, sedimentation patterns, flow patterns and flood retention areas;

B. the lowering of water level or water table;

C. the destruction of vegetation;

D. the changing of water temperature, biochemical oxygen demand (BOD), and other physical, biological or chemical characteristics of the receiving water;

Provided that when provisions of 310 CMR 10.03(6) and 10.05(3) or 333 CMR 11.03(9) have been met, the application of herbicides in the Buffer Zone in accordance with such plans as are required by the Department of Food and Agriculture pursuant to its rights of way management regulations, 333 CMR 11.00 effective July 10, 1987, is not an alteration of any area Subject to Protection Under the Act.

Aquaculture

A. Land in aquacultural use means land presently and primarily used in the growing of aquatic organisms under controlled conditions, including one or more of the following uses: raising, breeding or producing a specified type of animal or vegetable life including, but not limited to, finfish such as carp, catfish, black bass, flatfishes, herring, salmon, shad, smelt, sturgeon, striped bass, sunfishes, trout, whitefish, eel, tilapia; shellfish such as shrimp, crabs, lobster, crayfish, oyster, clams, periwinkles, scallops, mussels, squid; amphibians such as frogs; reptiles such as turtles; seaweeds such as Irish moss and dulse; and edible freshwater plants.

B. Normal maintenance or improvement of land in aquacultural use means the following activities, when done in connection with the production of aquatic organisms as defined above; draining, flooding, heating/cooling, removing, filling, grading, compacting, raking, tilling, fertilizing, seeding, harvesting, filtering, rafting, culverting or applying chemicals in conformance with all state and federal laws; provided, however, that such activities are clearly intended to improve and maintain land in aquacultural use and that best available measures are utilized to ensure that there will be no adverse effect on wetlands outside the area in aquacultural use, and further provided that removing, filling, dredging or altering of a salt marsh is not to be considered normal maintenance or improvement of land in aquacultural use.

Area Subject to Protection Under the Act means any area specified in 310 CMR 10.02(1). It is used synonymously with Resource Area, each one of which is defined in greater detail in Parts II and III of 310 CMR 10.00.

Bank (inland) is defined in Part III, 310 CMR 10.54(2).

Beach (inland): a naturally occurring inland beach means an unvegetated bank as defined in Part III CMR 10.54(2).

Best Available Measures means the most up-to-date technology or the best designs, measures or engineering practices that have been developed and that are commercially available.

Best Practical Measures means technologies, designs, measure or engineering practices that are in general use to protect similar interests.

Bordering means touching. An area listed in 310 CMR 10.02(1)(a) is bordering on a water body listed in 310 CMR 10.02(1)(a) if some portion of the area is found in the appropriate section of 310 CMR 10.02(1)(a) some portion of which is in turn touching the water body.

Bordering Vegetated Wetland is defined in Part III, 310 CMR 10.55(2).

Boundary means the boundary of an Area Subject to Protection Under the Act. A description of the boundary of each area is found in the appropriate section of 310 CRM 10.00. For inland areas, see Part III of 310 CMR 10.00.

Breeding Areas means areas used by wildlife for courtship, mating, nesting or other reproductive activity, and rearing of young.

Buffer Zone means that area of land extending one hundred twenty five (125) feet horizontally outward from the boundary of any resource area specified in this Ordinance (Para. 18.2).

Certificate of Compliance means a written documentation by the issuing authority that work or a portion thereof has been completed in accordance with an Order. It shall be made on Form 8 of 310 CMR 10.99, modified to reference this Ordinance or on a form designed under this Ordinance.

Commissioner means the Commissioner of the Department of Environmental Protection, pursuant to St. 1989, c. 240, s.101.

Conditions means those requirements set forth in a written Order issued by the Conservation Commission for the purpose of permitting, regulating or prohibiting any activity that removes, fills, dredges or alters an Area Subject to Protection Under this Ordinance.

Conservation Commission means that body comprised of members lawfully appointed pursuant to M.G.L. c. 40, s. 8C. For the purposes of the Act and 310 CMR 10.00, it shall also mean a mayor, where no conservation commission has been established under said M.G.L. c. 40, s. 8C.

Creek means the same as a stream, as defined in this section.

Date of Issuance means the date an Order is mailed, as evidenced by a postmark, or the date it is hand-delivered.

Date of Receipt means the date of delivery to an office, home or usual place of business by mail or hand-delivery.

Department means the Department of Environmental Protection, and shall include the Commissioner and any other person employed by said Department, pursuant to St. 1989, c. 240, s. 101.

Determination

A. Determination of Applicability means a written finding by a Conservation Commission as to whether a site or the work proposed thereon is subject to the jurisdiction of this Ordinance. It shall be made on Form 2 of 310 CMR 10.99, modified to reference this Ordinance or on a form designed under this Ordinance.

B. Determination of Significance means a written finding by a Conservation Commission, after a public hearing, that the area on which the proposed work is to be done, or which the proposed work will alter, is significant to one or more interests identified in this Ordinance. It shall be made as part of the Order, on Form 5 of 310 CMR 10.99, modified to reference this Ordinance or on a form designed under this Ordinance.

C. Notification of Non-Significance means a written finding by a conservation commission, after a public hearing, that the area on which the proposed work is to be done, or which the proposed work will alter, is not significant to any interests of this Ordinance. It shall be made as part of the Order, on Form 6 of 310 CMR 10.99, modified to reference this Ordinance or on a form designed under this Ordinance.

Dredge means to deepen, widen or excavate, either temporarily or permanently.

Extension Permit means a written extension of time within which the authorized work shall be completed. It shall be made on Form 7 of 310 CMR 10.99, modified to reference this Ordinance or on a form designed under this Ordinance.

Fill means to deposit any material so as to raise an elevation, either temporarily or permanently.

Final Order means the Order issued by the Commissioner after an adjudicatory hearing or, if no request for hearing has been filed, the Superseding Order or, if no request for a Superseding Order has been filed, the Order of Conditions.

Flood Control means the prevention or reduction of flooding and flood damage.

Freshwater Wetlands shall mean wet meadows, marshes, swamps, bogs, areas where around water, flowing or standing surface water or ice provide a significant part of the supporting substrate for a plant community for at least five months of the year; emergent and submergent plant communities in inland waters; that portion of any bank which touches any inland waters.

General Performance Standards means those requirements established by Regulations promulgated under this Ordinance for activities in or affecting each of the Areas Subject to Protection Under this Ordinance.

Ground Water Supply means water below the earth's surface in the zone of saturation.

Important Wildlife Habitat Functions mean important food, shelter, migratory or overwintering area, or breeding areas for wildlife.

Interests Identified in this Ordinance means public or private water supply, ground water supply, flood control, storm damage prevention, prevention of pollution, erosion control and sedimentation control, protection of wildlife, protection of wildlife habitat, passive recreation, aesthetics, agriculture, and aquaculture, protection of fisheries, and protection of wildlife habitat.

Issuing Authority means the Framingham Conservation Commission.

Lake means an open body of fresh water with a surface area of ten (10) acres or more, and shall include great ponds.

Land subject to flooding is defined in Part III, 310 CMR 10.57(2).

Land Under Water Bodies and Waterways means the bottom of, or land under, the surface of a creek, river, stream, pond, or lake. Land under inland water bodies is further defined in Part III 310 CMR 10.56(2).

Lot means an area of land in one ownership, with definite borders.

Majority means more than half of the members of the Conservation Commission then in office.

Marsh is defined in M.G.L. c.131, s.40, para. 10.

Meadow (or wet meadow) is defined in M.G.L. c. 131, s. 40, para. 9.

MEPA means the Massachusetts Environmental Policy Act, M.G.L. c.30, ss. 6-62H, and the regulations promulgated pursuant thereto, 301 CMR 11.00 et seq.

Migratory Areas means those areas used by wildlife moving from one habitat to another, whether seasonally or otherwise.

Notice of Intent means the written notice filed by any person intending to remove, fill, dredge, or alter an area subject to Protection Under this Ordinance. It shall be made on Form 3 or 4 of 310 CMR 10.99, modified to reference this Ordinance or on a form designed under this Ordinance.

Order means an Order of Conditions or Amended Order of Conditions.

Order of Conditions means the document issued by a conservation commission containing conditions which regulate or prohibit an activity. It shall be made on Form 5, 310 CMR 10.99, modified to reference this Ordinance or on a form designed under this Ordinance.

Owner of Land Abutting the Activity means the owner of land sharing a common boundary or corner with the site of the proposed activity in any direction, including land located directly across the street, way, creek, river, stream, brook or canal.

Party to any proceeding before the Commission means the applicant, and pursuant to 310 CMR 10.05(7)(a) may include the owner of the site, any abutter, any person aggrieved, any ten (1) residents of the city or town where the land is located and any ten (10) persons pursuant to M.G.L. c.30A, s.10A.

Person Aggrieved means any person who, because of an act or failure to act by the issuing authority, may suffer an injury in fact which is different either in kind or magnitude from that suffered by the general public and which is within the scope of interests identified in the Ordinance.

Plans mean such data, maps, engineering drawings, calculations, specification, schedules and other materials, if any, deemed necessary by the issuing authority to describe the site and/or the work, to determine the applicability of the Ordinance or to determine the impact of the proposed work upon the interests identified in the Ordinance.

Pond (inland) means any open body of fresh water, either naturally occurring or man-made by impoundment, with surface area observed or recorded within the last ten (10) years of at least 10,000 square feet, and which is never without standing water due to natural causes, except during periods of extended drought. For purposes of this definition, extended drought shall mean any

period of four (4) or more months during which the average rainfall for each month is 50 percent or less of the ten (10) years average for that same month. Basins or lagoons which are part of wastewater treatment plants shall not be considered ponds, nor shall swimming pools or other impervious man-made retention basins.

Prevention of Pollution means the prevention or reduction of contamination of surface or ground water.

Private Water Supply means any source or volume of surface or ground water demonstrated to be in any private use or demonstrated to have a potential for private use.

Protection of Fisheries means protection of the capacity of an Area Subject to Protection Under this Ordinance:

A. To prevent or reduce contamination or damage to fish; and

B. To serve as their habitat and nutrient source. Fish includes all species of fresh fish.

Protection of Land Containing Shellfish means protection of the capacity of an Area Subject to Protection Under the Act:

A. To prevent or reduce contamination or damage to shellfish; and

B. To serve as their habitat and nutrient source.

Public Water Supply means any source or volume of surface or ground water demonstrated to be in public use or approved for water supply pursuant to M.G.L. c. 111, s.160 by the Division of Water Supply of the Department, or demonstrated to have a potential for public use.

Rare Species means those vertebrate and invertebrate animal species officially listed as endangered, threatened, or of special concern by the Massachusetts Division of Fisheries and Wildlife under 321 CMR 8.00.

Remove means to take away any type of material, thereby changing an elevation, either temporarily or permanently.

Request for Determination of Applicability means a written request made by any person to a conservation commission or the Department for a determination as to whether a site or work thereon is subject to the Act. It shall be submitted on Form 1 of 310 CMR 10.99, modified to reference this Ordinance or on a form designed under this Ordinance.

Resource Area means any of the areas specified in this Ordinance. It is used synonymously with Area Subject to Protection Under this Ordinance, each one of which is enumerated in Para. 18.2, Jurisdiction.

River means a natural flowing body of water that empties to any ocean, lake or other river and which flows throughout the year.

Riverfront Area is the area of land between a river's mean annual high water line and a parallel line measured horizontally for 200 feet on both sides of the River. The Riverfront area may include or overlap other resource areas or their buffer zones.

Shelter means protection from the elements or predators.

Significant means plays a role. A resource area is significant to an interest identified in the Act when it plays a role in the provision or protection, as appropriate, of that interest.

State-listed Species means the same as rare species, as defined in this section.

Storm Damage Prevention means the prevention of damage caused by water from storms including, but not limited to, erosion and sedimentation, damage to vegetation, property or buildings, or damage caused by flooding, water-borne debris or water-borne ice.

Stream means a body of water, including brooks and creeks, which move in a definite channel in the ground due to hydraulic gradient, and which flows within, into or out of an Area Subject to Protection Under the Act. A portion of a stream may flow through a culvert or beneath a bridge. Such a body of running water which does not flow throughout the year (i.e., which is intermittent) is a stream except for that portion upgradient of all bogs, swamps, wet meadows and marshes.

Superseding Order means a document issued by the Department containing conditions which regulate or prohibit an activity. It shall be made on Form 5 of 310 CMR 10.99.

Swamp is defined in M.G.L. c.131, s.40, para. 8.

Vernal Pool Habitat means confined basin depressions which, at least in most years, hold water for a minimum of two continuous months, and which are free of adult fish populations, as well as the area within 125 feet of the mean annual boundaries of such depressions. These areas are essential breeding habitat, and provide other extremely important wildlife habitat functions during non-breeding season as well, for a variety of amphibian species such as wood frog (Rana sylvatica) and the spotted salamander (Ambystoma macultum), and are important habitat for other wildlife species.

Water-dependent uses means those uses and facilities which require direct access to, or location in inland waters and which therefore cannot be located away from said waters, including but not limited to: marinas, public recreational uses, navigational and commercial fishing and boating facilities, water-based recreational uses, navigation aids, basins, channels, industrial uses dependent on waterborne transportation or requiring large volumes of cooling or process water which cannot reasonably be located or operated at an upland site, crossing over or under water bodies or waterways (but limited to railroad and public roadway bridges, tunnels, culverts, as well as railroad tracks and public roadways connecting thereto which are generally perpendicular to the water body or waterway), and any other uses and facilities as may further hereafter be defined as water-dependent in 310 CMR 9.00.

Wildlife means all mammals, birds, reptiles and amphibians and, for the purposes of 310 CMR 10.37 and 10.59, all vertebrate and invertebrate animal species which are officially listed by the Massachusetts Division of Fisheries and Wildlife under 321 CMR 8.00 as endangered, threatened, or of special concern.

Wildlife habitat is defined in paragraph 13 of the Wetlands Protection Act, M.G.L. Ch. 131, Section 40.

Work means the same as activity.

18.10 Security

As part of a permit issued under this Ordinance, in addition to any security required by any other municipal or state board, agency, or official, the Conservation Commission may require that the performance and observation of the conditions imposed hereunder be secured wholly or in part by one or more of the methods described below:

A. By a proper bond or deposit of money or other negotiable securities or other undertaking of financial responsibility sufficient in the opinion of the Conservation Commission;

B. By a conservation restriction, easement or other covenant enforceable in a court of law, executed and duly recorded by the owner of record, running with the land to the benefit of the City of Framingham whereby the permit conditions shall be performed and observed before any lot may be conveyed other than by mortgage deed.

18.11 Enforcement

The Conservation Commission, its agents, officers, and employees shall, after proper notification to the owner, have authority to enter upon privately owned land for the purpose of performing their duties under this Ordinance and may make or cause to be made such examinations, surveys or sampling as the Conservation Commission deems necessary.

The Conservation Commission shall have the authority to enforce this Ordinance, its regulation, and permits issued thereunder by violation notices, administrative order, and civil and criminal court actions. Upon request of the Conservation Commission, the mayor and the City Solicitor shall take legal action for enforcement under civil law. Upon request of the Conservation Commission, the Chief of Police shall take legal action for enforcement under criminal law.

Municipal board and officers, including any police officer or other officers having police powers, shall have the authority to assist the Conservation Commission in enforcement.

Any person who violates any provision of this Ordinance, or permits issued thereunder, shall be punished by a fine of not more than three hundred dollars ($300) each day or portion thereof during which a violation continues shall constitute a separate offense, and each provision of the Ordinance, or permit violated shall constitute a separate offense. As the alternative to criminal prosecution, the Conservation Commission may elect to utilize the non-criminal disposition procedure set forth in M.G.L. Ch. 40, s.21D.

18.12 Burden of Proof

The applicant for a permit shall have the burden of proof by a preponderance of credible evidence that the work proposed in the application will not have a significant effect upon the wetland values protected by this Ordinance. Failure to provide adequate evidence to the Conservation Commission supporting this burden shall be sufficient cause for the Conservation Commission to deny a permit or grant a permit with conditions.

18.13 Relation to the Wetlands Protection Act

This Ordinance is adopted under the Home Rule Amendment of the Massachusetts Constitution and the Home Rule statutes, independent of the Wetlands Protection Act, M.G.L. Ch. 131, s.40, and regulations thereunder.

18.14 Appeals

A decision of the Conservation Commission is reviewable in Superior Court in accordance with M.G.L. Ch. 249, Sec. 4.

Section 19. Use of Ways by Pedestrians

Pedestrians shall obey the lawful directions of Police Officers. Whenever there is an officer directing traffic, a traffic control signal or a marked crosswalk, no such pedestrian shall cross the following road except within the limits of a marked crosswalk.

Route 126 (Concord St./Hollis St.)	From Everitt Ave. to Winthrop St.
Union Ave	From Walnut St. to Concord St.
Lincoln Street	From Union Ave. to Concord St.
Waverly Street	From Cedar St. to South St.
Irving Street	From Arlington St. to Burkis Square

The above area to be referred to as the Downtown Business District. Any person who violates this Ordinance shall be punished as follows:

First Offense	Written Warning
Second and Subsequent Offense	Twenty Dollar ($20) Fine

Any violator of this Ordinance who refuses to give their name to a police officer shall be subject to arrest under M.G.L., Ch. 90, s. 18A.

Section 20. Brownfields Tax Abatement Agreements

20.1 Purpose

Pursuant to the provisions of M.G.L., Ch. 59, s. 59A, it is the intent of the town to offer tax abatements to encourage the continued environmental cleanup and redevelopment of sites zoned for industrial and commercial use from or at which there has been a release of oil or hazardous material.

20.2 Subject Properties

Property which may be the subject of tax abatement agreements pursuant to this Ordinance must:

(a) Be a site or portion of a site from or at which there has been a release of oil or hazardous material;

(b) Be owned by an eligible person, as that term is defined in M.G.L., Ch 21E, s. 2;

(c) Be zoned for commercial or industrial use.

20.3 Abatement Agreements

20.3.1 The Chief Financial Officer is hereby authorized to negotiate agreements from the abatement of real estate taxes (hereinafter, "Abatement Agreements") with owners of eligible properties, the terms of which Abatement Agreements shall be subject to approval by the council.

20.3.2 Abatement Agreements may allow for reductions in outstanding taxes, interest, and/or penalties.

20.3.3 Abatement Agreements shall include, but not be limited to:

(a) The amount of outstanding real estate taxes;

(b) The percent of interest to accrue if determined applicable by the Chief Financial Officer and the property owner;

(c) The description of quantifiable monthly payments;

(d) The inception date of monthly payments;

(e) The date of the final payment;

(f) The late penalties to be imposed; and

(g) Any and all other contractual terms as arranged between the Chief Financial Officer and the property owner.

20.3.4 All Abatement Agreements shall be signed by the mayor and the property owner, whose signatures shall be notarized, and attested to by the City Clerk.

20.3.5 Copies of all Abatement Agreements shall be provided to the Massachusetts Department of Environmental Protection, the United States Environmental Protection Agency, the Massachusetts Commissioner of Revenue, the mayor, and the property owner.

Section 21. <u>Demolition Delay Ordinance for Historically or Architecturally Significant Buildings in the City of Framingham, MA.</u>

21.1 Intent and Purpose

This Ordinance is enacted for the purpose of protecting and preserving significant buildings within the City outside the Framingham Center Common Historic District (Local) and the Jonathan Maynard Historic District (Local) which constitute or reflect distinctive features of the architectural or historical resources of the City, and to encourage owners of such buildings to seek out alternative options to preserve, rehabilitate or restore such buildings rather than to demolish them, thereby promoting the public welfare and preserving the cultural heritage of the City. To achieve these purposes the Framingham Historical Commission is authorized to advise the Building Commissioner with respect to the issuance of permits for the demolition

of significant buildings. The issuance of demolition permits for significant buildings is regulated as provided by this Ordinance.

21.2 Definitions

21.2.1 "Building" - Any combination of materials forming a shelter for persons, animals, or property.

21.2.2 "Demolition" - Any act of pulling down, destroying, removing or razing a building or commencing the work of total or substantial destruction with the intent of completing the same.

21.2.3 "Building Commissioner" - The person occupying the office of Building Commissioner or otherwise authorized to issue demolition permits.

21.2.4 "Commission" - The Framingham Historical Commission.

21.2.5 "Demolition Permit" - The permit issued by the Building Commissioner as required by the State Building Code for a demolition, substantial demolition or removal of a building.

21.2.6 "Historically or Architecturally Significant Building" - Any building, in whole or in part, which is at least seventy five (75) years old and:

(a) which is listed on, or is a contributing building within an area listed on the National Register of Historic places, or which is the subject of a pending application for such listing, or is eligible for such listing; or

(b) is included in the Cultural Resources Inventory prepared by the Commission; or

(c) has been determined by vote of the Commission to be a significant building after a finding by the Commission that a building either:

(i) is importantly associated with one or more historic persons or events, or with the broad architectural, cultural, political, economic or social history of the City, or the Commonwealth, or

(ii) is historically or architecturally significant (in terms of period, style, method of building construction or association with a recognized architect or builder) either by itself or in the context of a group of buildings.

21.2.7 "Preferentially Preserved" - Any historically or architecturally significant building which the Commission determines is in the public interest to be preserved or rehabilitated rather than to be demolished.

21. 3 Procedure

21.3.1 No permit for the demolition of a building which is in whole or in part seventy five (75) years or more old shall be issued other than in conformity with the provisions of this Ordinance, as well as in conformity with the provisions of other laws and ordinances applicable to the demolition of buildings and the issuance of permits generally.

21.3.2 Application contents: Every application for a demolition permit for a building at least seventy five (75) years old shall be filled with the Building Commissioner and shall contain the following information:

(i) the address of the building to be demolished

(ii) the owner's name, address and telephone number

(iii) a brief description of the type of building and the condition requiring issuance of the permit

(iv) date of building as established by the Board of Assessors, deed or documentation verifying year of construction and

(v) a brief description of the proposed reuse, reconstruction or replacement on the premises upon which the building is located.

21.3.3 Within seven (7) working days from receipt of an application for a demolition permit of a building seventy five (75) years or older, the Building Commissioner shall forward a copy to the Commission. No demolition permit shall be issued during this time.

21.3.4 Within ten (10) working days after receipt of the application for demolition permit by the Commission, the Commission shall make a Determination of Architectural and/or Historical Significance. Upon determination by the Commission that the building is not architecturally and/or historically significant, the Commission shall so notify the Building Commissioner in writing. Upon receipt of such notification, or after the expiration of fifteen (15) working days from the date of submission to the Commission, if the Building Commissioner has not received notification from the Commission, the Building Commissioner may issue the demolition permit.

21.3.5 Upon determination by the Commission that the building is historically and/or architecturally significant, the Building Commissioner and applicant shall be so notified in writing, and a demolition permit shall not be issued. The Commission shall hold a public hearing within fifteen (15) working days of the Determination of Significance to determine whether the building should be preferentially preserved. Public notice of the time, place and purpose of the hearing shall be published by the Building Department at the expense of the applicant in a newspaper of general circulation in the City not less than seven (7) days before the day of said hearing and shall be posted in a conspicuous place in the City Hall for a period of not less than seven (7) days before the day of said hearing.

21.3.6 If after a public hearing the Commission determines that the significant building should not be preferentially preserved, the Commission shall notify the Building Commissioner, in writing within five (5) working days of the hearing and the Building Commissioner may issue a demolition permit upon receipt of the written decision.

21.3.7 If after a public hearing the Commission determines that the significant building should be preferentially preserved, the Commission shall so notify the Building Commissioner in writing within five (5) working days of the hearing, and no demolition permit may be issued until six (6) months after the date of the determination by the Commission.

a. For any building on the Cultural Resources Inventory that the Commission has determined should be preferentially preserved, no demolition permit may be issued until twelve (12) months after the date of determination by the Commission.

b. Provided however, until a building has been listed on the Cultural Resources Inventory for a period of twelve (12) months, a demolition delay may not exceed six (6) months.

21.3.8 Notwithstanding anything contained in paragraph 3.7, the Building Commissioner may issue a demolition permit for a preferably preserved building

at any time after receipt of written advice from the Commission to the effect that either:

(i) the Commission is satisfied that there is no reasonable likelihood that either the owner or some other person or group is willing to purchase, preserve, rehabilitate or restore such building, or

(ii) the Commission is satisfied that during the demolition delay period the owner has made continuing, bona fide and reasonable efforts to locate a purchaser to preserve, rehabilitate or restore the subject building, and that such efforts have been unsuccessful.

21.4 Responsibility of Owners

It shall be the responsibility of the owner of record or his designee to assist in the facilitation of the above process by providing information, allowing access to the property and securing the premises; for participating in the investigation of preservation options and for actively cooperating in seeking alternatives with the Commission and any interested parties.

21.5 Emergency Demolition

Nothing in this Ordinance shall restrict the Building Commissioner from immediately ordering the demolition of any building in the event of imminent danger to the safety of the public.

21.6 Enforcement and Remedies

The Commission and/or the Building Commissioner are each specifically authorized to institute any and all actions and proceedings, in law or equity, as they may deem necessary and appropriate to obtain compliance with the requirements of this Ordinance or to prevent a threatened violation thereof. No building permit shall be issued with respect to any premises upon which a significant building has been voluntarily demolished in violation of this Ordinance for a period of two (2) years after the date of the completion of such demolition. As used herein, "premises" refers to the parcel of land upon which the demolished significant building was located and all adjoining parcels of land under common ownership or control.

21.7 Historic District Act

Nothing in this Ordinance shall be deemed to conflict with the provisions of the Historic District Act, Massachusetts General Laws Chapter 40C. If any of the provisions of this Ordinance do so conflict, that act shall prevail.

Section 22. Nuisance Ordinance

22.1 Authority and Purpose

Pursuant to the general powers granted to cities and towns by Article 89 of the Amendments to the Massachusetts Constitution, and the specific powers granted by M.G.L., Ch. 139, ss. 1-3A, this Ordinance is adopted for the prevention of future nuisances and the removal of existing nuisances within the City, which nuisances constitute a hazard of blight, or adversely affect property values.

22.2 Definitions

22.2.1 Blight

Any condition that seriously impairs the value, condition, strength, durability, or appearance of real property, or is otherwise detrimental to property values or neighboring properties including real property owned or occupied by an Interested Party as defined in Section 22.2.5 below.

22.2.2 Building

A structure, whether portable or fixed, with exterior walls or firewalls and a roof, built, erected or framed, of a combination of any materials, to form shelter for persons, animals, or property. See "structure" below.

22.2.3 Dilapidated

A condition of decay or partial ruin due to neglect, misuse, or deterioration. The term includes, but is not limited to:

(a) Property having deteriorated or ineffective waterproofing of exterior walls, roofs, foundations, or floors, including broken or inadequately secured windows or doors;

(b) Property having defective weather protection (such as paint, stain, siding or tarpaulin) for exterior wall covering; deleterious weathering due to lack of such weather protection or other protective covering.

(c) Personal property that is broken, rusted, worn, partially or wholly dismantled or otherwise due to deterioration is unsuitable for the purpose for which designed.

(d) Property having a paved parking lot or a parking area in a deteriorated condition causing hazardous conditions to automobiles, bicycles, or pedestrians. Such conditions may include but are not limited to potholes, broken pavement, and/or insufficient drainage so as to cause flooding.

22.2.4 Hazard

A condition likely to expose persons to injury, or property to damage, loss or destruction.

22.2.5 Interested Parties

In connection with the notification requirements of this Ordinance Interested Parties are the Building Commissioner; owner(s) and/or occupants of property which is the subject of a hearing; owners and/or occupants of property directly opposite the subject property on any public or private street or way, owners and/or occupants of property abutting the subject property, and owners and/or occupants of abutting property that is within 300 feet of, the property line of the subject property. Other persons who own or occupy property and who demonstrate to the satisfaction of the Building Commissioner that they are affected by the condition of the property or building that is the subject of a hearing may be regarded as Interested Parties by the Building Commissioner.

22.2.6 Nuisance

Any substantial interference with the common interest of the general public in maintaining safe and sanitary structures and neighborhoods that are not dilapidated when such interference results from the hazardous or blighted condition of private property, land or buildings. The fact that a particular structure or use may be permitted under the zoning ordinance does not create an exemption from the application of this Ordinance. The term includes but is not limited to:

(a) burned structures not otherwise lawfully habitable or usable,

(b) dilapidated real or personal property including but not limited to real or personal property containing graffiti, tagging or similar markings,

(c) dilapidated real or personal property including parking lots or parking areas,

(d) dangerous or unsafe structures or personal property,

(e) overgrown vegetation which may harbor rats and vermin, conceal pools of stagnant water or other nuisances, or which is otherwise detrimental to neighboring properties or property values,

(f) dead, decayed, diseased or hazardous trees,

(g) personal property that is exposed to the elements without protection against deterioration, rust or dilapidation,

(h) vehicles, machinery or mechanical equipment or parts thereof that are located on

soil, grass or other porous surfaces that are likely to result in the destruction of vegetation or contamination of soil,

(i) in any Residence District, keeping of more than one commercial vehicle, or of a tractor that exceeds a gross vehicle weight of three-quarters (3/4) of a ton for hauling a van or trailer as defined by the Registry of Motor Vehicles,

(j) trash , debris or personal property, including but not limited to personal property marked "free" or "take" that has been placed for collection as rubbish or refuse in violation of Town of Framingham policies as approved by the Director of Public Works.

22.2.7 Occupant

A person who occupies real property with the consent of the owner as a lessee, tenant at will, licensee or otherwise. The singular use of the term includes the plural when the context so indicates.

22.2.8 Owner

Every person who alone or jointly or severally with others:

(a) has legal title to any building, structure or property to this Ordinance

(b) has care, charge, or control of any such building structure or property in any capacity including but not limited to agent, executor, executrix, administrator, administratrix, trustee or guardian of the estate of the holder of legal title

(c) is a lessee under a written letter agreement

(d) has a mortgagee in possession

(e) is an agent, trustee or other person appointed by the courts.

22.2.9 Responsible Party

The owner or occupant (in the case of real property) of property that is the subject of proceedings under this Ordinance. The singular use of the term includes the plural when the context so indicates.

22.2.10 Structure

A combination of materials, whether wholly or partially level with, above or below the surface of the ground, whether permanent or temporary, assembled at a fixed location to give support, shelter or enclosure such as a building, (see above), framework, retaining wall, stand, platform, bin, fence (having a height at any point of six feet or greater above grade), parking area sign, flagpole, or mast for an antenna or the like.

22.3.1 Enforcement

This Ordinance shall be enforced by the Building Commissioner. If the Building Commissioner shall be informed or have reason to believe that any provision of this Ordinance has been, is being, or is likely to be violated, he shall make or cause to be made an investigation of the facts, including an investigation of the property where the violation may exist. If he finds any violation he shall give immediate notice in writing to the Owner and to the Occupant of the premises to immediately cease such violation. In making such inspection, the Building Commissioner shall have such right of access to

premises that may be lawfully exercised by him under the laws and constitution of the Commonwealth or of the United States.

If, after such notice and order, such violation continued, or if any Owner of Occupant fails to obey any lawful order of the Building Commissioner with respect to any violation of the provisions of the Ordinance, the Building Commissioner may make complaint to the Superior Court or any court of competent jurisdiction for any injunction or order restraining any further use of the premises and the continuation of the violation and shall take such other action as is necessary to enforce the provisions of this Ordinance.

In addition to the foregoing remedy, whoever violates any provision of this Ordinance or fails to obey any lawful order issued by the Building Commissioner in enforcing this Ordinance shall be liable to a fine of not more than three hundred dollars ($300) for each violation. Each violation of this Ordinance shall constitute a separate offense. Each day that any such violation continues shall constitute a separate offense.

The Building Commissioner may require disclosure to him/her of the identity of the person bringing a complaint of nuisance. The Building Commissioner may require that such complaint be made under oath or subject to the penalties of perjury. If the Building Commissioner determines that a reported condition may warrant immediate action, constitute a substantial violation of this Ordinance, or adversely affect protected interests of others than the complainant, the Building Commissioner may commence action under this Ordinance without requiring the disclosure of the identity of the complainant.

If the Building Commissioner determines that the condition is subject to the jurisdiction of the Board of Health or is a violation of the State Sanitary Code or any health regulation, in addition to enforcing this Ordinance, he shall refer the matter to the Director of Public Health of the town or other appropriate state or town officials for action.

During his investigation of the matter, the Building Commissioner may consult, but is not required to do so, with any Interested Party in an attempt to obtain voluntary compliance with this Ordinance without the need to issue a notice of violation.

22.3.2 Notice to Complainant

In any matter in which a complaint has been made by a person other than the Building Commissioner, the Building Commissioner, if requested, shall promptly notify the complainant in advance of all conferences or proceedings concerning resolution of the nuisance complaint or of any enforcement action and the complainant shall be allowed to be present and to be heard.

22.3.3 Removal of Nuisance by Council

If the Responsible Party fails to remedy the nuisance upon notice from the Building Commissioner to do so, the council may cause the nuisance to be removed as provided in M.G.L., Ch. 139.

22.3.4 Review by the Mayor

Any Interested Party who has filed a written complaint of a nuisance with the Building Commissioner upon which complaint the Building Commissioner has determined that the condition is not a nuisance, or has taken other action that the Interested Party claims is inadequate shall have a right to a review of the matter by the mayor. At the request of such an Interested Party, the mayor shall confer with the Building Commissioner and shall recommend appropriate action to the Building Commissioner and to the council.

22.3.5 Reports by Building Commissioner

The Building Commissioner shall file with the mayor each month a report that shall include all complaints of nuisance made to him during the prior month; all proceedings

begun by him under this Ordinance; all pending complaints and all investigations and enforcement actions taken by him or referred to the Director of Public Health. The report shall state the location of the premises, a summary of the nature of the complaint, the name of the Responsible Party(ies), and the disposition or the status of the matter.

Section 23. **(Deleted – October 21, 2014 Special Town Meeting, Art. 12)**

Section 24. Ordinance Concerning Lodging Houses

24.1 Purpose

This Ordinance is intended to supplement the provisions of G.L. c. 140, § 22, et seq., and all other statutes and State regulations pertaining to lodging houses, for the purpose of ensuring the maintenance and protection of the health, safety and welfare of all persons and the health, safety and general welfare of the public.

24.2 Definitions

1) **Lodging House**: Every dwelling or part thereof which contains one or more rooming units in which space is let or sublet for compensation by the licensee, owner or operator to four or more persons not within the second degree of kindred to the person compensated. The term Lodging House shall include but not be limited to boarding houses, rooming houses, inns, bed and breakfast establishments, dormitories, fraternity houses, sober houses and other similar dwelling places, but shall not include dormitories of charitable or philanthropic institutions or convalescent or nursing homes licensed under section seventy-one of chapter one hundred and eleven or rest homes so licensed, or group residences licensed or regulated by agencies of the commonwealth.

2) Lodger: A lodger is any person residing in a rooming unit including any person listed as a lodger on any lease agreement for said unit.

3) **Rooming Unit**: The room or group of rooms let to an individual or household for use as living and sleeping quarters.

4) **Licensee**: That person (s) or entity listed on the lodging house license and the owner (s) of the land and building where the lodging house is operated.

24.3 Responsibilities of Licensee

The licensee shall be responsible for the proper supervision, operation and maintenance of the lodging house in accordance with the requirements of this Ordinance and of all other pertinent State laws, regulations and other City Ordinances. The appointment of an agent shall in no way relieve the licensee from responsibility for full compliance with all the foregoing laws and regulations. This Ordinance and the penalties imposed by them shall apply with equal force to the keeper of any lodging house required to be licensed.

24.4 Agent (s)

If the licensee, because of health, other employment, non-residence on the premises, frequent or extended absences from the premises or other reasons, is unable to exercise proper supervision of the premises, he/she shall designate one or more agent (s) to carry out all or part of his/her responsibilities. The owner of any lodging house that contains twelve (12) or more units shall be required to have an agent residing on the premises. Upon the recommendation of the Chief of Police for reasons of public safety, the Board of License Commissioners may require the owner of a lodging house that contains less than twelve units to have an agent residing on the premises. Based on the qualifications of the agent(s) designated and the extent of their responsibilities, the Board of License Commissioners may require that more than one agent be provided. If, for any reason, an agent ceases to exercise his/her responsibilities, the licensee shall at once notify the Board of License Commissioners and take immediate steps to provide proper interim supervision and obtain a suitable replacement.

The agent (s) shall be available on a 24-hour basis and must post his/her telephone or beeper number in a conspicuous place inside the Lodging House. The agent must also notify the mayor's Office, Licensing Department, Police Department, Health Department, Fire Department and Building Department of his/her beeper or telephone number.

24.5 Registers, Card Files and Rosters

The licensee of every lodging house shall keep or cause to be kept, in a permanent form, a register. Such register shall contain the true name or name in ordinary use and the last residence of every person engaging or occupying a private room together with a true and accurate record of the room assigned to such person and of the day and hour of check-in and checkout. The entry of the names of the person engaging a room and the lodgers of said room shall be made by said person engaging said room or by any lodger thereto.

Until the entry of such name and the record of the room have been made such person shall not be allowed to occupy privately any room upon licensed premises.

In addition, each licensee shall keep or cause to be kept a card file or database containing current information on each lodger including full name, date and time of registration, room number, former address, registration number, state of registration, and make of automobile, and the name and telephone number of the person to be notified in case of emergency. These cards should be kept for a minimum of one year after departure of the lodger. The register, card file, and roster required in this section shall be available for inspection at all times by the Board of License Commissioners, its agent(s), the Building Commissioner and his designee(s), the Director of Public Health and his designee(s), and any officer of the Framingham Police Department.

24.6 Minimum Standards

This Ordinance sets forth the minimum standards intended for the maintenance and enforcement required for the protection of health, safety and welfare of all persons concerned. If there is any conflict with state or local law the stricter provision shall apply to the extent legally permissible.

All lodging houses shall comply with the requirements of Article II of the State Sanitary Code, Minimum Standards of Fitness for Human Habitation, and to the requirements of this Ordinance, whenever they are in addition to or more stringent than the requirements of Article II of said code.

All lodging houses in which meals are served to lodges shall comply with the requirements of Article X of the State Sanitary Code, Minimum Sanitation Standards for Food Establishments, or to such additional standards as may be approved in writing by the Director of Public Health.

24.7 Bathroom Facilities

Bathroom facilities, as required by the Sanitary Code, shall be located on the same floor as the individuals who are to use them.

24.8 Lighting and Electrical Facilities

The electrical service to the building shall conform with the rules and regulations issued by the Commonwealth of Massachusetts, Department of Public Safety, Board of Fire Prevention Regulations, known as the Massachusetts Electrical Code, which is incorporated herein by reference. Specific questions regarding the requirements of the Massachusetts Electrical Code may be directed to the City of Framingham Electrical Inspector.

24.9 House Rules & Supervision:

Licensees and their agent (s) must:

1. Exercise due care in the selection of lodgers.
2. Inspect all common areas at least daily and all occupied rooms at every change of lodger to insure that all such areas are in a clean and orderly condition and

without violation of regulations pertaining to obstruction of egress, cooking in rooms, and other health and safety hazards. A schedule of inspections must be posted at least forty-eight hours prior to said inspection. Posting of the schedule for inspections shall not apply in the case of an emergency.

3. Institute and enforce such house rules as are necessary to prevent the lodging house from being a cause of nuisance or annoyance to the neighborhood.
4. Ensure that House Rules are in writing and at a minimum contain rules adequate to address the following matters:
   a. Noise Control including use of audio or other equipment which may disturb the peace ;
   b. Disorderly behavior;
   c. Adherence to this Ordinance and the consequences for repeated violations;
   d. Proper garbage disposal; and
   e. Cleanliness of rooming units and common areas.
5. File a copy of the House Rules with the Board of License Commissioners as part of the Licensee's license application or renewal thereof.
6. Post a copy of the House Rules in a common area of the lodging house.
7. Provide every lodger who intends to remain for thirty (30) days or more with a copy of the house rules.
8. Meet with the lodgers at least annually to discuss house rules.
9. Take whatever steps necessary to stop Lodger(s) from repeatedly violating house rules or the requirements of this Ordinance, up to and including eviction.

24.10 Housekeeping

It shall be the duty of the licensee and/or his agent to provide or cause to be provided:

1. Daily cleaning of all common bathroom facilities and of community kitchen or laundry facilities,
2. Cleaning of all occupied rooms and private bathroom facilities at the change of each lodger or as otherwise necessary for sanitary purposes.
3. Cleaning, as necessary, of all other common areas.

24.11 Storage, Collection & Disposal of Waste

The Licensee and his/her agent (s) shall comply with the City of Framingham's Regulations Governing the Handling, Storage Collection and Disposal of Waste and all other state or local laws pertaining to the proper storage, collection and disposal of waste. Responsibilities of the Licensee and Agent (s) include but are not limited to following:

1. Storing waste in watertight, rodent-proof receptacles with tight fitting covers.
2. Providing as many receptacles as are sufficient to contain accumulation of all waste before final collection.
3. Locating waste containers in an area where objectionable odors will not enter

any dwellings, preferably in the rear of the building.

4. Informing all lodgers of the rules regarding proper storage, collection and disposal of waste.
5. Placing waste for collection in the designated location no earlier then 6:00 am on the day of the scheduled collection.
6. Removing all empty containers of any kind from the area of collection no later than midnight of the collection day.

24.12 Egress Facilities

The egress shall allow every lodger to reach the outside at ground level by a second way of egress if the principal or customary egress is blocked by fire or smoke, or is otherwise obstructed.

24.13 (Deleted by the Attorney General, November 5, 2007)

24.14 Approved Fire Escape

No obstruction shall be permitted in the path of egress to a fire escape. Fire escapes are to be used for emergency purposes only. Use of fire escapes for general access to rooms is strictly prohibited.

24.15 (Deleted by the Attorney General, November 5, 2007)

24.16 Emergency Lighting

Approved emergency lighting shall be provided along ways of egress. The number, type and location of emergency lighting units shall be as designated by the Building Commissioner.

24.17 (Deleted by the Attorney General, November 5, 2007)

24.18 Portable Fire Extinguishers

Portable fire extinguishers of a type and capacity approved by the Chief of the Fire Department, shall be provided for each story and basement, one for each 2500 square feet of the floor area or portion thereof and maintained in a fully charged and operable condition at all times and kept in their designated places when not being used.

Such fire extinguishers shall be inspected and serviced annually and after use in accordance with NFPA l0. Fire extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. Preferably they shall be located along normal paths of travel, including exits from areas. Fire extinguishers shall not be obstructed or obscured from view.

Portable fire extinguishers other than wheeled types shall be securely installed on the hanger or in a bracket shall be securely and properly anchored in the bracket supplied, placed in cabinets or wall recesses. The hanger or bracket shall be securely and properly anchored to the mounting surface in accordance with the manufacturer's instructions.

24.19 (Deleted by the Attorney General, November 5, 2007)

24.20 Hazardous Areas and Combustible Storage

The Building Commissioner or the Fire Chief may require that kitchens, work shops, heater rooms, storerooms containing combustible materials, or other areas constituting a special hazard be protected by additional approved portable fire extinguishing equipment, or other means as directed. Combustible or flammable material shall not be placed, stored or kept in any portion of an exit or elevator car or hoist way or at the bottom of a stairway, fire escape or other means of escape.

24.21 Cooking in Rooms

The use of electric hot plates, gas plates, stoves using sterno or other fuel, electric percolators, grills, and toasters, are prohibited in any room other than a kitchen approved by the Building Commissioner.

Lodgers may use microwaves in their rooming units with the approval of the Licensee. The use of appliances for the preparing or serving of food shall not be permitted in rooms used for sleeping.

24.22 Portable Heaters

The use of portable heaters is strictly prohibited.

24.23 Heating Systems

The owner shall provide and maintain in good operating condition the facilities for heating every habitable room and every room containing a toilet, shower or bathtub to such temperature as required by the State Health code.

Central heating systems shall be provided with all the safety devices required for new installations under all applicable laws, ordinances, and regulations of any authority having jurisdiction thereof. The heater should be located in an area suitably ventilated to ensure the safe operation of the heater or burner.

24.24 Maintenance

1. The building and all parts thereof shall be kept in good general repair and properly maintained. All exterior surfaces shall be kept painted where necessary for the purposes of preservation of structural elements or appearance. Interior walls and ceilings shall be periodically refinished in order to maintain such surfaces free from stains, marks or visible foreign matter.

2. All outdoor areas not devoted to walks and drives or otherwise paved shall be landscaped and adequately maintained to prevent overgrowth of unsightly conditions.

3. Outdoor walks, drives and exterior ways of egress shall be kept unobstructed, free of litter, and clean. Accumulation of ice and snow shall be removed from such areas, including required ways of egress to provide safe walking surfaces and shall be removed.

4. The exterior front entrance will be provided with adequate illumination and the property address number will be maintained in a clear visible location on or near the front entrance.

24.25 Automatic Fire Alarm System

Fire protection systems shall not be disconnected or otherwise rendered unserviceable without first notifying the fire department. The design, installation and performance of required fire warning systems, pursuant to M.G.L. c.148, sec. 26C, shall be in accordance with NFPA 72.

24.26 Care and Maintenance of Fire Protection System

The Licensee shall be responsible for the care and maintenance of all fire protection systems, including equipment and devices, to insure the safety the safety and welfare of the lodgers. If required fire protection systems are temporarily out-of service for maintenance or repair, the licensee or his/her agent (s) shall immediately advise the fire department and shall diligently restore the system to working order. Installation of, or modification to, any automatic fire protection system shall require a permit from the Chief of the Fire Department or his/her designee.

Aisles, floors, halls, stairways, fire escapes, doors and windows shall be kept in good repair and ready for use, and shall be kept properly lighted.

No person shall shut off, disconnect, obstruct, remove or destroy, or cause or permit to be shut off, disconnected, obstructed, removed or destroyed, any part of any sprinkler system, water main, hydrant or other device used for fire protection in any building owned, leased or occupied by such

person under his control or supervision, without first procuring a written permit to do so from the Chief of the Fire Department or his/her designee.

24.27 Egress From and Access to a Building

Any obstacle, which may interfere with the means of egress or escape from any building or other premises, or with the access of any part of said building or premises by the fire department in the case of fire, shall be removed from aisles, floors, halls, stairways and fire escapes. Doors and windows designated as exits shall be kept clear at all times.

No person shall at any time place encumbrance of any kind before or upon any fire escape, balcony or ladder intended as a means of escape from fire. The means of egress from each part of the building, including stairways, egress doors, and any panic hardware installed thereon, aisles, corridors, passageways and similar elements of the means of egress, shall at all times be maintained in a safe condition and shall be available for immediate use and free of all obstructions.

All exterior bridges, steel or wooden stairways, fire escape and egress balconies shall be maintained in accordance with 780 CMR 1028.0 and shall be examined and or tested, and certified for structural adequacy and safety every five years, by a Massachusetts registered professional engineer, or others qualified and acceptable to the Building Commissioner or his/her designee. The engineer or other party shall after inspection submit an affidavit to the building department.

24.28 Conflict With Other Laws or Regulations

Whenever any provision of this Ordinance is in conflict with another law, ordinance or regulation, the more restrictive provision shall apply, unless a contrary intent is clearly stated.

24.29 Certificates of Inspection

The Board of License Commissioners may require certificates of inspection certifying compliance with the various requirements of this Ordinance, in addition to the required minimum yearly inspection pursuant to 780 CMR Table 106.

24.30 Severability of Provisions

The invalidity of any provision of this Ordinance shall not affect the validity of the remaining sections of this Ordinance, if so declared by a Court of competent jurisdiction.

24.31 Penalty

The Board of License Commissioners and its agents including any police officer of the City of Framingham shall be charged with the authority to enforce the terms of this Ordinance, in addition to the authority provided to the Board of License Commissioners pursuant to the provisions of G.L. c. 140, § 22, et seq. to award, restrict, revoke and otherwise regulate licenses to operate lodging houses.

Any person violating any provision of this Ordinance shall be punished by a fine of three hundred dollars ($300) per violation. Each day that the violation continues shall constitute a separate offense. As an alternative to initiating criminal proceedings, the Board of License Commissioners Agent may elect to utilize the non-criminal disposition procedure set forth in M.G.L. Ch. 40, § 21D and Article X of the General Ordinances. For purposes of non-criminal disposition, the penalty shall be three hundred dollars ($300) for each offense.

Section 25. Right to Farm

25.1 Legislative Purpose and Intent

25.1.1 The purpose and intent of this Ordinance is to state with emphasis the Right to Farm accorded to all citizens of the Commonwealth under the Constitution and all state statutes and regulations.

25.1.2 This Ordinance encourages the pursuit of agriculture, promotes agriculture-based economic opportunities, and protects farmlands within the City of Framingham by

allowing agricultural uses and related activities to function with minimal conflict with abutters and City agencies. This Ordinance shall apply to all jurisdictional areas within the City.

25.2 Definitions

25.2.1 The word "farm" shall include any parcel or contiguous parcels of land or water bodies used for the primary purpose of commercial agriculture, or accessory thereto.

25.2.2 The words "farming" or "agriculture" or their derivatives shall include, but not be limited to the following:

(a) farming in all its branches and the cultivation and tillage of the soil.

(b) dairying;

(c) production, cultivation, growing, and harvesting of any agricultural, aquacultural, floricultural, viticultural, or horticultural commodities;

(d) growing and harvesting of forest products upon forest land, and any other forestry or lumbering operations;

(e) raising of livestock including horses;

(f) keeping of horses as a commercial enterprise; and keeping and raising of poultry, swine, cattle, bovine, ratites (such as emus, ostriches and rheas) and camelids (such as llamas and camels), and other domesticated animals for food and other agricultural purposes including bees and fur-bearing animals.

25.2.3 "Farming" shall encompass activities including, but not limited to, the following:

(a) operation and transportation of slow-moving farm equipment over roads within the town;

(b) control of pests, including, but not limited to, insect, weeds, predators and disease organism of plants and animals;

(c) application of manure, fertilizers and pesticides;

(d) conducting agriculture-related educational and farm based recreational activities including agri-tourism, provided that the activities are related to marketing the agricultural output or services of the farm;

(e) processing and packaging of the agricultural output of the farm and the operation of a farmer's market or farm stand including signage thereto;

(f) maintenance, repair, or storage of seasonal equipment, or apparatus owned or leased by the farm owner or manager used expressly for the purpose of propagation, processing, management, or sale of the agricultural products; and

(g) on-farm relocation of earth and the clearing of ground for farming operations.

25.3 Right To Farm Declaration

The Right to Farm is hereby recognized to exist within the City of Framingham. The above-described agricultural activities may occur on holidays, weekdays, and weekends by night or day and shall include the attendant incidental noise, odors, dust, and fumes associated with normally accepted agricultural practices. It is hereby determined that whatever impact may be caused to others through the normal practice of agriculture is more than offset by the benefits of farming to the neighborhood, community, and society in general. The benefits and protections of this Ordinance are intended to apply exclusively to those commercial agricultural and farming operations and activities conducted in accordance with generally accepted agricultural practices. Moreover, nothing in this Right To Farm Ordinance shall be deemed as acquiring any interest in

land, or as imposing any land use regulation, which is properly the subject of state statute, regulation, or local zoning law.

25.4 Disclosure Notification

25.4.1 The mayor shall prominently post on the Municipal Bulliten Board and make available for distribution the following disclosure:

> "It is the policy of this community to conserve, protect and encourage the maintenance and improvement of agricultural land for the production of food, and other agricultural products, and also for its natural and ecological value. This disclosure notification is to inform buyers or occupants that the property they are about to acquire or occupy lies within a town where farming activities occur. Such farming activities may include, but are not limited to, activities that cause noise, dust and odors. Buyers or occupants are also informed that the location of property within the City may be impacted by commercial agricultural operations including the ability to access water services for such property under certain circumstances."

25.4.2 In addition to the above, a copy of this disclosure notification shall be available in a public area at City Hall and periodically provided by the City to landowners by mail.

25.5 Resolution of Disputes

25.5.1 Any person who seeks to complain about the operation of a farm may, notwithstanding pursuing any other available remedy, file a grievance with the mayor, the Zoning Enforcement Officer, or the Board of Health, depending upon the nature of the grievance. The filing of the grievance does not suspend the time within which to pursue any other available remedies that the aggrieved may have. The Zoning Enforcement Officer or mayor may forward a copy of the grievance to the Agricultural Advisory Committee or its agent, which shall review and facilitate the resolution of the grievance, and report its recommendations to the referring City authority within an agreed upon time frame.

25.5.2 The Board of Health, except in cases of imminent danger or public health risk, may forward a copy of the grievance to the Agricultural Advisory Committee or its agent, which shall review and facilitate the resolution of the grievance, and report its recommendations to the Board of Health within an agreed upon timeframe.

Section 26. Illicit Discharges to Municipal Separate Storm Sewer System

26.1 Purpose

The purpose of the Ordinance is to eliminate non-stormwater discharges to the City of Framingham's municipal separate storm sewer system. Non-stormwater discharges contain contaminants and supply additional flows to the City's storm drain system. Both increased and contaminated stormwater runoff are major causes of:

(1) impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;

(2) contamination of drinking water supplies;

(3) alteration or destruction of aquatic and wildlife habitat; and

(4) flooding.

Regulation of illicit connections and discharges to the municipal separate storm sewer system is necessary for the protection of the City of Framingham's natural resources, municipal facilities, and to safeguard the public health, safety, welfare and the environment.

The objectives of the Ordinance are:

(1) To prevent pollutants from entering the City's municipal separate storm sewer system (MS4);

(2) To prohibit illicit connections and unauthorized discharges to the MS4;

(3) To require the removal of all such illicit connections;

(4) To comply with state and federal statutes and regulations relating to stormwater discharges; and

(5) To establish the legal authority to ensure compliance with the provisions of the Ordinance through inspection, monitoring, and enforcement.

26.2 Definitions

Unless a different definition is indicated in other sections of this Ordinance, the following definitions and provisions shall apply throughout this article, also referred to in this article, as this Ordinance.

Applicable Authority: The employees and/or agents of the Division of Public Works, Conservation Commission, Division of Inspectional Services, and Board of Health designated to enforce this Ordinance.

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. sec. 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 Wetland Resource Areas from any source.

Discharger: A person or persons who discharge any pollutant or combination of pollutants into the municipal storm drain system or into the Wetland Resource Areas 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 or approved before the effective date of this Ordinance.

Illicit Discharge: Direct or indirect discharge to the municipal storm drain system that is not composed entirely of stormwater except as exempted herein.

Illicit Discharge Detection and Elimination (IDDE): One of six Minimum Control Measures regulated under the City's NPDES Phase II MS4 Permit. The federal regulation governing implementation of the IDDE program under this permit is Section (b)(3) of CFR 122.34, "Storm Water Phase II Regulations."

Impervious Surface: Any material or structure on or above the ground that prevents water infiltrating the underlying soil. Impervious surface includes without limitation roads, paved parking lots, sidewalks and roof tops.

Municipal Separate Storm Sewer System (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 City of Framingham.

National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit: A permit issued by United States Environmental Protection Agency or jointly with the Commonwealth of Massachusetts that authorizes and regulates 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.

Notice of Violation: A written notice given to a person by the Applicable Authority that states that said person has violated this Ordinance on any specified occasion.

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, 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 Wetland Resource Areas. Effluent waters from dewatering operations are adequately regulated under NPDES. Pollutants shall include without limitation:

(1) paints, varnishes, and solvents;

(2) oil and other automotive fluids;

(3) non-hazardous liquid and solid wastes and yard wastes;

(4) refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnances, accumulations and floatables;

(5) pesticides, herbicides, and fertilizers;

(6) hazardous materials and wastes;

(7) sewage, fecal coliform and pathogens;

(8) dissolved and particulate metals;

(9) animal wastes;

(10) rock, sand, salt soils;

(11) construction wastes and residues; and

(12) noxious or offensive matter of any kind

(13) vegetable oil and waste vegetable oil.

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: Runoff from precipitation or snow melt.

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 as defined under G.L. Ch. 21C and Ch. 21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000. 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 these laws and regulations.

Watercourse: A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

Wetland Resource Areas: All wetlands and watercourses protected under the Massachusetts Wetlands Protection Act and the Framingham Wetlands Protection Ordinance.

Wastewater: Any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, come into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

26.3 Applicability

This Ordinance shall apply to flows entering the municipally owned storm drainage system, a watercourse, and any Wetland Resource Areas located within the boundaries of the City of Framingham.

26.4 Authority

This Ordinance is adopted under authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule statutes, and the regulations of the federal Clean Water Act found at 40 CFR 122.34.

26.5 Responsibility for Administration

The Applicable Authority shall administer, implement and enforce this Ordinance.

26.6 Regulations

The Applicable Authority may promulgate rules and regulations to effectuate the purposes of this Ordinance. Failure by the Applicable Authority to promulgate such rules and regulations shall not have the effect of suspending or invalidating this Ordinance.

26.7 Prohibited Activities

Illicit Discharges. No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into the municipal separate storm sewer system (MS4), into a watercourse, or into the Wetland Resource Areas.

Illicit Connections: No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless or whether the connection was permissible under applicable law, regulation or custom at the time of connection.

Obstruction of Municipal Storm Drain System (MS4). No person shall obstruct or interfere with the normal flow of stormwater into or out of the MS4 without prior consent from the Applicable Authority. No person shall dump or dispose of yard waste (leaves, grass clippings, etc.) into the open watercourses (swales, brooks and streams) that make up the MS4.

Other Prohibited Activities.

(1) No person shall discharge, or cause to be discharged, water or any other liquid, on to the streets, sidewalks, or ways of the City in such a manner as to cause an obstruction of traffic or to endanger travel by freezing or otherwise.

(2) Drains – No one shall tie any pump, cellar, yard, roof or area drain directly into the storm water drainage system without approval from the Applicable Authority.

(3) Catch Basins – No person shall directly or indirectly pump, discharge or cause or allow to be discharged into any catchbasin, any solid waste, construction debris, paint or paint product, antifreeze, hazardous waste, oil, gasoline, grease and all other automotive and petroleum products, solvents and degreasers, drain cleaners, commercial and household cleaners, soap, detergent, ammonia, food and food waste, grease or yard waste, animal feces, dirt, sand gravel or other pollutant. Any person determined by the Applicable Authority to be responsible for the discharge of any of the above substances to a catchbasin and any other portions of the storm water system impacted according to City standards and requirements or paying the cost for such cleaning. In addition, the person shall be responsible for paying any penalties assessed by the City.

(4) Septage – No person shall discharge or cause or allow to be discharged any septage, or septage tank or cesspool overflow into the City's storm water drainage system.

(5) Storage & Disposal of Hazardous Material – No one shall dispose of anything other than clear water into the City's storm drainage system. The disposal of waste, gasoline or any other hazardous material into the storm drainage system is strictly prohibited and is in violation of state and federal pollution laws.

(6) Private Drainage Systems – It is prohibited for anyone with a private drainage system from tying into the public storm water disposal system without written approval from the

Applicable Authority. The maintenance of any and all private drainage systems shall be the responsibility or the owners.

26.8 Exemptions

Discharges or flows resulting from fire fighting activities or other authorized hydrant use are exempt.

The following non-stormwater discharges or flows are exempt from the prohibitions of this Ordinance provided that the source is not a significant contributor of a pollutant to the municipal storm drain system:

(1) Waterline flushing;

(2) Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems), crawl space pumps, or air conditioning condensation;

(3) Discharge from landscape irrigation or lawn watering;

(4) Water from individual residential car washing;

(5) Discharge from dechlorinated swimming pool water (less than one ppm chlorine) provided the water is allowed to stand for one week following last chlorination prior to draining and the pool is drained in such a way as not to cause a nuisance;

(6) Discharge from street sweeping;

(7) Flow from potable water sources;

(8) Springs;

(9) Natural flow from riparian habitats and wetlands;

(10) Diverted stream flow;

(11) Rising groundwater;

(12) Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater (e.g. sump pump), provided that the operator seeks written approval from the Applicable Authority prior to discharge, and thereafter discharges in accordance with the applicable laws and regulations to be issued by the Applicable Authority;

(13) Dye testing, provided verbal notification is given to the Applicable Authority prior to the time of the test;

(14) Non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency, provided that the discharge is in full compliance with the requirements of the written approval, waiver, or order and applicable laws and regulations; and

(15) Discharge for which advanced written approval is received from the Applicable Authority as necessary to protect the public interest.

26.9 Emergency Suspension of Storm Drainage System Access

The Applicable Authority may suspend municipal storm drain system access 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 or harm to the public health, safety, welfare or the environment. In the event any person fails to comply with an emergency suspension order, the Applicable Authority ma take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

A person commits an offense if the person reinstates water service, sanitary sewer service, and or MS4 access to premises terminated pursuant to this Ordinance, without the prior written approval of the Applicable Authority.

26.10 Industrial or Construction Activity Discharges

NPDES Stormwater Permit

Any person subject to an industrial or construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Applicable Authority prior to the allowing of discharges to the MS4.

Monitoring of Discharges

Upon notice of an alleged illicit discharge or connection, the Applicable Authority have the right to investigate any facility that has storm water discharges associated with industrial activity, including construction activity. The exercise of this right does not constitute a replacement or substitution for enforcement by federal or state agencies for facilities that are adequately regulated either under a NPDES permit or, if a violation is determined to have occurred, under 310 CMR 40.00, the Massachusetts Contingency Plan.

Watercourse Protection

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

Failure by the property owner to maintain the watercourse does not constitute an obligation on the part of the City to assume this responsibility.

26.11 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 of or suspects a release of materials at that facility or operation resulting in or which may result in discharge of pollutants to the municipal drainage system or Wetland Resource Areas, 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 municipal fire and police departments. In the event of a release of non-hazardous materials, the reporting person shall notify the Applicable Authority not later than the next business day. The reporting person shall provide to the Applicable Authority 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 on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

26.12 Enforcement

The Applicable Authority or an authorized agent of the Applicable Authority shall enforce this Ordinance, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

26.13 Entry to Perform Duties

To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Applicable Authority may enter upon privately owned property for the purpose of performing their duties under these regulations and may make or cause to be made such examinations, surveys or sampling as the Applicable Authority deems reasonably necessary.

26.14 Civil Relief

If a person violates the provisions of this Ordinance, regulations, written approval, notice or order issued thereunder, the Applicable Authority 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.

26.15 Orders

The Applicable Authority may issue a written order to enforce the provisions of this Ordinance or the regulations thereunder, which may include: (a) elimination of illicit connections or discharges to the MS4; (b) performance of monitoring, analyses, and reporting; (c) that unlawful discharges, practices, or operations shall cease and desist; (d) remediation of contamination in connection therewith; and (e) implementation of source control or treatment BMPs.

If the enforcing person 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 City may, at its option, undertake such work, and expenses thereof shall be charged to the violator.

Within thirty (30) days after completing all measures necessary to abet the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the City, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the Applicable Authority 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 Applicable Authority 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 being to accrue on any unpaid costs at the statutory rate provided in G.L. Ch. 59, Sec. 57 after the thirty-first day at which the costs first become due.

26.16 Non-Criminal Disposition

As an alternative to criminal prosecution or civil action, the City may elect to utilize the non-criminal disposition procedure set forth in G.L. Ch. 40, sec. 21D in which case the Applicable Authority shall be the enforcing person. For non-criminal disposition, the penalty for the first violation shall be one hundred dollars ($100), the penalty for the second violation shall be two hundred dollars ($200), and the penalty for the third and subsequent violations shall be three hundred dollars ($300). Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

26.17 Criminal Penalty

Any person who violates any provision of this Ordinance, regulation, order or written approval issued thereunder, shall be punished by a fine not to exceed three hundred dollars ($300) per violation. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

26.18 Appeals

The decisions or orders of the Applicable Authority shall be final. Further relief shall be to a court of competent jurisdiction.

26.19 Remedies Not Exclusive

The remedies listed in this Ordinance are not exclusive of any other remedies available under any applicable federal, state or local law.

26.20 Severability

The provisions of this Ordinance are hereby declared to be severable. If any provision, paragraph, sentence, or clause, of this Ordinance 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 Ordinance.

Residential property owners shall have 90 days from the effective date of the Ordinance to comply with its provisions provided good cause is shown for the failure to comply with the Ordinance during that period.

Section 27. Prohibition of Floor Drains

27.1 Purpose of Ordinance

The purpose of this ordinance is to protect groundwater used as the source of a public drinking water supply in conformity with requirements detailed in the Commonwealth's Drinking Water Regulations (310 CMR 22.00).

Whereas:

- floor drains in industrial and commercial facilities are often tied to a system leading to a leaching structure (e.g. dry well, cesspool, leach field) or a septic system; and
- poor management practices and accidental and/or intentional discharges may lead petroleum and other toxic or hazardous materials into these drainage systems in facilities managing these products; and
- improper maintenance or inappropriate use of these systems may allow the passage of contaminants or pollutants entering the drain to discharge from the leaching structure or septic system to the ground; and
- discharges of hazardous wastes and other pollutants to floor drains leading to leaching structures and septic systems have repeatedly threatened surface and ground water quality throughout Massachusetts; and
- surface and ground water resources in the City of Framingham contribute to the City's drinking water supplies;

The City of Framingham adopts this Ordinance, under its authority as specified in Section 27.2, as a preventative measure for the purposes of:

- preserving and protecting the City of Framingham's drinking water resources from discharges of pollutants to the ground via floor drains, and
- minimizing the threat of economic losses to the City due to such discharges.

27.2 Scope of Authority

This Ordinance is adopted under authority granted by the Home Rule Amendment of the Massachusetts Constitution, This Ordinance shall apply, as specified herein, to all applicable facilities, existing and new, within the Groundwater Protection District defined in the City's Zoning Ordinances Section III (N)(4) – Establishment and Delineation of the Groundwater Protection District.

27.3 Definitions

For the purposes of this Ordinance, the following words and phrases shall have the following meanings:

Applicable Authority: The employees and/or agents of the Division of Public Works designated to enforce this Ordinance.

Commercial and Industrial Facility: A public or private establishment where the principal use is the supply, sale, and/or manufacture of services, products, or information, including but not limited to: manufacturing, processing, or other industrial operations; service or retail establishments; printing or publishing establishments; research and development facilities; small or large quantity generators of hazardous waste; laboratories; hospitals.

Department: The Massachusetts Department of Environmental Protection.

Discharge: The accidental or intentional disposal, deposit, injection, dumping, spilling, leaking, incineration, or placing of toxic or hazardous material or waste upon or into any land or water so that such hazardous waste or any constituent thereof may enter the land or waters of the Commonwealth. Discharge includes, without limitation, leakage of such materials from failed or discarded containers or storage systems and disposal of such materials into any on-site leaching structure or sewage disposal system.

Floor Drain: An intended drainage point on a floor constructed to be otherwise impervious which serves as the point of entry into any subsurface drainage, treatment, disposal, containment, or other plumbing system.

Leaching Structure: Any subsurface structure through which a fluid that is introduced will pass and enter the environment, including, but not limited to, dry wells, leaching catch basins, cesspools, leach fields, and oil/water separators that are not water-tight.

Oil/Water Separator: A device designed and installed so as to separate and retain petroleum based oil or grease, flammable wastes as well as sand and particles from normal wastes while permitting normal sewage or liquid wastes to discharge into the drainage system by gravity. Other common names for such systems include MDC traps, gasoline and sand traps, grit and oil separators, grease traps, and interceptors.

Toxic or Hazardous Material: Any substance or mixture of physical, chemical, or infectious characteristics posing a significant, actual, or potential hazard to water supplies or other hazards to human health if such substance or mixture were discharged to land or water of the City of Framingham. Toxic or hazardous materials include, without limitation, synthetic organic chemicals, petroleum products, heavy metals, radioactive or infectious wastes, acids and alkalis, and all substances defined as Toxic or Hazardous under Massachusetts General Laws (MGL) Chapter 21C and 21E or Massachusetts Hazardous Waste regulations (310 CMR 30.000), and also include such products as solvents, thinners, and pesticides in quantities greater than normal household use.

Use of Toxic or Hazardous Material: The handling, generation, treatment, storage, or management of toxic or hazardous materials.

27.4 Prohibitions

With the exception of discharges that have received a Department issued permit prior to the effective date of this Ordinance, no floor drain(s) shall be allowed to discharge, with or without pretreatment (such as an oil/water separator), to the ground, a leaching structure, or septic system in any industrial or commercial facility if such floor drain is located in either:

A. an industrial or commercial process area,

B. a toxic or hazardous materials and/or waste storage area, or

C. a leased facility without either A or B of this section, but in which the potential for a change of use of the property to a use which does have either A or B is, in the opinion of the Applicable Authority or its agent, sufficient to warrant the elimination of the ground discharge at the present.

27.5 Requirements for Existing Facilities

27.5.1 The owner of a facility in operation prior to the effective date of this Ordinance with a prohibited (as defined under Section 27.4) floor drain system shall:

a. Disconnect and plug all applicable inlets to and outlets from (where possible) applicable leaching structures, oil/water separators, and/or septic systems;

b. Remove all existing sludge in oil/water separators, septic systems, and where accessible, leaching structures. Any sludge determined to be a hazardous waste shall be disposed of in accordance with state hazardous waste regulations (310 CMR 30.000). Remedial activity involving any excavation and/or soil or groundwater sampling must be performed in accordance with appropriate Department policies;

c. Alter the floor drain system so that the floor drain shall be either:

1. connected to a holding tank that meets all applicable requirements of Department policies and regulations, with hauling records submitted to the Applicable Authority at the time of hauling;

2. connected to a municipal sanitary sewer line, if available, with all applicable Department and local permits; or

3. permanently sealed. Any facility sealing a drain shall be required to submit for approval to the Applicable Authority a hazardous waste management plan detailing the means of collecting, storing, and disposing of any

hazardous waste generated by the facility, including any spill or other discharge of hazardous materials or wastes.

27.5.2 Any oil/water separator remaining in use shall be monitored weekly, cleaned not less than every 90 days, and restored to proper conditions after cleaning so as to ensure proper functioning. Records of the hauling of the removed contents of the separator shall be submitted to the Applicable Authority at the time of hauling.

27.5.3 Compliance with all provisions of this Ordinance must be accomplished in a manner consistent with Massachusetts Plumbing, Building, and Fire code requirements.

27.5.4 Upon complying with one of the options listed under Section 27.5.A.3., the owner/operator of the facility shall notify the Department of the closure of said system by filing the Department's UIC Pre-Closure Form BRP WS-06d with the Department, and sending a copy to the Framingham Department of Public Works.

27.6 Effective Dates for All Facilities

27.6.1 Existing Facilities:

a. Owners/Operators of a facility affected by this Ordinance shall comply with all of its provisions within 120 days of the effective date;

b. All applicable discharges to the leaching structures and septic systems shall be discontinued immediately through temporary isolation or sealing of the floor drain.

27.6.2 New Facilities:

a. As of the effective date of this Ordinance, all new construction and/or applicable change of use within the City of Framingham shall comply with the provisions of this Ordinance.

b. Certification of conformance with the provisions of this Ordinance by the Applicable Authority shall be required prior to issuance of construction and occupancy permits.

c. The use of any new oil/water separator shall comply with the same requirements as for existing systems, as specified above in Section 27.5.B.

27.7 Penalties

Failure to comply with provisions of this Ordinance will result in a fine not to exceed three hundred dollars ($300). Each day's failure to comply with the provisions of this Ordinance shall constitute a separate violation.

The Applicable Authority or an authorized agent of the Applicable Authority shall enforce this Ordinance, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

Section 28. Tax Title Payment Agreements

28.1 Purpose

Pursuant to M.G.L. c. 60, §62A and the terms set forth in this Article V, Section 28 of the General Ordinances, the City is authorized but not required to offer tax title payment agreements to persons entitled to redeem parcels in tax title.

28.2 Subject Properties

Property which may be the subject of tax title payment agreements pursuant to this section must:

(a) Be a site or portion of a site from or at which there has been a release of oil or hazardous material;

(b) Be owned by a person not otherwise eligible to utilize Article V, Section 20 of the General Ordinances related to Brownfields Tax Abatement Agreements;

(c) Be zoned for commercial or industrial use; and

(d) Be the subject of a clean-up and remediation plan that at a minimum complies with M.G.L. c. 21E and the Massachusetts Contingency Plan, 310 CMR 40.0000 (the "MCP") and which allows for the continued use of the property for commercial or industrial uses. The compliance of said clean-up and remediation plan shall be ascertained by the City's Licensed Site Professional or equivalent paid for by the property owner, and shall be confirmed in writing by the mayor or his/her designee.

28.3 Payment Agreements

28.3.1 The Treasurer or Chief Financial Officer is hereby authorized to negotiate agreements for the reduction of interest that has accrued on the amount of the tax title account (hereinafter, "Payment Agreements") with owners of eligible properties, the terms of which Payment Agreements shall be subject to approval by the mayor for reductions not exceeding $500,000. Reductions above this amount shall also be subject to approval of the council.

28.3.2 Payment Agreements may allow for the reduction of not more than thirty-five percent (35%) of the interest that has accrued on the tax title account.

28.3.3 Such Payment Agreements shall be for a maximum term of no more than three (3) years and require a minimum payment at the inception of the agreement of twenty-five percent (25%) of the total amount needed to redeem the parcel.

28.3.4 During the term of the Payment Agreement, the Treasurer or Chief Financial Officer may not bring an action to foreclose the tax title unless payments are not made in accordance with the schedule set out in the Payment Agreement or timely payments are not made on other amounts due to the City relative to the same parcel.

28.3.5 Payment Agreements shall include, but not be limited to:

(a) The amount of outstanding real estate taxes;

(b) The statutory interest to accrue;

(c) The description of quantifiable monthly payments;

(d) The inception date of monthly payments;

(e) The date of the final payment;

(f) Contractual late fees to be imposed;

(g) The amount and percentage of the reduction of interest (not to exceed 35%) that will occur provided that the recipient complies with all terms of the Payment Agreement;

(h) A statement that any reduction in the interest authorized by this subsection shall be contingent upon the recipient's fulfillment of all terms of the Payment Agreement, including making all payments required by such Payment Agreement in a timely manner;

(i) Such Payment Agreement shall further provide that all interest and penalties will become due in full should the recipient fail to comply with all terms of the Payment Agreement;

(j) A requirement that the property owner will provide the City with a copy of all reports submitted to the Massachusetts Department of Environmental Protection within seven (7) days of receipt;

(k) A requirement that the property owner will pay for the services of a Licensed Site Professional ("LSP") or equivalent, retained by the City to assist the City in evaluating whether the clean-up and remediation plan for the property at a minimum complies with M.G.L. c. 21E and the Massachusetts Contingency Plan, 310 CMR 40.0000 (the "MCP") and which allows for the continued use of the entire property for commercial or industrial uses. The amount of such payment shall be agreed upon between the City and the property owner; and

(l) Any and all other contractual terms as arranged between the Treasurer or Chief Financial Officer and the property owner, and as approved by the mayor, and the council if necessary, as set forth in Section 28.3.1 herein.

28.4 All Payment Agreements shall be signed by the mayor and the property owner, whose signatures shall be notarized.

28.5 Copies of all Payment Agreements shall be provided to the mayor and the property owner.

Section 29. (Deleted: April 26, 2016 Town Meeting, Article 43)

Section 30. Registration and Maintenance of Foreclosed Properties

30.1 Purpose; Enforcement Authority

(1) Unsecured and un-maintained foreclosed properties present a danger to the safety and health of the public, occupants, abutters, neighbors, and public safety officers. It is the purpose and intent of this Ordinance to protect and preserve public safety, health, welfare and security, and the quiet enjoyment of occupants, abutters and neighbors, and to minimize hazards to public safety personnel inspecting or entering such properties by:

a. requiring all residential, commercial, and industrial property owners, including lenders, trustees and service companies, to register and maintain foreclosed properties with the City of Framingham; and by

b. regulating the maintenance and security of foreclosed properties to help prevent blighted and unsecured properties.

(2) The Building Commissioner of the City of Framingham is empowered to enforce this Ordinance.

30.2 Definitions

When used in this Ordinance, the following terms shall have the following meanings, unless a contrary intention clearly appears:

(1) "Vacant" means a residential, commercial or industrial property which has not been actively used or occupied within the preceding sixty days. This definition does not include property that is unoccupied while undergoing renovations, or while undergoing repairs due to fire or other casualty, or to residential property that is temporarily vacant due to seasonal absences.

(2) "City" means the City of Framingham

(3) "Commissioner" means the Building Commissioner of the City of Framingham or his/her designee.

(4) "Days" means consecutive calendar days.

(5) "Foreclosed" means a residential, commercial or industrial property, placed as security for a real estate loan, as to which all rights of the mortgagor or his grantee in the property have been terminated as a result of a default of the loan.

(6) "Foreclosing" means the process by which a property, placed as security for a real estate loan, is prepared for sale to satisfy the debt if the borrower defaults.

(7) "Local" means within twenty miles of the property in question.

(8) "Mortgagee" means the creditor, including but not limited to service companies, lenders in a mortgage agreement, or any successor in interest and/or assignee of the mortgagee's rights, interests or obligations under the mortgage agreement.

(9) "Owner" means every person, entity, service company, property manager or real estate broker who alone or severally with others has legal or equitable title to any property or has care, charge or control of any property in any capacity, including but not limited to agent, executor, executrix, administrator, administratrix, trustee or guardian of the estate of the holder of legal title; or mortgagee in possession of any such property; or is an agent, trustee or other person appointed by the courts and vested with possession or control of any such property; or is an officer or trustee of the association of unit owners of a condominium. Each such person is bound to comply with the provisions of these minimum standards as if he/she were the owner. However, this Ordinance shall not apply to a condominium association created pursuant to M.G.L. c. 183A to the extent that such association forecloses on or initiates the foreclosure process for unpaid assessments due or owing to the association. "Owner" also means every person who operates a rooming house or is a trustee who holds, owns or controls mortgage loans for mortgage-backed securities transactions and has initiated the foreclosure process.

(10) "Property" means any residential, commercial or industrial property or portion thereof, located in the City of Framingham, including but not limited to buildings and structures situated on the property; excepted from this definition is any and all property owned by the City, the state, or the federal government.

(11) "Residential Property" means any property that contains one or more units used, intended, or designed to be occupied for living purposes.

30.3 Registration

(1) All owners of foreclosed properties shall register such properties with the Commissioner on forms provided by the Commissioner within seven days of the date of foreclosure. If the owner is an out-of-state corporation, person, or other entity, the owner shall appoint an in-state agent authorized to accept service of process and other documents under this Ordinance.

a. Each registration must state the owner's or agent's name, telephone number and mailing address located within the Commonwealth of Massachusetts including name of owner, street number, street name, city or town, and zip code; the mailing address shall not be a post office box.

b. Each registration must also certify that the property has been inspected by the owner and must identify whether the property is vacant. Each registration must designate a property manager, who shall be a local individual or local property management company responsible for the maintenance and security of the property. This designation must state the individual or company's name, direct telephone number, and local mailing address; the mailing addresses shall not be a post office box. The property manager shall be available twenty-four hours per day, every day, by telephone and/or electronic mail notification, and shall respond to all notifications from the Commissioner to secure, maintain, inspect or repair the property within 24 hours.

(2) All property registrations pursuant to this section are valid for one calendar year from the date when the registration is received by the Commissioner. An annual registration fee of one hundred dollars ($100.00) must accompany the registration form. Subsequent registrations and fees are due within thirty days after the date of the expiration of the previous registration. Subsequent registrations must certify whether the property remains in foreclosure.

(3) Any owner that has registered a property under this section must report any change in information contained in the registration within ten days of the change.

(4) Once the property is sold, the owner shall provide the Commissioner with written proof of sale.

30.4 Maintenance and Security Requirements

(1) Properties subject to this Ordinance must be maintained in accordance with the State Building Code, sanitary code, and City Ordinances. The owner or property manager must inspect and maintain the property on at least a monthly basis for as long as the property is vacant.

(2) The owner shall maintain properties subject to this section, including but not limited to maintaining and keeping in good repair any building(s), structure(s), and improvements, the removal of trash and debris, and the regular mowing of lawns, pruning and/or trimming of trees and shrubbery, and upkeep of other landscape features.

(3) The owner shall repair or replace broken windows or doors within thirty days of breakage. Boarding up doors and windows is prohibited except as a temporary measure for no longer than thirty days.

(4) In accordance with state law, including but not limited to Massachusetts General Laws chapter 143 sections 6 through 10 and the State Building Code, property that is vacant must be safe and must be secured from exposure to the elements and so as not to be accessible to unauthorized persons.

(5) Compliance with this section does not relieve the owner of any applicable obligations set forth in regulations, covenant conditions and restrictions, and/or homeowner's association rules and regulations.

30.5 Inspections

Pursuant to the State Building Code, the Commissioner or his/her designee shall have the authority and the duty to inspect properties subject to this Ordinance for compliance with this Ordinance and to issue citations for any violations. The Commissioner or his/her designee shall have the discretion to determine when and how such inspections are to be made, provided such determination is reasonably calculated to ensure that this Ordinance is enforced.

30.6 Penalties

(1) In addition to any other means of enforcement available to the Commissioner, the Commissioner may enforce this Ordinance by means of noncriminal enforcement pursuant to Massachusetts General Laws chapter 40 section 21D. The following penalties are established for purposes of said noncriminal disposition:

a. A failure to initially register with the Commissioner pursuant to section 30.3: three hundred dollars ($300.00).

b. A failure to properly designate the name of the local individual or local property management company responsible for the maintenance and the security of the property pursuant to section 30.3: three hundred dollars ($300.00) for each violation, and a like penalty for each day's continuation of such violation.

c. A failure to maintain and/or to secure the property pursuant to section 30.4: three hundred dollars ($300.00) for each week during which the property is not maintained and/or not secured in compliance with section 30.4.

(2) The penalties provided in this section shall not be construed to restrict the City from pursuing other legal remedies available to the City. Violation of this Ordinance shall be subject to a fine not to exceed three hundred dollars for each violation; each day shall be considered a new violation.

30.7 Appeals

Any persons aggrieved by the requirements of this Ordinance or by a decision issued hereunder may seek relief in any court of competent jurisdiction as provided by the laws of the Commonwealth.

30.8 Applicability

If any provisions of this Ordinance impose greater restrictions or obligations than those imposed by any general law, special law, regulation, rule, ordinance, order or policy, then the provisions of this Ordinance shall control.

30.9 Severability

If any provision of this Ordinance is held to be invalid by a court of competent jurisdiction, then such provisions shall be considered separately and apart from this Ordinance's remaining provisions, which shall remain in full force and effect.

Section 31. Municipal Liens Ordinance: Municipal Charges, Fees and Fines

This Ordinance is adopted pursuant to Chapter 19 of the Acts of 2013 for the purpose of protecting the public health, safety and welfare by providing a more effective means of enforcing the Ordinances to address properties that are a nuisance, blighted, or otherwise in violation of Ordinances in order to encourage the maintenance of properties within the town in a clean and safe condition.

31.1 Municipal Charges, Fees and Fines

The City of Framingham may impose a lien on property located within the City for any local charge, fee or fine that has not been paid by the due date, but only for those local charges, fees, and fines that are enumerated in this Ordinance. This lien shall be known as a municipal charges lien. For purposes of this Ordinance, local charge, fee or fine shall mean any charge, fee or fine imposed by the City under City ordinances, City regulations, statutes or state regulations and any charge, fee or fine imposed by a state court payable to the City as a result of any action initiated by City officials to enforce City ordinances, City regulations, statute or state regulations, but only for those local charges, fees, and fines that are enumerated in this Ordinance.

Municipal charges and fees shall include all costs and fees incurred by the City for remediation of a property that is in violation of any ordinance, regulation, or statute set forth in this Ordinance, including but not limited to:

(a) Trash & Debris clean up charges (labor)

(b) Trash & Debris clean up charges (dumpster)

(c) Securing Structure (boarding up)

(d) Demolition (labor, materials, and dumpster)

(e) Power Washing

(f) Painting Graffiti (labor & materials)

(g) Overgrown Vegetation (cutting, clearing, & cleaning.

(h) Recording Fees (Reg. of Deeds)

(i) Towing Charges (from private property)

(j) Pest Control & Exterminating Charges

31.2 Eligible charges, fees and fines

Municipal charges liens may be imposed under this Ordinance for unpaid charges, fees and fines only under the following City ordinances, City regulations, statutes or state regulations:

General Ordinances

Article V, Section 18, Framingham Wetlands Protection Ordinance

Article V, Section 22, Nuisance Ordinance

Article V, Section 24, Ordinance Concerning Lodging Houses

Article VI, Section 3, Unregistered Cars

Article VI, Section 4, Rubbish and Refuse

Zoning Ordinances

State Statutes and Regulations

State Building Code 780 CMR

Fire Code 527 CMR

State Sanitary Code, 105 CMR 410 (Minimum Standards of Fitness for Human Habitation)

General Laws chapter 40, Section 41D (Non-criminal disposition)

General Laws chapter 111, Section 31C (Atmospheric pollution)

General Laws chapter 111, Sections 122-125 (Nuisances)

General Laws chapter 111, Section 127A (State Sanitary Code)

General Laws chapter 111, Section 127B (Dwellings Unfit For Human Habitation)

General Laws chapter 131, Section 40 (Wetlands Protection Ordinance)

General Laws chapter 139, Section 3 (Dilapidated Buildings)

General Laws chapter 143, Sections 6-9 (Dilapidated Buildings)

General Laws chapter 148A (Building and Fire Code)

31.3 Recording of Lien

A lien authorized under this act shall take effect upon recording of the unpaid municipal charge, fee or fine, by parcel of land and by the name of the property owner assessed for the fine in the southern district of the registry of deeds of Middlesex County.

31.4 Commitment of Charge, Fee or Fine

If a charge, fee or fine, which is secured by a municipal charges lien, remains unpaid when the assessors are preparing a real estate tax list and warrant to be committed under General Laws chapter 59, §53, then the board or officer in charge of the collection of the municipal charge, fee or fine shall certify such charge, fee or fine to the assessors, who shall add the charge, fee or fine to the tax on the property to which it relates and commit it with the warrant to the collector of taxes as part of the tax.

31.5 Exempt Properties

If the property to which such charge, fee or fine relates is tax exempt, the charge, fee or fine shall be committed as the tax.

31.6 Discharge of Lien

A lien under this section may be discharged by filing in the southern district of the registry of deeds of Middlesex County, a certificate from the tax collector that all municipal charges, fees or fines constituting the lien, together with any interest and costs thereon, have been paid or legally abated.

31.7 Costs

All costs of recording or discharging a lien under this act shall be borne by the owner of the property.

Section 32. Water & Sewer Pricing System Ordinance

32.1 Purpose

The City of Framingham, for the purposes of water conservation, water resource management, water resource planning and comprehensive financial management, hereby enacts this ordinance to provide a rate structure which includes the costs of the provision of water and sewer services to the residents and industrial and commercial users of Framingham receiving said services.

32.2 Costs

The definition of "costs" as used in this section shall include, but no be limited to, costs of pipe and related appurtenances, costs of facilities associated with the City's water and sewer services, including without limitation pumping and storage facilities, replacement stock for water and sewer, costs relating to the replacement and repair thereof, including street work, maintenance of all facilities, equipment and related appurtenances necessary for the provision of water or the removal of wastewater services, all costs relating to MWRA charges to the City for both water and sewer, all costs relating to the metering of water, all related costs of police and fire protection, all administrative costs relating to the collection of said water and sewer financing expenses and related costs associated with capital improvements to said systems, all costs relating to the personnel of the departments, all costs for other City departments and resources assisting or supporting water and sewer activities, as well as any long-term planning costs for the continued provision of said services, and any costs of land acquisition relating to long-range planning and future water supply development or wastewater treatment facilities.

32.3 Adjustments to Rate Structure; Public Hearing

Adjustments or changes to the rate structure may be made from time to time based on the costs incurred or anticipated to be incurred by the City for the provision of water and sewer services. Any such adjustments or changes to the rate structure shall be consistent with applicable state law and regulations, and may be authorized by the mayor only after a public hearing, which shall be held by the mayor, Chief Financial Officer or Public Works Division Head.

Town of Framingham
Board of Health

RULES AND REGULATIONS RELATIVE TO ILLICIT DISCHARGES INTO MUNICIPAL STORM DRAIN SYSTEM

These regulations are adopted in accordance with the authority granted by the General Laws of the Commonwealth of Massachusetts, Chapter 111, Section 31

TOWN OF FRAMINGHAM
REGULATIONS FOR ILLICIT DISCHARGES TO MUNICIPAL SEPARATE STORM SEWER SYSTEM

SECTION I - GENERAL PROVISIONS

A. Authority

These Regulations are promulgated by the Town of Framingham Department of Public Works, Conservation Commission, Department of Building Inspection, and Board of Health ("the Applicable Authority") pursuant to the authority granted under Article V, Section 26 "Illicit Discharges to Municipal Separate Storm Sewer System" of the Town of Framingham General Bylaws ("the Bylaw"). These Regulations shall complement and apply the Bylaw to particular circumstances, and will have the force and effect of law upon their effective date.

The failure of these Regulations to address all aspects of the Bylaw, or a legal declaration of their invalidity by a court of law, shall not act to suspend or invalidate the effect of the Bylaw. Moreover, to the extent that any provision or section of these Regulations are deemed invalid by a court of competent jurisdiction, the remaining provisions of said Regulations shall remain in full force and effect to the extent permitted by law.

B. Purpose

The purpose of these Regulations is to define and clarify the process and standards applied under the Bylaw to Town of Framingham's municipal separate storm sewer system (MS4) by establishing definitions and uniform procedures by which the Applicable Authority may carry out its responsibilities under the Bylaw. Terms and definitions used herein are consistent with usage in the Bylaw, unless otherwise provided herein.

C. Jurisdiction

The Bylaw protects the MS4, which includes 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 Town of Framingham.

In addition, the Bylaw protects watercourses and wetlands, which are natural or man-made channels through which water flows, including streams, rivers, brooks or underground streams, and all wetlands and waters as defined in the Framingham Wetlands Protection Bylaw, Article V, Section 18.2.

D. Definitions

Definitions are as set forth in the Bylaw except as follows.

Applicable Authority: The employees and/or agents of the Department of Public Works, Conservation Commission, Department of Building Inspection, and Board of Health designated to enforce these regulations. The Applicable Authority may designate employees or agents to enforce these Regulations.

SECTION II - PROCEDURES

A. Notification of Spills

As soon as a person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of or suspects a release of materials at that facility or operation resulting in or which may result in discharge of pollutants to the municipal drainage system, the person shall take all necessary steps to ensure containment, and cleanup of the release. In the event of a discharge of prohibited materials, the reporting person shall notify the Applicable Authority no later than the next business day. The reporting person shall provide to the Applicable Authority written confirmation of all telephone, facsimile or in-person notifications within five business days thereafter.

As soon as a person who is not responsible for a facility or residence or operation has information about or suspects a release of materials at a facility or residence, the release should be reported to the Applicable Authority. The report should include the date, time, and location of the release; a description of the release; any information that may identify the responsible person(s); and the name and telephone of the person reporting the information for follow-up confirmation.

In addition, existing notification practices will continue to be used. The Fire Department responds to notifications of spills with follow-up notification to the appropriate federal agencies, state agencies, and to the Applicable Authority; and with coordination of cleanup as appropriate. The Police Department responds to notifications of spills using the M.G.L Chapter 270, Section 16 process. If the spill is hazardous, it is reported to the Fire Department. If it is non-hazardous, it is reported to the Applicable Authority.

B. Notification of Illicit Connections

As soon as a person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of or suspects an illicit connection resulting in or which may result in discharge of pollutants to the municipal drainage system, the person shall take all necessary steps to ensure removal of the connection. The reporting person shall notify the Applicable Authority no later than the next business day following detection of the connection. The reporting person shall provide to the Applicable Authority written confirmation of all telephone, facsimile or in-person notifications within five business days thereafter.

As soon as a person who is not responsible for a facility or residence or operation has information about or suspects an illicit connection resulting in or which may result in discharge of pollutants to the municipal drainage system, the release should be reported to the Applicable Authority. The report should include the date, time, and location of the release; a description of the connection; any information that may identify the responsible person(s); and the name and telephone of the person reporting the information for follow-up confirmation.

SECTION III - ENFORCEMENT

The Applicable Authority shall enforce these regulations and violation notices, and may pursue all civil and criminal remedies for such violations according to the rules and regulations established within his/her governing Department, Board, or Commission.

A. Response to Reports of Illicit Discharges

1. The Applicable Authority will review records and available resources/tools and conduct a site visit. If the responsible party does not grant permission for the Applicable Authority to observe the alleged violation from the premises, the Applicable Authority will make observations from a public location (street or town property) and/or from an adjacent property with that landowner's permission. The Applicable Authority will take photographs and detailed notes, and determine whether or not there is an illicit discharge violation and, if so, what type of violation it is.

2. These Regulations do not constitute an obligation that the Applicable Authority performs removal and disposal of the discharged material, even if no responsible party is determined.

B. Monitoring of Industrial or Construction Activity Discharges.

This Section applies to all facilities that have storm water discharges associated with industrial activity, including construction activity as regulated under NPDES permits.

1. Access to Premises – The Applicable Authority shall be permitted to enter and inspect premises subject to regulation under this Bylaw as often as may be necessary to determine compliance with this Bylaw. If a discharger has security measures in force which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to the Applicable Authority.

2. Facility operators shall allow the Applicable Authority ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge storm water, and the performance of any additional duties as defined by state and federal laws.

3. The Applicable Authority shall have the right to set up on any premises such devices as are necessary in the opinion of the Applicable Authority to conduct monitoring and/or sampling of the premises' storm water discharge.

4. The Applicable Authority shall have the right to require the discharger to install monitoring equipment as necessary. The discharger's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense. All devices used to measure storm water flow and quality shall be calibrated to ensure they are accurate.

5. Any temporary or permanent obstruction to safe and easy access to the premises to be inspected and/or sampled shall be promptly removed by the operator at the written or oral request of the Applicable Authority and shall not be replaced. The costs of clearing such access shall be borne by the operator.

6. Delays in allowing the Applicable Authority access to premises is a violation of a written storm water discharge approval and of the Bylaw. A person who is the operator of a facility with a NPDES permit to discharge storm water associated with industrial activity commits an offense if the person denies the Applicable Authority ready access to the premises for the purpose of conducting any activity authorized or required by this Bylaw.

7. If the Applicable Authority has been refused access to any part of the premises from which storm water is discharged, and he/she is able to demonstrate probable cause to believe that there may be a violation of the Bylaw, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with the Bylaw or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the Applicable Authority may seek issuance of a search warrant from any court of competent jurisdiction.

C. Types of Violations

1. Violations

   a. Discharge of any prohibited material to the MS4.

   b. Repeat violations.

   c. Illicit connections to the MS4.

2. Violations Deemed a Public Nuisance - Any condition caused or permitted to exist in violation of any of the provisions of these regulations is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

D. Addressing Violations

1. Actions taken to resolve violations under the Bylaw may include, but are not limited to:

   a. Notice of Violation signed and issued by the Applicable Authority.

   b. As an alternative to initiating criminal proceedings, violations of this regulation may be enforced in a manner provided in M.G.L. c. 40, Sect. 21D, by the Applicable Authority. Any penalty imposed under the provisions of the Bylaw shall enure to the Town of Framingham for such uses as the Town may direct. Penalties do not include costs for abatement of violations.

   c. Suspension of storm drainage system access due to illicit discharge in emergency situations. Under the Bylaw, the Applicable Authority may suspend municipal storm drain system access 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. The Applicable Authority will notify a violator of the termination of its MS4 access as part of the Notice of Violation following the suspension of access.

      A person commits a violation of the Bylaw if the person reinstates MS4 access to premises terminated pursuant to this Section, without the prior written approval of the Applicable Authority. The Town will not reinstate suspended services or MS4 access to the violator until the violator presents proof, satisfactory to the Applicable Authority, that the non-complying discharge has been eliminated and its cause determined and corrected.

d. Requirements for Remediation of Illicit Actions, including:

(i) elimination of illicit connections or discharges to the MS4;

(ii) performance of monitoring, analyses, and reporting;

(iii) cessation of unlawful discharges, practices, or operations;

(iv) remediation of contamination in the illicit connection or discharge;

(v) payment to cover administrative and remediation costs; and

(vi) implementation of source control or treatment Best Management Practices (BMPs).

2. Defenses

a. It is an affirmative defense to any enforcement action for a violation that the discharge was composed entirely of one or more of the exemptions stated in the Bylaw.

b. No affirmative defense shall be available under subsection (a) if:

(i) The discharge or flow in question has been determined by the Applicable Authority to be a source of a pollutant or pollutants to the waters of the United States or to the MS4;

(ii) Written notice of such determination has been provided to the discharger; and

(iii) The discharge has continued after the expiration of the time given in the notice to cease the discharge.

3. Entry to Perform Duties. To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Applicable Authority may enter upon privately owned property for the purpose of performing their duties under these regulations and may make or cause to be made such examinations, surveys or sampling as the Applicable Authority deems reasonably necessary.

E. Procedures for Abatement of Violations

The Applicable Authority will take steps to bring Violations into compliance according to the rules and regulations established within his/her governing Department, Board, or Commission.

Any Person determined by the Applicable Authority to be responsible for an illicit discharge may be held responsible for cleaning the impacted portions of the storm water system according to Town standards and requirements or paying the cost for such cleaning.

F. Factors in Determining the Issuance of Penalties

The Applicable Authority shall consider the following factors in imposing penalties.

1. Whether the violation was willful or negligent;

2. Actual and potential harm to the public interests (as described in the Bylaw and regulations), safety, or the environment resulting from the violation;

3. Actual and potential cost to the Town of Framingham resulting from the violation, including its enforcement costs and attorneys fees;

4. Actual and potential damages suffered by the Town of Framingham or any person(s), resulting from the violation, including its enforcement costs and attorneys fees;

5. Whether the violator took steps to prevent the violation(s);

6. Whether the violator promptly took steps to come into compliance after the occurrence of the violation(s);

7. Whether the violator took steps to remedy and mitigate whatever harm occurred as a result of the violation(s); and

8. Any history of noncompliance by the violator.

G. Approvals

These Regulations were approved by the applicable governing bodies (Conservation Commission, Board of Health, Building and Wire, and Pubic Works).

APPENDIX F

SSO INVENTORY

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
1550 Worcester Rd	Ground Surface (no release to surface water)	8/1/2013	11:30am - 12:00pm	50	Pump Station Failure	The Sewage Pump Station at Gates St. was having work performed on two of their pumps. Upon completion of this work, a test of the pumped was conducted. Both pumps operating at the same time	n/a
Eaton Rd Cul de Sac	Ground Surface (no release to surface water)	8/7/2013	11:30am - 11:45am	100	Pump Station Failure, Other - Bypass pump valve malfunction by Contractor	Bypass pump was shut down. Repair to damaged valve was completed and bypass pump was retord to normal working condition, area was completely cleaned and disinfected, bpass pump valve repaired by contractor	Sewer Department was called to Easton Rd. Cul De Sac for clean and disinfection of small sewage spoll of approximately 100 gallons due to bypass pump malfunction. Area was completely cleaned and disinfected and bypass pump valve was repaired.
892 Concord St	Backup ino Property Basement	9/3/2013	09:30am - 10:15am	100	Sewer system blockage, sewer main was stopped	Jetted and freed the blockage, system was returned to normal function, the area will be cleaned and disinfected by the owner, entire area of sewer blockage was completely cleaned and video inspected	The sewer department was called to #892 Concord St for sewage entering residence through basement pipe. The sewer main was jetted and freed returning normal service. Immediately after, the entire area of the blockage was completely cleaned and video inspected. Roots were found to be the cause of the blockage. The roots were removed
1 Worcester Rd	Ground Surface (no release to surface water)	10/22/2013	03:00pm - 03:30pm	50	Sewer system blockage, grease blockage	Private contractor jetted and freed the private sewer system, Property owners must clean and video inspect private sewer systems and provide the town with a scheduled cleaning maintenance plan	on 10/22/2013 the Framingham Police called for a water leak on the private roadwa at #1 Worcester Rd. This property is also known as Shopper's World. Upon ariival it was determined that this was a huge sewage issue. Owners of property were notified and private cleaning contractor jetted and freed the private sewer system. Complete cleaning and video inspection of private sewer system is to follow.
134 Beaver St	Backup ino Property Basement	11/25/2013	08:00pm - 10:00 pm	75	Sewer system blockage, grease blockage	Jetted and freed the sewer main, resident cleaned and disinfected affected area's, on 11/26/2013 the sewer main was completely cleaned and video inspected	On 11/25/2013 the sewer department was called to #134 Beaver St for a sewage backup into the basement. The sewer crew jettted and freed the sewer main. On 11/26/2013 the entire length of Beaver St was comepltely cleaned and video inspected and service was restored to normal.
161 Worcester Rd	Catch Basin to Receiving Water	11/28/2013	05:00pm - 06:00pm	1000	Sewer system blockage, grease blockage	Jetted and freed the sewer main, area was cleaned and disinfection. Sewer main was jetted and free on 11/28/2013 by the Framing Sewer Dept. the area was cleaned up and disinfected	This is a private sewer main the town of Framingham is going to contact owner to resolve issue in the future.
75 Fountain St	Backup ino Property Basement	12/1/2013	12:00pm - 04:00pm	1000	Sewer system blockage, grease blockage	Jetted and freed the sewer main, area was cleaned and disinfected, sewer main waas jetted and freed on 12/1/2013 by the Framingham Sewer Dept. Service Master was on location 12/1/2013 for clean up and disinfection	Town of Framingham scheduled complete cleaning and video inspection of problem area of the sewer main on 12/2/2013. service was restore to normal condition.
31 Waybossett Ave	not specified	1/17/2014	09:00pm - 09:30pm	100	Sewer system blockage, grease blockage	Jetted and freed the sewer main, resident was to call private cleaning co. to clean and disinfect affected areas, sewer main was jetted and freed on 1/17/2014 by the framingham sewer department, complete cleaning and video inspection of the sewer main has been scheduled	Minor grease blockage was removed by the Framingham Sewr Dept. Complete cleaning and video inspection has been scheduled
Cushing Parking Easement	Ground Surface (no release to surface water)	1/23/2014	08:00am - 08:30am	100	Sewer system blockage, grease blockage	Jetted and freed the sewer main, area was cleaned and disinfected, sewer main was jetted and freed on 1/23/2014 by the Framingham Sewer Dept	The line has been scheduled to be cleaned and CCTV
100 Western Ave	not specified	1/23/2014	02:40pm - 06:00pm	100	Pump station Failure	Pump Station department was notified of problem with pump station failure. Within 10 minutes the problem was corrected and service was restored to normal, area was cleaned and disinfected, pump station service was restored	The pump station on the Town of Framingham DPW Building property was in failure as a result of a minor blockage which was corrected by Pump station department. Serice was restored to normal and affected area was cleaned and disinfected.
802 Worcester Rd	Catch Basin to Receiving Water	1/30/2014	09:30am - 10:30am	1000	Sewer system blockage, grease blockage	Jetted and freed the sewer main, area was cleaned and disinfected, sewer main was jetted and free on 1/30/2014 by the Framingham Sewer Dept for clean up and disinfection	the Wastewater Dept. responded to 802 worcester rd for a manhole overflowing. Upon arrival the crew found the sewer main was stopped, the crew jetted and freed the line. The area was them cleaned and disinfected. The line has been scheduled to be cleaned and CCTV on 1/3/2014. the affected catch basin and lines were cleaned and dininfected on 1/30/2014

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
Intersection of Arbetter Dr. and Gregory Rd	not specified	2/20/2014	10:00am - 10:10am	100	Sewer system blockage	Jetted and freed the sewer main, area was cleaned and disinfected, sewer main was jetted and freed on 2/20/2014 by the framingham sewer department for clean up and disinfection	The sewer dept. jetted and freed a stopped sewer main with an overflowing manhole at the intersection of Arbetter Dr. and Gregory Rd. The area was cleaned and disinfected. This sewer main has been scheduled for a complete cleaning and video inspection
55 Curtis Rd	not specified	3/14/2014	04:00pm - 04:30pm	30	Sewer system blockage, grease blockage	Jetted and freed the sewer main, Resident was to call private cleaning company to clean and disinfect affected areas, sewer amin was jetted and freed on 3/14/2014 by te Framingham Sewer Dept. Complete cleaning and CCTV inspection of the sewer main has been scheduled for 3/17/2014	n/a
33 Ruthellen Rd	not specified	3/31/2014	07:00am - 5:30 pm	<10000	Rain event, Insufficient Capacity in the System	Monitor situation until rain stopped and water receeded, area cleaned and disinfected, clean up and disinfection after water dropped to normal level	The Sewer Dept. was notified of an overflowing sewer manhole in ront of #33 Ruthellen Rd. Heavy rainfall and insufficient capacity were the cause of the problem. After the water levels in the sewer system dropped to normal,the area was cleaned and disinfected.
College Parking Lot at Maple St and State St	not specified	3/31/2014	07:00am - 06:15pm	<10000	Rain event, Insufficient Capacity in the System	Monitor situation until rain stopped and water receeded, area was cleaned and disinfected, clean up and disinfection after water dropped to normal level	The Sewer Dept. was notified of an overflowing sewer manhole at the parking lot for Framingham State College Maple St @ State St. Heavy Rainfall and insufficient capacity were the cause of the problem. After the water levels in the sewer system dropped to normal, the area was cleaned and disinfected.
Bosworth Rd @ Pleasant St @ State St	not specified	3/31/2014	07:00am - ?	>10000	Rain event, Insufficient Capacity in the System	Monitor situation until rain stops and water receeds, area will be cleaned and disinfected, clean up and disinfection after water drops to normal level	The sewer department was notified of an overflowing sewer manhole at Bosworth Rd. @ Pleasant St Heay rainfall and insufficient capacity were the cause of the problem. After the water levels in the sewer system drop to normal, the area will be cleaned and disinfected
95 Colonel James H. Halpin Way	Catch Basin to Receiving Water	6/8/2014	7:30pm - 8:30 pm	1000	Sewer system blockage, grease blockage	Jetted and freed sewer siphon, area was cleaned and disinfected, The wastewater dept repsonded to 95 Coloneal James h Halpin way for a manhole overflowing. Upon arrival the crew found the sewer main was stopped, The crew jetted and cleaned the siphon	n/a
4 Old Wood Rd	Backup ino Property Basement	6/10/2014	09:00pm - 09:30pm	25	Sewer system blockage, grease blockage	Jetted and freed the sewer main, resident called private cleaning company to clean and disinfect affected area, sewer main was jetted and freed on 6/10/2014 by the Framingham Sewer Department. The line has been scheduled to be cleaned and CCTV inspected on 06/11/2014	n/a
73 Henry St	not specified	7/9/2014	06:00pm - 07:00pm	100	Sewer system blockage	Jetted and freed the sewer main, area was cleaned and disinfected, Sewer main was jetted and freed on 7/9/2014 by the Framginham Sewer Dept then cleaned up and disinfected	The sewer dept. Jetted and freed a stopped sewer main with an overflowing manhole at #73 Henry St. The area was cleaned and disinfected. This sewer main has been scheduled for a complete cleaning and video inspection
Intersection of Wickford St and Linda Ave	not specified	7/9/2014	10:00pm - 02:30am	100	Sewer system blockage	Jetted and freed the sewer main, area was cleaned and disinfected, sewer main was jetted and freed on 7/9/2014 by the framingham sewer dept. then cleaned up and disinfected	The Sewer Dept. Jetted and freed a stopped sewer main with an overflowing manhole at the intersection of Wickford St and Linda Ave. The area was cleaned and disinfectd. The sewer main has been scheduled for a complete cleaning and video inspection
121 Concord St (Pho Dakao)	Backup into Property Basement	10/6/2014	08:00pm - 09:00pm	35	Sewer system blockage, grease blockage	Private draing cleaning company on site, resident called private cleaning company to clean and disinfect affected area, sewer main was down and rnning.Private sewer latteral was blocked. Property owner had drain cleaning company on site. This was a private issue	n/a
1012 Waverley St	Catch Basin to Receiving Water	10/28/2014	08:00am - 06:30pm	250	Sewer system blockage, grease blockage	Private Drain Cleaning co. jetted and freed the private sewer main, resident called private cleaning company to clean and disinfect affected area, this is an issue which needs to remedied, This is a private sewer main which needs to be repaired.	n/a

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
22 Walnut St	Backup into Property Basement	10/31/2014	09:00am - 09:30am	50	Sewer system blockage, grease blockage	Jetted and freed the sewer main, resident called private cleaning company to clean and disinfect affected areas, sewer main was jetted and freed on 10/31/2014 by the Framingham Sewer Department. The line has been scheduled to be cleaned and CCTV inspected on 11/3/2014	n/a
635 Winter St	not specified	11/17/2014	09:00am - 10:00am	<1000	Sewer system blockage, grease blockage	Jetted and freed the sewer main, residents were going to call private cleaning Co. to clean and disinfect affected areas, Sewer main was jetted and freed on 11/17/2014 by the Framingham Sewer department, Complete cleaning and video inspection of the sewer main has been scheduled for 11/18/2014	n/a
1651 Worcester Rd	Direct to Receiving Water	11/25/2014	03:00pm - 10:30am	<10000	Sewer system blockage, grease blockage	The sewer dept. jetted and freed the sewer main, area was cleaned and disinfeted, te sewer main was schedule for cleaning and video inspection. Follow up report will be sent when inspection is completed	n/a
1012 Waverely St	Catch Basin to Receiving Water	11/27/2014	10:00am - 06:30pm	250	Sewer system blockage, grease blockage	Private Drain Cleaning co. jetted, freed, and video inspected the private sewer main, resident called Landlord (David 617/417/7567) who called private cleaning company to clean and disinfect affected area,This is an issue which needs to be remedied, this is a private sewer main which needs to be repaired	n/a
213 Central St	Ground Surface (no release to surface water)	12/27/2014	03:30pm - 04:00pm	25	Sewer System Blockage	Property owner to hire drain cleaning company , town jetted past latteral to confirm main was down and running, resident called private cleaning company to clean and disinfect affected area	n/a
1640 Worcester Rd (Bernardi Toyota) 2014 folder	Ground Surface (no release to surface water)	3/13/2015	10:30am - 11:45am	1000	Sewer system blockage, grease blockage	Jetted and freed the sewer main, area was cleaned and disinfected, sewer main was jetted and freed on 3/13/2015 by the Framingham Sewer Dept then cleaned up and disinfeted. Follow up work required	The wastewater Dept. responded to 1640 Worcester Rd for a manhole overflowing. Upon arrival the crew found the sewer main was stopped, the crew jetted and freed the line. The area was then cleaned and disinfected. The line has been scheduled to be sleaned and CCTV when whether conditions are more favorable.
1640 Worcester Rd (Bernardi Toyota) 2015 folder	Ground Surface (no release to surface water)	3/13/2015	10:30am - 11:45am	1000	Sewer system blockage, grease blockage	Jetted and freed the sewer main, area was cleaned and disnfected, sewer main was jetted and freed on 3/13/2015 by the Framingham Sewer Dept. then cleaned up and disinfected. Follow up work required	The wastewater Dept. responded to 1640 Worcester Rd for a manhole overflowing. Upon arrival the crew found the sewer main was stopped, the crew jetted and freed the line. The area was then cleaned and disinfected. The line has been scheduled to be sleaned and CCTV when whether conditions are more favorable.
Belknap Rd @ Woodmere rd	Ground Surface (no release to surface water)	6/9/2015	08:30pm - 09:45pm	100	Sewer system blockage, grease blockage	jetted and freed the sewer main, area was cleaned and disinfected, sewer main was jetted and free on 6/9/2015 by the Framingham Sewer Dept. then cleaned up and disinfected. Follow up work required	The wastewater Dept responded to Belknap Rd @ Woodmere Rd for a manhold overlfowing. Upon arrival the crew found the sewer main was stopped, the crew fettef and freed the line. The area was then cleaned and disinfected The lin was scheduled to be cleaned and CCTV inspected on 6/10/2015
1325 Worcester Rd	Ground Surface (no release to surface water)	8/15/2015	10:30pm - 11:00pm	500	Rain event, Insufficient Capacity in the System	this was a private issue, there was a significant rain event that cause a private system to overflow, byt the time the town arrive on site the water had subsided, area was cleaned and disinfected by propery owner, the towns sewer system in the area had no problems	The wastewater dept responded to 1325 Worcester Rd for sewer backing up out of the floor drains and a first floor toilet during the severe rain. The water has stopped b the time the sewer department arrived. This was a private issue and the towns sewer main remained down and running.
5 Jean st	Ground Surface (no release to surface water)	10/31/2015	8:30am - 09:45am	100	Sewer system blockage, grease blockage	Jetted and freed the sewer main, Area was cleaned and disinfected, Sewer main was jetted and freed on 10/31/2013 by the framingham Sewer Dept. then cleaned up and disinfected the area. Complete cleaning and video inspection scheduled for 11/2/2015	The wastewater dept. responded to #5 Jean St for a manhole overflowing. Upon arrival the crew found the sewer main was stopped, the crew jetted and freed the lie. The area was then cleaned and disinfected. The line was scheduled to be cleaned and CCTV inspectd on 11/2/2015

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
121 Woodland Drive	Ground Surface (no release to surface water)	12/8/2015	08:30am - 09:45am	100	Sewer system blockage, grease blockage	Jetted and freed the private sewer main which is owned by the Mass. Turnpike Authority, Area was cleaned and disinfected, Sewer main was jetted and freed on 12/8/2015 by the Framingham Sewer Dept. then cleaned up and disinfected the area	n/a
100 Pennsylvania Ave	Ground Surface (no release to surface water)	12/9/2015	1:30pm - 2:30pm	100	Sewer system blockage, grease blockage	Jetted and freed the private sewer main which connects 100 Pennsylvania ave, area was cleaned and disinfected, Sewer main was jetted and freed on 12/9/2015 by the Framingham Sewer Dept. then cleaned up and disinfected the area	Met with building maintenance manager Mr. Roel (1-617-839-2363). He has scheduled a complete glean and video inspection of the private sewer system for 12/12/2015. He will submit plan to the Town of Framingham for future maintenance of the private sewer system.
37 Audobon Rd	Backup into Property Basement	1/11/2016	03:00pm - 04:00pm	15	Sewer System Blockage	Sewer main was jetted and vactored to relieve the blockage, Homeowner called cleaning co., The framingham Sewer Department jetted and freed the blockage on 1/11/2016	Small amount of liquid entered basement bathroom through shower drain. The Framingham Sewer Dpeartment has schedulued to clean and CCTV this line
10 Magnolia St	Backup into Property Basement	1/26/2016	11:00pm - 11:30pm	25	Sewer Sytem Blockage	Sewer main was jette and catored to relieve the blockage, Homeowner to call cleaning Co., The framingham Sewer Department jetted and freed the blockage on 1/26/2016	Small amount of liquid enetered basement bathroom through washing machine stand pipe. The Framingham sewer Department has scheduled to clean and CCTV this line.
121 Woodland Drive	Ground Surface (no release to surface water)	2/16/2016	06:00pm - 07:30pm	250	Pump station failure	Pump station power resumed and returned to normal operation, sewer department cleaned and disinfected area	Sewer Pump station lost power. Sewage overflowed out of 2 manholes on woodland Dr. For a short amount of time until power was restored and pump station returned to naormal operation
153 Second St	Backup into Property Basement	5/25/2016	09:30pm - 10:30pm	10	Sewer System Blockage	Sewer main was jetted and actored to relieve the blockage, property manager to call cleaning co., the framingham Sewer Department jetted and freed the blockage on 5/25/2016	Small amount of liquid entered bathrooms through shower drain. The framingham Dewer Department has scheduled to clean and CCTV this line.
145 Pennsylvania Ave	Ground Surface (no release to surface water)	5/25/2016	10:00am - ?	100	Pipe collapse	Private contractor hired to make repair on broken private force main, issue ongoing as of this time, repair to be completed on 5/27/2016, follow up required.	n/a
3 Marian Rd	Backup into Property Basement	6/5/2016	01:30pm - 02:30pm	10	Sewer System Blockage	Sewer main was jetted and vactored to relieve the blockage, the framingham Sewer Department jetted and freed the blockage on 6/5/2016	Small amount of liquid entered basement bathroom though shower drain. The Framingham Sewer Department has scheduled to clean and CCTV this line
42 Linda ave	Backup into Property Basement	6/19/2016	04:00pm - 05:00pm	75	Sewer system Blockage	Sewer main was jetted and vactoed to relieve the blockage, Homeowner contracted emergency cleaning company, Framingham sewer dept jetted and vactored the main to relieve blockage on 6/19/2016	Sewage entered through uncapped unused standpipe in basement. The Framingham Sewer Department has scheduled to clean and CCTV this line on 6/20/2016
10 Alder Ln	Backup into Property Basement	6/23/2016	06:00pm - 10:00pm	50	Sewer System Blockage	Sewer Main was jetted and vactored to relieve the blockage, Homeowner to call cleaning Co., the framingham Sewer Department jetted and freed the blockage on 6/23/2016	Sewage (mostly liquid) entered basement bathroom through floor level cleanout pipe. This Framingham Sewer Department has scheduled to clean and CCTV this line
22 Flutie Pass	Catch Basin to Receiving Water	6/28/2016	1:30pm - 1:45pm	100	Pump station failure	Private Contractor cleaned and disinfected the area. Also cleaned catch basin, Private pump station chamber was cleaned and function was restored to normal	n/a
80A Long Ave	Backup into Property Basement	8/17/2016	10:30am - 11:00am	5	Sewer System Blockage	sewer main was jetted and vactored to relieve the blockage, Homeowner contracted emergency cleaning company, Framingham sewer dept jetted and vactored the main to relieve blockage on 8/17/2016	Sewage entered through basement sink. The Framingham Sewer Department has scheduled to clean and CCTV this line on 8/19/2016
Waverley St @ Second St	Direct to Receiving Water	11/17/2016	09:30am - 10:30am	100	Sewer system blockage, grease blockage	Sewer dept. jetted and freed the sewer main, sewer department cleaned and disinfected area	Sewer Dept. jetted and freed the sewer main of grease blockage. Complete cleaning and video inspection of sewer main scheduled for 11/18/2016
Flutie Pass	Catch Basin to Receiving Water	11/21/2016	02:30pm - 04:45pm	100	Sewer system blockage	Private contractor hired to clean private sewer main, private contractor cleaned and disinfected area, also cleaned catch basin, private sewer main was cleaned and function was restored to normal	n/a
Shoppers World (1 Worcester Rd)	Ground Surface (no release to surface water)	2/21/2017	02:00pm - 02:45pm	100	Sewer System Blockage	Got a call of SSO on private property - upon my arrival the property mgnt company already had a contractor on site working the backup they jetted private main, SSO was on private property and he was going to have his crew handle the minor clean up	was a private main for shoppers world upon my arrival they already had a company there jetting the main and they had the back up freed shortly after my arrival

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
Brook St @ Salvi Drive	not specified	8/25/2017	08:00pm - 09:00pm	100	Sewer System Blockage	The S.M.H @ Brook St @ Salvi Dr has a breather hole in the center of cover was allowing small flow discharge ut - we jetted from down stream M.H. and got a sewer main running - We will be back out next week to swap out the cover with a new cover	n/a
10 Janice Circle	Backup into Property Basement	10/1/2017	09:30pm - 10:00pm	100	Sewer system Blockage	on 10/1/2017 the Wastewater Department was notified of ewage backing into basement at 10 Janice Circle. The sewer crew responded jetted and freed the sewer main. The homeowner was pumping out basement into backyard, complete cleaning and CCTV inspection was scheduled and being completed on 10/2/2017, homeowner had private cleaning company clean basement	n/a
126 Oak Crest Dr	Backup into Property Basement	1/12/2018	07:00pm - 07:30pm	200	Pump Station Failure, other - power outage	Emergency power to station, station went back online, homework will clean/disinfect affected area	n/a
Adams rd @ High St	Ground Surface (no release to surface water)	1/19/2018	01:30pm - 02:00pm	<50	Sewer System Blockage	Jetted main to free blockage	n/a
Wellington @ Alexander St	Ground Surface (no release to surface water)	2/17/2018	07:00pm - 07:30pm	<50	Sewer system Blockage	Jetted main to free blockage	n/a
19 Flagg Dr	Ground Surface (no release to surface water)	4/27/2018	12:00pm - 12:15pm	<50	Pipe collapse	pump station was taken offline, force main was repaired	n/a

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
NPDES MS4 permit effective date July 1, 2018							
55 Proctor Street & 54 Union Ave	Backup into Property Basement	9/10/2018	12:00pm - 12:15pm	<5,000	Sewer system Blockage	Jetted and freed the sewer main. The property owner had a private cleaning company cleaning properties. The City assisted with vactoring out the basement at 55 Proctor St. Cpmplete cleaning and CCTV inpsection was performed that day.	n/a
113 Worcester Rd	Backup into Property Basement	9/19/2018	5:00pm - 5:30pm	<500	Sewer system Blockage	Received a call that sewerage was entering a private property basement, found City main was stopped, jetted main freed blockage	n/a
575 Pleasant St	Ground Surface (no release to surface water)	9/26/2018	3:00 pm - 4:00 pm	<50	Sewer system Blockage	Line was jetted to remove blockage	n/a
89 Maynard Rd	Ground Surface (no release to surface water)	11/12/2018	10:45 pm - 11:15 pm	<1000	Sewer system Blockage (grease blockage)	Line was jetted to remove blockage	n/a
2 Fieldstone Way	Ground Surface (no release to surface water)	11/18/2018	8:15 pm - 9:15 pm	<50	Sewer system Blockage	Line was jetted to remove blockage	n/a
119 Herbert St	Ground Surface (no release to surface water)	11/18/2018	9:00 pm - 9:30 pm	100	Sewer system Blockage (pipe collapse)	Line was jetted to remove blockage; impacted area around manhole was cleaned and disinfected	n/a
Pleasant St @ Belknap Rd	Ground Surface; catch basin to receiving water	11/21/2018	9:00 pm - 1:00 am	<10,000	Rain Event; Insufficient capacity in system	DPW responded to overflowing manhole at Pleasant St @ Belknap Rd on 11/21/18. The DPW coned off the overflowing area until the rain water receeded. The area was cleaned and disinfected. The following week, the DPW inspected and cleaned the system in the area and identified potential modification for short-term mitigation.	DPW has requested funding for FY20 for a study & design to improve the sewer in the Pleasant St area. The study will include investigation of potential sources of infiltration to avoid SSOs in the future.
Shoppers World/ Flutie Pass	Ground Surface (no release to surface water)	1/12/2019	8:00 pm - 9:00 pm	100	Sewer system Blockage	SMH on Flutie Pass discharged small amount into roadway. Blockage was cleared from private manhole on Cochituate. Property manager handled clean up and stated he would have the line properly cleaned.	n/a
2,4,6 Hemenway Rd.	Ground Surface (no release to surface water); Backup into Property Basement	1/14/2019	10:00 am - 10:30 am	<10,000	Sewer system Blockage	Sewer main was jetted to remove obstruction, private common sewer lateral was push cammed, found a break in private common line 51 ft. from manhole in rear of #4 Hemenway Road. The City's sewer main will be cleaned and C.C.T.V, on 01/15/2019	n/a
Worcester Rd Eastbound @ Under Price Way	Ground Surface (no release to surface water)	5/18/2019	3:00 pm - 4:00 pm	<1000	Sewer system Blockage	Line was jetted to remove blockage. A leader hose from a private service was inside a public sewer manhole and impeding flow. The hose was removed on 5/21/19 and the manhole cleared. Impacted area was cleaned & disinfected.	n/a

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
Year 2							
80A Long Ave & Dr. Harvey Cushing Way (easement)	Backup into Property Basement	12/17/2019	5:30 pm - 5:45 pm	<10,000	Sewer system Blockage	Sewer main was jetted to remove obstruction, impacted area around manhole cleaned.	n/a
Lavelle Lane pump station	Ground Surface (no release to surface water)	12/24/2019	8:30 am - 9:30 am	<10,000	Force Main broken	Sewer pump staion was shut down (flow was controlled with vactor trucks) force main was repaired; Impacted area pump station was cleaned	n/a
Gates Street	Direct to Receiving water (Foss Reservoir)	1/3/2020	8:50 am - 10:45 am	13,500	Force Main broken	Upon discovery of the SSO, DPW immediately dispatched wastewater operators and equipment to locate the force main break and initiate field activities to repair. At the same time, a pumper truck company was contacted and multiple trucks were dispatched to the Gates Road Pump Station to initiate bypass and control of incoming flows. Once the repair was completed, the entire affected ground surface area was treated with lime. Wastewater operators inspected the site on 1/4/2020 to check the area and confirm that no further SSO was occurring. On 1/6/2020, DPW met with the Conservation Director and MWRA to inspect the site and place additional lime on the affected area and on other ground surface areas down gradient of the affected area as directed by the Conservation Director and MWRA.	n/a
Waverly St @ Liberty St	Ground Surface (no release to surface water)	1/15/2020	8:00 am - 9:00 am	<100	Sewer System Blockage	Surface cleaned with vactor truck.	n/a
Liberty St @ Waverly St	Ground Surface (no release to surface water)	2/2/2020	8:00 am - 12:00 pm	<1000	Sewer System Blockage	Sewer main was jetted to remove obstruction	n/a
Wilson Sts	Ground Surface (no release to surface water)	2/12/2020	8:00 am - 10:00 am	<1000	Sewer System Blockage	Sewer main was jetted to remove obstruction	n/a
73 Henry St	Ground Surface (no release to surface water)	3/12/2020	10:30 am - 10:45 am	>50	Sewer System Blockage	Sewer jetted to remove obstruction	n/a
6 Colonial Dr	Ground Surface (no release to surface water)	6/30/2020	7:45 am - 8:15 am	<1000	Pump Station Failure	Station was put back online; impacted area around manholes and roadway was cleaned with vactor	n/a

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
Year 3							
85 Main St	Ground Surface (no release to surface water)	8/28/2020	3:00 pm - 3:10 pm	<1000	Sewer System Blockage	Sewer main jetted to remove obstruction	n/a
3 Roxanna St	Ground Surface (no release to surface water)	9/30/2020	7:45 pm - 8:30 pm	<1000	Sewer System Blockage	Sewer main jetted & blockage was removed	n/a
Caldor Rd	Ground Surface (no release to surface water)	11/21/2020	9:30 am - 1:00 pm	<1000	Sewer System Blockage	Sewer main jetted to remove obstruction by private contractor (SSO on private property)	n/a
Rte 9 eastbound	Ground Surface (no release to surface water)	11/30/2020	7:45 am - 8:30 pm	<1000	Sewer System Blockage	Sewer main jetted and blockage removed	n/a
43 Ruthellen Rd	Ground Surface (no release to surface water)	12/25/2020	8:15 am - 3:00 pm	<1000	Vandalism	Tree logs has been put into the wastewater manhole causing a bloackage. The debris was removed by the DPW. Sewer main was jetted and cleaned.	n/a
Columbia St	Ground Surface (no release to surface water)	5/19/2021	8:45 am - 9:00 am	<50	Sewer System Blockage	Sewer main jetted and blockage removed	n/a
Year 4							
Salem End Rd	Ground Surface (no release to surface water)	7/8/2021	3:00 pm - 3:30 pm	<50	Sewer System Blockage	Sewer main jetted and blockage removed	n/a
1 Rock St/ Vose Rd	Ground Surface (no release to surface water)	11/8/2021	7:15 am - 7:20 am	<1000	Sewer System Blockage	Sewer main jetted and blockage removed	n/a
74 Main St	Direct to Receiving water (Sudbury River)	3/4/2022	1:40 pm - 4:05 pm	36,000	Force Main broken	Upon discovery of the SSO, DPW immediately dispatched wastewater operators and equipment to locate the force main break and begin field activities to make the repair. Pumper trucks were called in to by pass the Worcester Rd Pump Station and two upstream pump stations, Fenwick and Woodland to control incoming flows and stop the SSO. The repair to the force main was then completed and the entire affected area was treated with lime. Wastewater operations inspected the area to make sure there was no recurring SSO.	n/a
1083 Waverly St	Ground Surface (no release to surface water)	3/21/2022	10:55 am - 11:15 am	<50	Sewer System Blockage	Sewer main jetted and blockage removed	n/a
Year 5							
1200 Worcester Rd	Backup into Property Basement	10/22/2022	1:00 pm - 1:30 pm	<50	Sewer System Blockage	Sewer main jetted and blockage removed	n/a
2 Hemenway Rd	Ground Surface (no release to surface water)	11/5/2022	8:30 am - 9:00 am	<50	Sewer System Blockage	Sewer main jetted and blockage removed	n/a
6 Flanagan	Ground Surface (no release to surface water)	3/22/2023	7:30 am - 11:00 am	<300	Pump Station Failure	Station was taken offline until pipe was repaired.	n/a
7 Colonial Drive	Ground Surface (no release to surface water)	6/15/2023	4:30 pm - 4:45 pm	<1	Pump Station Failure	Station repaired, cleared with vactor.	n/a

Location	Discharged To	Date	Time	Volume (gals)	Causes	Mitigation	Comments
Year 6							
6 Colonial Dr	Ground Surface (no release to surface water)	12/5/2023	7:30 am - 9:00 am	<100	Pump Station Failure	Station was repaired and put back into service.	n/a
34 Beulah	Backup into Property Basement	12/18/2024	11am	<300	Rain Event; Insufficient capacity in system	Storm related capacity issue. Affected area was cleaned and disinfected.	n/a
Ruthellen Rd @ Amy Rd, 7 McAdams, 10 Janice	Ground Surface (no release to surface water)	12/18/23-12/19/23	12/18/23 6 pm - 12/19/23 5 pm	1000	Rain Event; Insufficient capacity in system	Storm related capacity issue. Affected area was cleaned and disinfected.	n/a
Waverly St @ Fay Rd/ 1000 Waverly St/988 Waverly St	Ground Surface (no release to surface water)	12/18/2023	7 pm - 9 pm	<300	Rain Event; Sewer System Blockage; Grease Blockage	line was jetted and backup was cleared. Area around manhole was cleaned	n/a
Year 7							
6 second st	Ground Surface (no release to surface water)	9/9/2024	3:30 am - 3:45 am	>50	Sewer System Blockage	main was jetted and freed plug up	n/a
72-74 MAIN STREET	Direct to Receiving water (Sudbury River)	7/30/2024	4:27 pm -9:00 pm	675000	Force Main broken (Crack along bottom of pipe)	Upon discovery of the SSO, DPW immediately dispatched Watewater Operators and equipmentto locate the force main break and begin field activites to make the necessary repair. Septic pump trucks were called in to bypass the Worcester Road Wastewater Pump Station. Two (2) upstream Wastewater Stations (Fenwick Station & Woodland Station)were utilized to control incoming flows and stop the SSO. The repair to force main was then completed, entire area was then treated with lime. Wastewater opertors inspected the area on 7/31/2024 to ensure there was no recurring SSO.8/1/2024 Watewater operators are onsite making any and all needed restorations. Follow up with Conservation agent will take place in the next few days.	n/a
640 Worcester Road	Ground Surface (no release to surface water)	11/10/2024	11:30 am - 1:30 pm	<1000	Sewer system Blockage (grease blockage)	Sewer main was jetted to remove obstruction. Impacted areas around manholes and roadway was cleaned with vactor.	n/a

APPENDIX G

IDDE TRAINING

FUSS & O'NEILL

M E M O R A N D U M

TO: John Woodsmall; Tom Gregory; Kerry Reed

FROM: Stefan Bengtson; William Guenther

DATE: May 7, 2019

RE: MS4 Training Workshop Summary

This memorandum summarizes the material and content from a workshop presented by Fuss & O'Neill on April 24, 2019. Fuss & O'Neill developed a workshop to address requirements of the General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4). Specifically, the workshop focused on Illicit Discharge Detection and Elimination (IDDE) requirements detailed in Section 2.3.4 of the permit. The workshop also provided training for participants on general aspects of their municipalities' MS4 requirements and critical aspects of their IDDE program, recognizing illicit discharges and Sanitary Sewer Overflows (SSOs), which is required training under Section 2.3.4.11. Twenty-eight municipal employees from fifteen member communities participated in the day-long training workshop (Attachment A).

The workshop was broken down into distinct sections. There was an initial classroom portion, detailing the required IDDE training and IDDE program planning and execution using checklists and planning documents created for the workshop (Attachments B&C). Additionally, workshop participants conducted physical field inspections of both outfalls and catchbasins/manholes and also were given instruction and hands-on training in the use of field test kits used to analyze samples for parameters required by the MS4 permit.

The classroom portion initially focused on training requirements such as illicit discharge and SSO identification and also included more general information related to municipal IDDE programs. This included information on IDDE ordinance, written plan, and storm system mapping requirements (Attachment C). Participants were also trained on how to prepare for and conduct outfall investigation and sampling. The checklists and planning documents prepared for the workshop outlined step-by-step procedures for implementing outfall and catchment investigation and sampling. The training presentation reviewed pertinent safety considerations for planning and execution of an IDDE program as well as detailed discussion of equipment checklists needed to execute these programs. Participants were also instructed on how to properly fill out both the Outfall Investigation Form and Manhole/Catch Basin Investigation Form previously prepared by Fuss & O'Neill for the CMRSWC members. Additional discussion covered topics including paper-based vs. digital data collection, how to identify likely sewer inputs, and how to efficiently conduct catchment investigations.

Following the classroom portion, participants put instruction into practice by visiting and completing a full dry-weather outfall inspection at two outfalls. Participants also completed two manhole/catch basin inspections representing key junction manholes in a catchment investigation. Finally, participants were given hands-on training in the use of IDDE sampling and safety equipment and procedures were

reviewed during the investigations and participants asked more specific questions. The workshop concluded with hands-on instruction on how to use test kits for chlorine, ammonia, and surfactants, including "clean" and "hot" samples. Finally, a variety of water quality meters were demonstrated to provide an overview of the options available for collecting temperature, conductivity, and salinity data.

Central Mass Regional Stormwater Coalition
IDDE Implementation Workshop
April 24, 2019

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Central Mass Regional Stormwater Coalition
IDDE Implementation Workshop
April 24, 2019

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Illicit Discharge Detection and Elimination Training

Provided by: Central Massachusetts Regional Stormwater Coalition &
Fuss & O'Neill

Funded through an MS4 Assistance Grant from the Commonwealth of Massachusetts

Illicit Discharge Detection and Elimination (IDDE) is an integral component of any municipal stormwater management program. IDDE requirements in the 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts (MS4 Permit) are more complex than the IDDE requirements from the previous permit. Fuss & O'Neill, in partnership with the Central Massachusetts Regional Stormwater Coalition, conducted training workshops for municipal employees of MS4-regulated communities on implementing IDDE program requirements of the MS4 Permit. The training workshops were held on May 5, 2020 and May 7, 2020 remotely via GoTo Meeting. The training provided at these workshops is also intended to satisfy the MS4 Permit requirements for annual IDDE training as outlined in Section 2.3.4.11 of the MS4 Permit.

While the workshop training presentation focused on IDDE program requirements, the presentation also included general information about the Six Minimum Control Measures and highlighted some of the additional permit requirements. The training presentation included detailed information on the following topics:

- General MS4 Information
    - Brief descriptions of each of the six minimum control measures
- IDDE requirements
- Identification of Illicit Discharges and Sanitary Sewer Overflows
- Safety Considerations for IDDE program staff
- IDDE Program Planning
- Illicit Discharge Source Identification

Participants were encouraged to ask questions throughout the presentation, via a chat feature. Answers to questions can be found in the recording of the presentation.

If there are additional questions about the MS4 Permit or IDDE requirements, please feel free to contact Fuss & O'Neill directly.

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FUSS & O'NEILL

CMRSWC IDDE Training Workshop
May 5, 2020
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CMRSWC IDDE Training Workshop
May 7, 2020
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Illicit Discharge Detection and Elimination Training

Provided by: Central Massachusetts Regional Stormwater Coalition &
Fuss & O'Neill

Illicit Discharge Detection and Elimination (IDDE) is an integral component of any municipal stormwater management program. IDDE requirements in the 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts (MS4 Permit) are more complex than the IDDE requirements from the previous permit. Fuss & O'Neill, in partnership with the Central Massachusetts Regional Stormwater Coalition, conducted a training workshop for municipal employees of MS4-regulated communities on implementing IDDE program requirements of the MS4 Permit. The training workshop was held on May 26, 2021 remotely via GoTo Meeting. The training provided at these workshops is also intended to satisfy the MS4 Permit requirements for annual IDDE training as outlined in Section 2.3.4.11 of the MS4 Permit.

While the workshop training presentation focused on IDDE program requirements, the presentation also included general information about all Six Minimum Control Measures and highlighted some of the additional permit requirements. The training presentation included detailed information on the following topics:

- General MS4 Information
    - Brief descriptions of each of the six minimum control measures
- IDDE requirements
- Identification of Illicit Discharges and Sanitary Sewer Overflows
- Safety Considerations for IDDE program staff
- IDDE Program Planning
- Illicit Discharge Source Identification Methods
- Catchment Investigation Planning and Execution

Participants were encouraged to ask questions throughout the presentation. Answers to questions can be found in the recording of the presentation.

If there are additional questions about the MS4 Permit or IDDE requirements, please feel free to contact Fuss & O'Neill directly.

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Illicit Discharge Detection and Elimination (IDDE) Training Workshop

Central Massachusetts Regional Stormwater Coalition (CMRSWC)

May, 2021

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Today's Agenda

- Introduction/Tech Minute
- Upcoming Deadlines
- General MS4
- IDDE Requirements
- Identifying Illicit Discharges/SSOs
- Safety Considerations
- IDDE Program Planning
- Source Identification



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Upcoming Deadlines – June 30, 2021

- Written SOPs
  - Parks and Open Space
  - Buildings and Facilities
  - Vehicles and Vehicle Maintenance
  - Site Inspection/Enforcement Procedures - Sediment and Erosion Control
- Stormwater Pollution Prevention Plans (SWPPP)
- IDDE Outfall inspections
- Regulatory mechanism for incorporating LID into site design for development sites
- Phosphorus Control Plan funding source assessment
  - Charles R. Watershed
  - Lake Phosphorus TMDLs

Upcoming Deadlines – Year 4

- Regulatory Reviews:
  - Street Design and Parking Lot Guidelines affecting Impervious Cover creation
  - Allowing Green Roofs, Infiltration Practices, Rain Barrels/Cisterns in site development
- Identify 5 Municipal Properties for Stormwater Retrofits
- Nitrogen Source Identification Report
  - Long Island Sound
- Define Phosphorus Control Plan scope
  - Charles R. Watershed
  - Lake Phosphorus TMDLs
- Phosphorus Source Identification Report
  - Non-TMDL Phosphorus Impairments

MS4, what?

Municipal Separate Storm Sewer System (MS4)

- Storm drainage system owned or operated by a municipality, state or federal agency
- Discharges to surface waters

Regulated Small MS4s

- Small MS4 located partially or entirely within an Urbanized Area (defined by 2010 U.S. Census)



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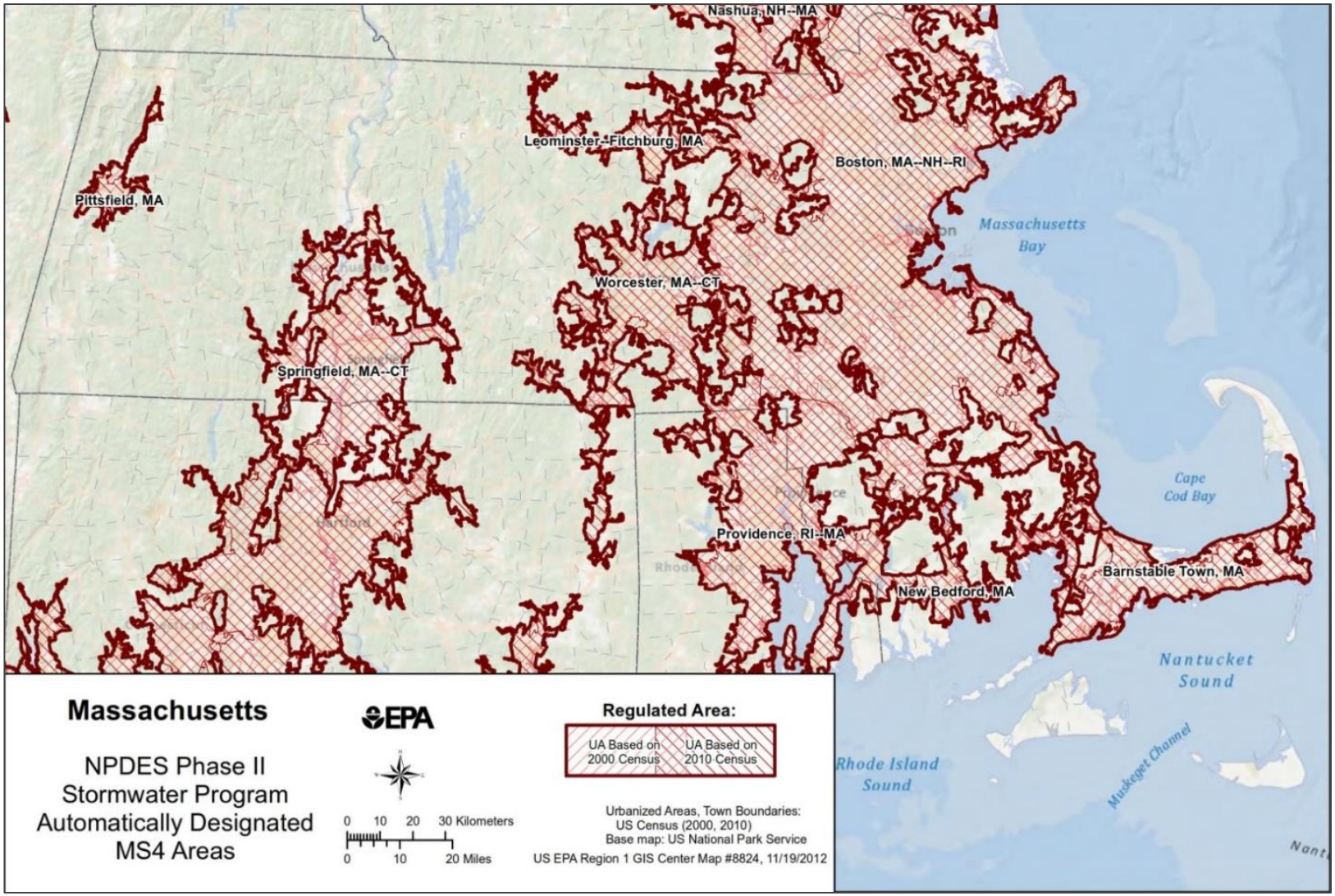
MS4 Permit 101

US Environmental Protection Agency

- Phase II Stormwater Program - 1999
  - Targets smaller communities in "urbanized areas"
    - ***Goal is to reduce the discharge of pollutants to the "maximum extent practicable"***
  - Construction sites disturbing ≥ 1 acre
- General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (MA MS4 Permit)



MS4 Regulated Areas in MA



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Phase II Stormwater Program



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MCM 1: Public Education and Outreach

- 2 messages each to 4 audiences over term of permit (8 total)
- Audiences
  - Residential
  - Businesses, Institutions, Commercial
  - Industrial
  - Developers
- Additional Messaging for waters subject to a TMDL













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MCM 2: Public Participation

- Need to provide opportunities for public participation
- Annual report public notice
- Town website, stormwater committee, public meetings







MCM 4: Construction Site Runoff Controls

- Essentially unchanged from 2003 permit
- Ordinance or regulatory mechanism to control construction site runoff
- Also include controls for other construction related wastes including demolition debris, litter, and sanitary wastes
- Written site plan review procedure (CMRSWC Template)
- Inspections to be conducted both during BMP construction and after to ensure proper installation and operation







MCM 5: Post-Construction Stormwater Management

Development Sites >1acre

- Controls need to retain 1-inch of runoff from impervious surfaces AND/OR
- Controls need to remove 90% of TSS and 60% of TP (annual load)

Redevelopment Sites >1acre

- Controls need to retain 0.8-inch of runoff from impervious surfaces AND/OR
- Controls need to remove 80% of TSS and 50% of TP (annual load)







MCM 5: Post-Construction Stormwater Management

- Shall require as-built drawings no later than 2 years after completion of construction projects
- Shall have procedures to ensure long-term operation and maintenance of on site controls
- Within 4 years of the effective date permittees will need to complete a retrofit inventory of at least 5 municipally owned properties.
  - These identified projects can be used for offsite mitigation within same HUC10
  - Municipality needs to keep a rolling list of 5 opportunities





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MCM 6: Good Housekeeping

What falls under Good Housekeeping?

- SWPPPs
- Street Sweeping
- Catch Basin Cleaning
- Winter De-Icing Operations









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MCM 6: Good Housekeeping (cont.)

- Written O&M Plans
  - Infrastructure
  - Operations (i.e., parks and open space, facilities, and vehicles & equipment)
- Routine cleaning of catch basins such that no basin will be >50% full
  - Need to report total #of catch basins, # inspected, #cleaned, and the total volume/mass of material removed from all catch basins annually
- All streets swept once annually
  - Exceptions – rural uncurbed roads with no catch basins & TMDL watersheds (2x/year)
  - Need to report # of miles cleaned or volume/mass of material removed annually





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Infrastructure O&M Plan

CMRSWC Resource



Municipal Stormwater Infrastructure Operation and Maintenance Plan

Central Massachusetts Regional Stormwater Coalition

June 30, 2016

CMRSWC

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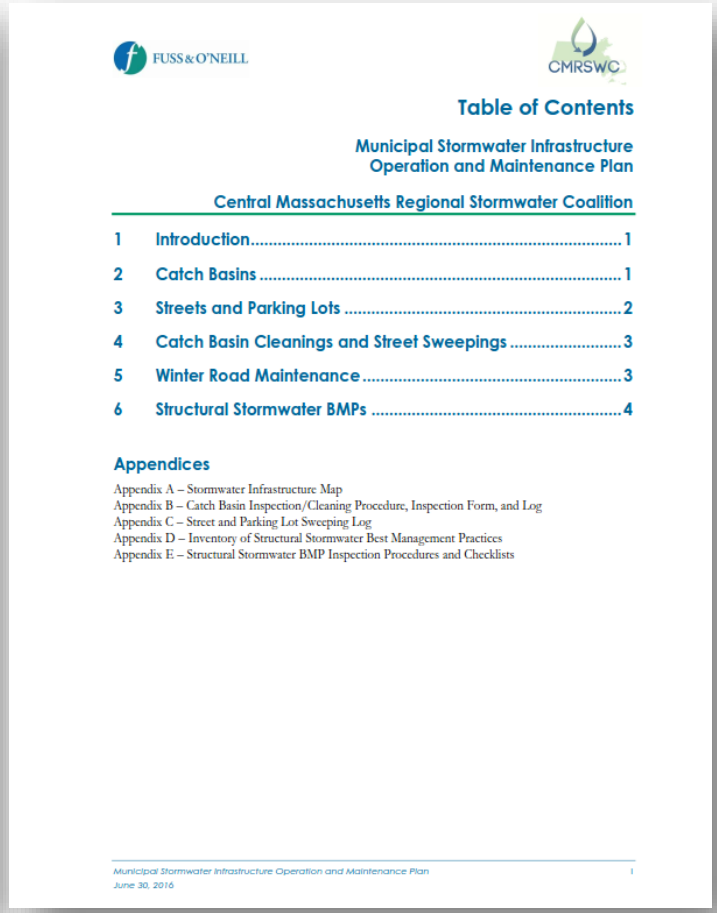

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CMRSWC

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Municipal Stormwater Infrastructure Operation and Maintenance Plan

Central Massachusetts Regional Stormwater Coalition

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3 Streets and Parking Lots 2
4 Catch Basin Cleanings and Street Sweepings 3
5 Winter Road Maintenance 3
6 Structural Stormwater BMPs 4

Appendices

Appendix A – Stormwater Infrastructure Map
Appendix B – Catch Basin Inspection/Cleaning Procedure, Inspection Form, and Log
Appendix C – Street and Parking Lot Sweeping Log
Appendix D – Inventory of Structural Stormwater Best Management Practices
Appendix E – Structural Stormwater BMP Inspection Procedures and Checklists

MCM 6: Good Housekeeping (cont.)

Stormwater Pollution Prevention Plans (SWPPPs)

- New requirement under 2016 permit
- Required for maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater
- Covers the following topics specific to the site:
  - Spill Prevention and Response
  - Erosion and Sediment Control (on-site)
  - Salt Storage
  - Training
  - Maintenance

MCM 3: IDDE

- Illicit Discharge Detection and Elimination
- Area of largest change between 2003 and 2016 permit
- 2003 permit required an ordinance, map of **outfalls**
- New permit requirements include:
  - Additional mapping requirements
  - Catchment delineations
  - Dry-weather outfall inspections
  - Catchment Investigations



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What are Illicit Discharges?

- Any substance entering storm drain system not entirely composed of stormwater
- Some examples
  - Illegal floor drain connections
  - Broken sanitary sewer lines
  - Sanitary cross-connections
  - Sanitary sewer overflows
  - Car washwater
  - Grass clippings, pet waste, or other material dumped into catch basins



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Not All Discharges are Illicit

Permit allows some limited discharges*

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (40 CFR § 35.2005(20))
- Uncontaminated pumped ground water
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- Flows from riparian habitats and wetlands
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents
- Flows from firefighting

***Unless you, EPA, or DEP determines these are significant source of pollutants**

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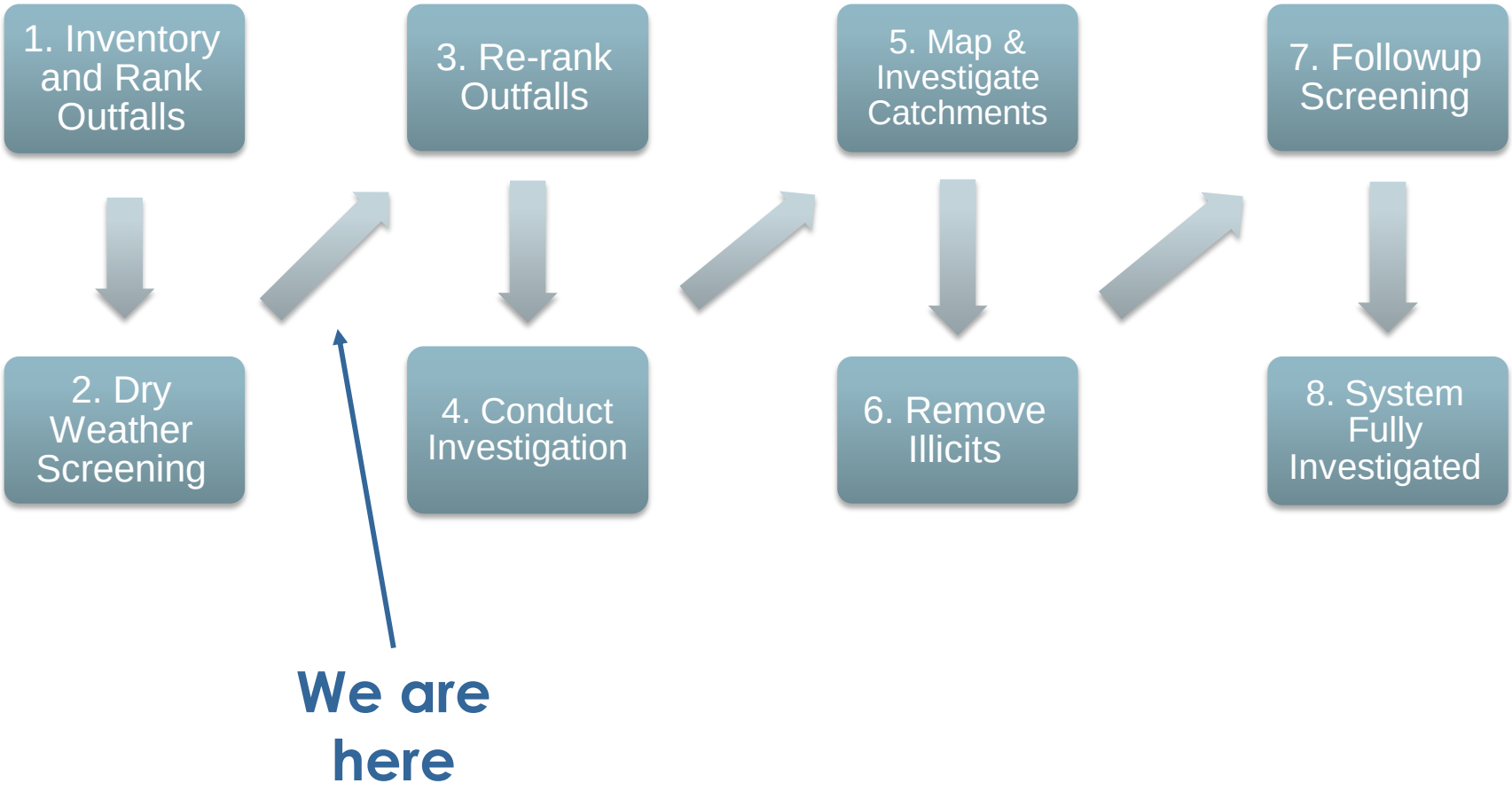
New IDDE Program Protocol



IDDE Requirements & Deadlines

Requirement	1YR	1.5YR	3YR	7YR	10YR
Written IDDE Plan	X				
Outfall/Interconnection Inventory and Ranking	X				
SSO Inventory	X				
Catchment Investigation Procedure		X			
Dry Weather Outfall Sampling			X		
Follow-up ranking of outfalls and interconnections			X		
Catchment Investigations - Problem				X	
Catchment Investigations - Problem, High & Low Priority					X

Red = dry weather outfall screening and sampling

Blue = wet weather screening and sampling

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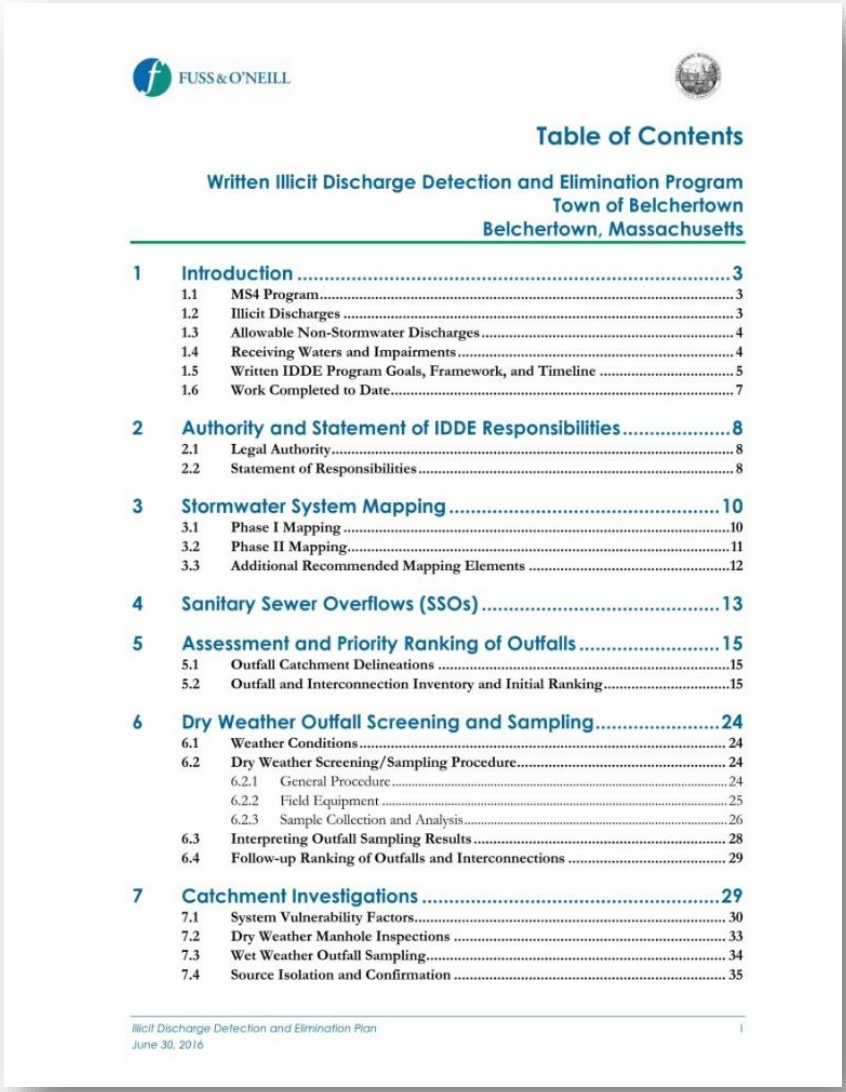
Written IDDE Program

- Required by end of Year 1
- Formal documentation of program and process already in place
- Must describe procedures for
  - Sample collection
  - Use of field kits
  - Storage and conveyance of samples (incl. hold times)
  - Field data collection and storage



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Belchertown, Massachusetts

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Written IDDE Program – Template

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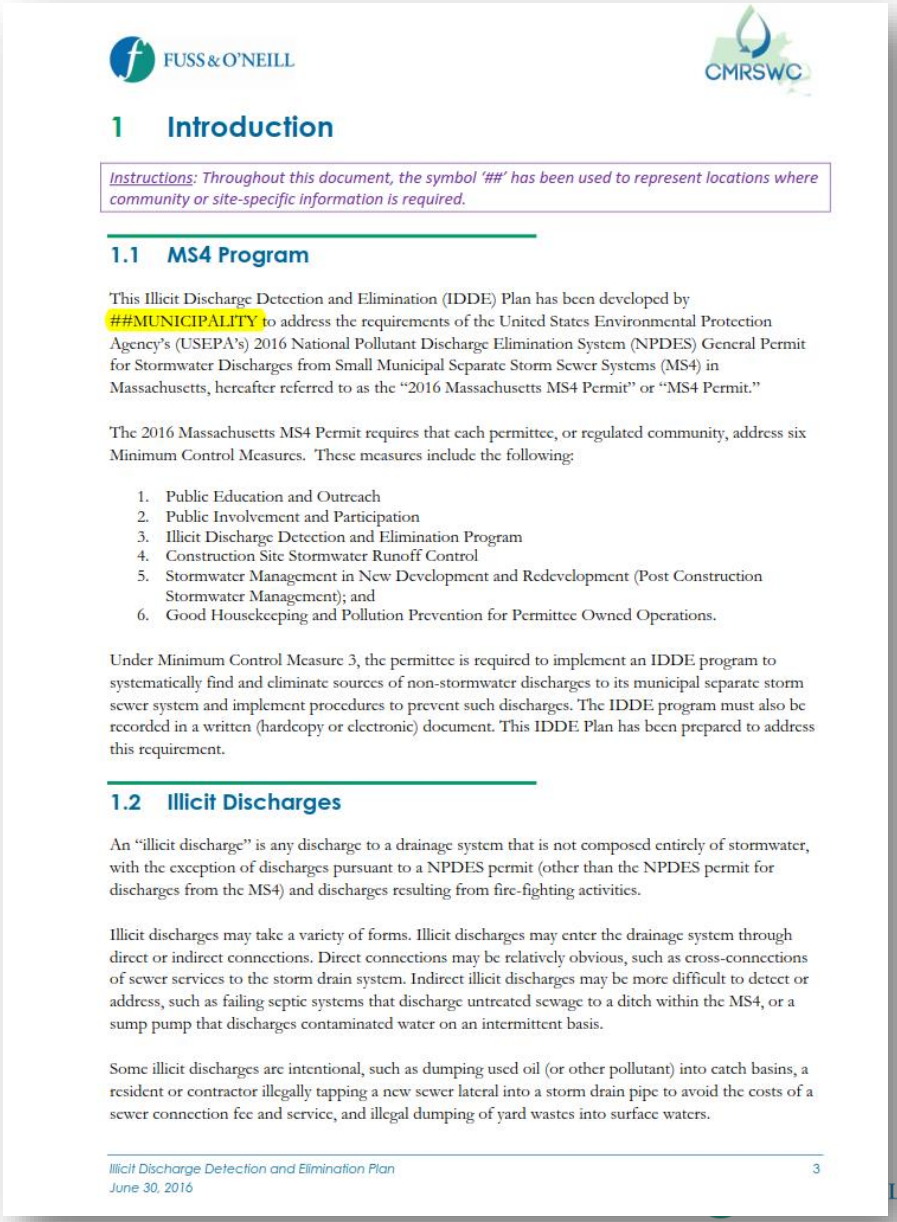
Appendix B – Storm System Mapping
Appendix C – Outfall Inventory and Priority Ranking
Appendix D – Field Forms, Sample Bottle Labels, and Chain of Custody Forms
Appendix E – Water Quality Analysis Instructions, User's Manuals and Standard Operating Procedures
Appendix F – IDDE Employee Training Record
Appendix G – Source Isolation and Confirmation Methods: Instructions, Manuals, and SOPs

Written IDDE Program – Template

- Instruction boxes
- Boilerplate text
- Highlighted text to add or edit
  - Community-specific information



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CMRSWC

1 Introduction

Instructions: Throughout this document, the symbol '##' has been used to represent locations where community or site-specific information is required.

1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by ##MUNICIPALITY to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit."

The 2016 Massachusetts MS4 Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination Program
4. Construction Site Stormwater Runoff Control
5. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management); and
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations.

Under Minimum Control Measure 3, the permittee is required to 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. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement.

1.2 Illicit Discharges

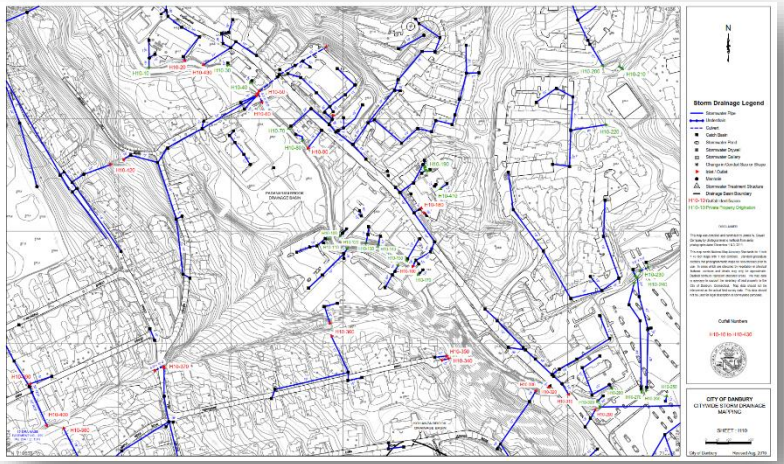
An "illicit discharge" is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.

Storm System Mapping

- Outfalls, manholes, catch basins, pipes, interconnections, and refined catchment delineations by year 10
- Much of this info will be needed earlier to complete catchment delineations and investigations
- Outgoing interconnections are outfalls





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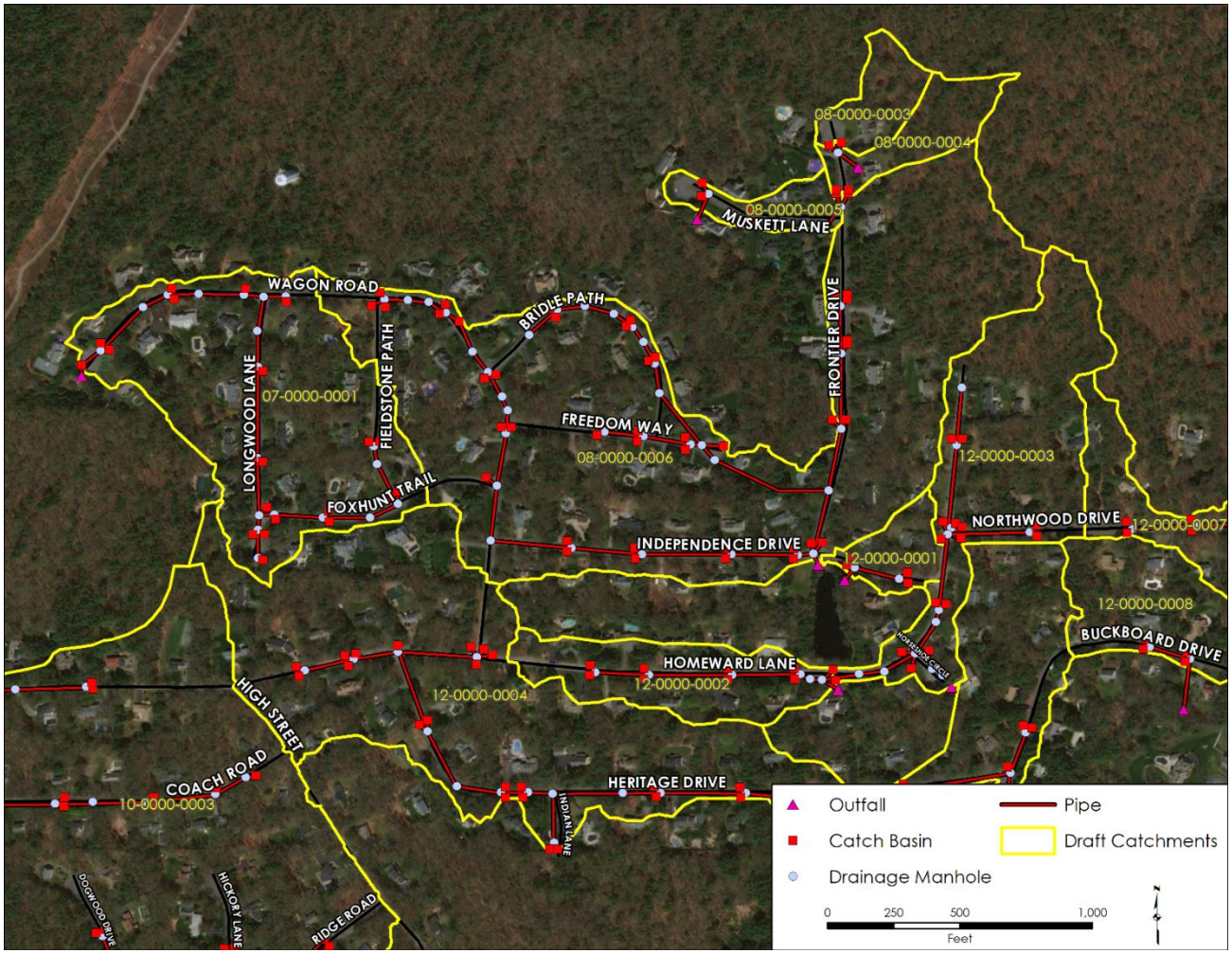
Delineation Example



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Sanitary Sewer Overflows (SSOs)

- Inadequate conveyance capacity
- Inventory of locations going back 5 years
- Must report new SSOs to EPA
  - Verbally w/in 24 hours
  - In writing within 5 days
- Requires mitigation and corrective action





Sanitary Sewer Overflows

- Inventory and subsequent reports to EPA must contain:
  - Location (street crossing/address and receiving water)
  - Did SSO enter stream/pond directly or MS4?
  - Date(s) and time(s) of beginning and end of discharge
  - Estimate volume of discharge
  - Description, including known or suspected cause
  - Mitigation and corrective measures completed, with dates
  - Mitigation and corrective measures planned, with implementation schedule

Priority Ranking Criteria

Rank using the following criteria:

- Past discharge complaints/reports
- Poor receiving water quality (Impairment/TMDL)
- Density of generating sites
- Age of development and infrastructure
- Sewer conversion
- Historically combined systems
- Surrounding density of aging septic systems
- Culverted streams longer than a simple road crossing

**No mention of how to rank based on criteria, just that these criteria be used

Outfall/Catchment Ranking

- Ranking grouped into the following categories:
  - **Problem:** Known or suspected illicit discharges based on existing info
  - **High Priority:** Discharging to an area of concern or previous evidence of an illicit discharge
  - **Low Priority:** Lack of screening or system vulnerability factors
  - **Excluded:** No potential for illicit discharges



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Dry Weather Outfall Inspection/Sampling

- For each outfall and interconnection, conduct visual inspection during dry weather

Basic Information

- Unique identifier
- Receiving water
- Date of most recent inspection
- Dimensions
- Shape
- Material (concrete, PVC)
- Spatial location (latitude & longitude with a minimum accuracy of +/-30 feet)
- Physical condition

Evidence of Non-Stormwater Flows

- Odor: sewage, sulfur, sour, rancid, petroleum/gas smells
- Visual: color, turbidity (cloudy water), floatables (suds, toilet paper), or oil sheen

Types of Illicit Discharges

- Continuous
  - Cross connected sewer
- Intermittent
  - Cross connected residential laundry
- Transitory
  - dumping







Common Illicit Discharges

- Cross connected sewer line





Common Illicit Discharges

- Failing septic system/cross connected septic







Common Illicit Discharges

- Sanitary Sewer Overflows





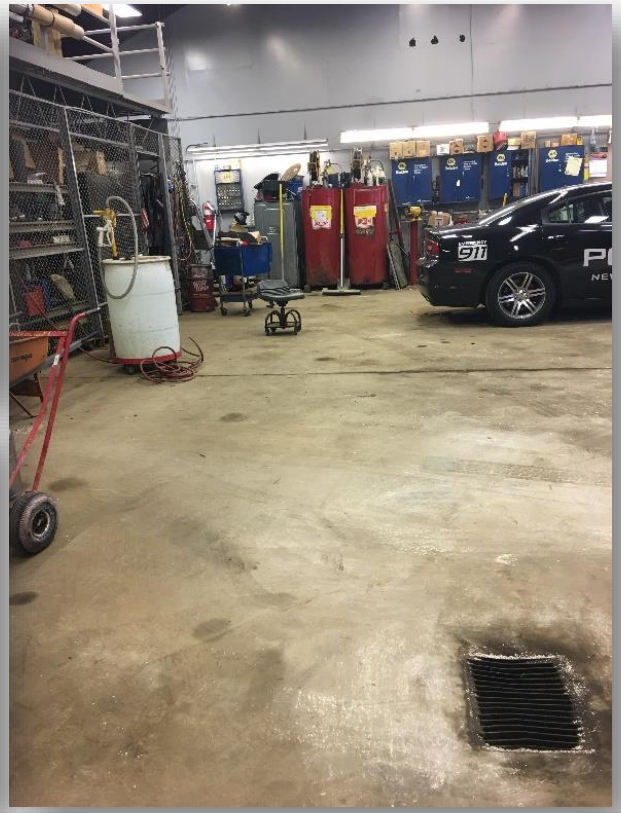


Common Illicit Discharges

- Floor drains





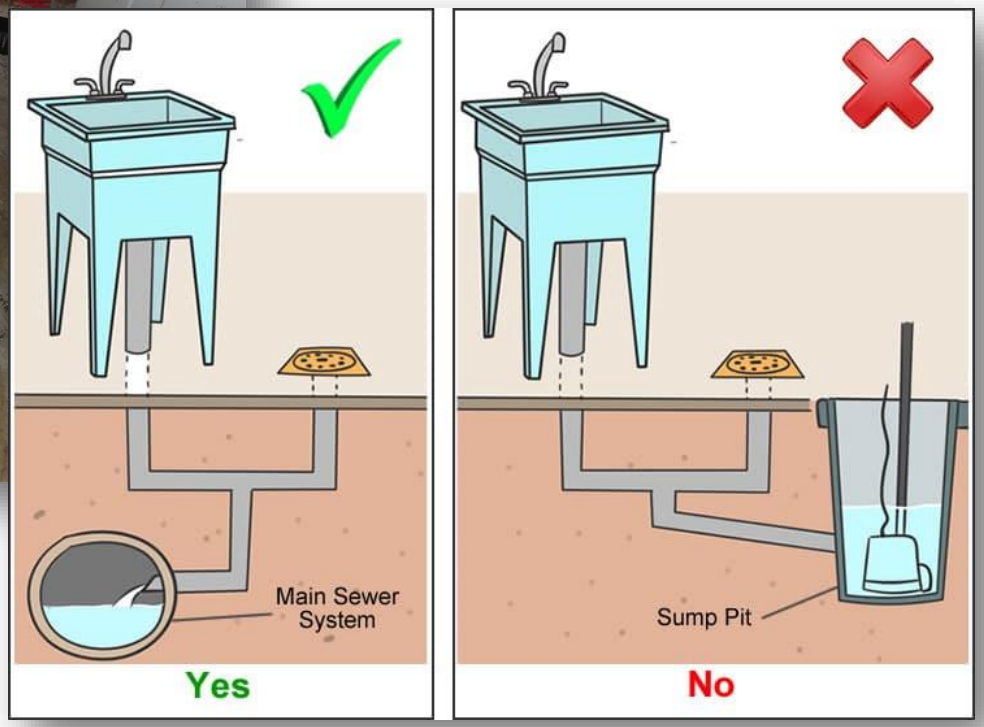




Common Illicit Discharges

- Contaminated sump pumps





Common Illicit Discharges

- Chlorinated pool water
  - Never drain to street or driveway
  - Let pool water stand for one week
  - Dechlorinate before draining (<1ppm)
  - Neutralize pH (6.5 – 8.5)
  - Slowly discharge to pervious surfaces



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Common Illicit Discharges

- Construction site runoff







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Common Illicit Discharges

- Dumping







Common Illicit Discharges

- Fats, Oils, and Grease from dumpsters









Common Illicit Discharges

- Spills







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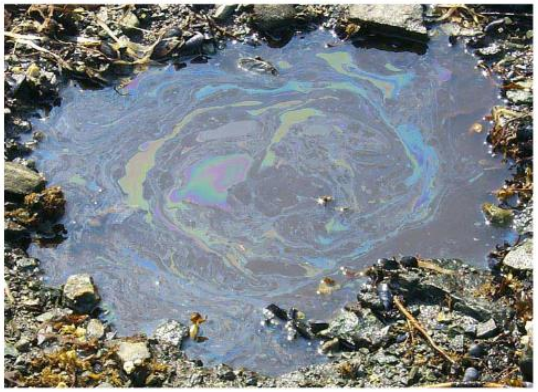
Illicit Discharges – Visual Indicators

Natural Sheen vs. Synthetic Sheen



Natural sheen



Synthetic sheen

Foam and Suds



Low severity, naturally occurring suds



High severity suds

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Illicit Discharges – Visual Indicators

Sanitary sewer input



There could be a noticeable smell

Sanitary sewer input, trash



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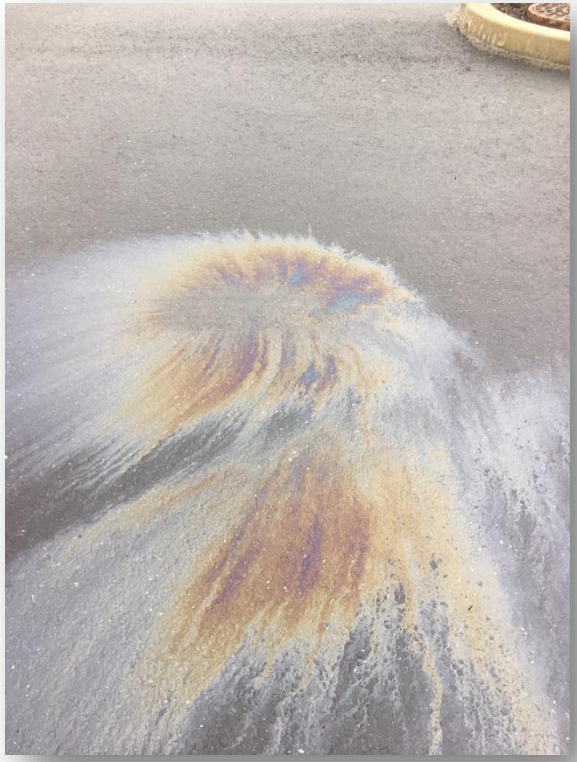
Illicit Discharges – Olfactory Indicators

- Sewage smell
- “Fresh” or “Clean”
- Gas or petroleum









Likely Sewer Input Indicators

- 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
- Ammonia ≥ 0.5 mg/l, surfactants ≥ 0.25 mg/l, and detectable levels of chlorine

Evidence of Flow: ☐ Yes ☐ No **If Yes, Description of Flow:** ☐ Damp ☐ Trickle ☐ Moderate ☐ High

Visual Evidence of Illicit Discharge
Visual Inspection: ☐ None ☐ Floatables ☐ Pet Waste ☐ Oily Sheen ☐ Sanitary Waste ☐ Algae ☐ Foam

Olfactory Evidence of Illicit Discharge
Olfactory Inspection: ☐ None ☐ Sewage Smell ☐ Musty ☐ Rotten Eggs ☐ Ammonia ☐ Petroleum

Samples Taken and Sampling Results

Temp.	Conductivity	Salinity	Chlorine
Ammonia	Surfactants	Bacteria	Pollutant of Concern

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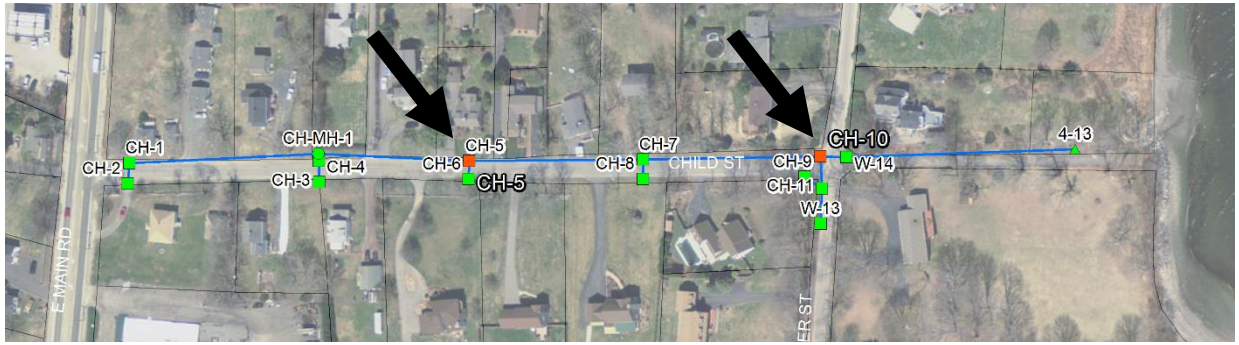
Revise Initial Outfall Priority Ranking

- Due June 2021
- Based on Outfall Investigation results
- Outfalls with Likely Sewer Input Indicators
  - Automatically top of priority list
- Other outfall ranking changes at permittee's discretion

Catchment Investigations

- System Vulnerability Factors (SVF) – indicators of likely sanitary sewer input
  - SSOs, sanitary/storm pipe alignment crossings, past CSO areas, infiltration/inflow, high septic failure rate, etc.
- Key Junction Manholes to streamline effort



Isolate pipe segment where illicit discharge enters system

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Catchment Investigations

- Where System Vulnerability Factor(s) present, must also conduct wet-weather sampling (i.e., during rain event)
  - Do high sanitary flows during wet weather or high-groundwater in Title 5 system areas enter storm drain system?
- When pipe segment is identified, locate source
  - Video investigation
  - Smoke/dye testing
- Work with property owner or use bylaw enforcement mechanism to remove any illicit connections found
- Document investigations and enforcement/removal actions
  - Include in Annual Reports

Outfall and Catchment Investigation How-To

- Safety Considerations
- IDDE Program Planning and Procedures







General Safety Considerations

- Traffic
- Weather
- Water Quality
- Insects: Ticks, Bees, Hornets & Wasps, Mosquitos
- Plants: Poison Ivy, Poison Sumac, Poison Oak
- Excessive Heat
- Slips/Trips/Falls
- Drowning
- Stuck in mud







Example Job Hazard Analysis (JHA)

Job Hazard Analysis (JHA)

PROJECT/PROJECT LOCATION:	DATE:	☐ NEW ☐ REVISED	PAGE 1 of 1

PROJECT/TASK NUMBER:	TASK ACTIVITY: Conduct Dry-Weather IDDE Inspection/Sampling	TASK DESCRIPTION: Collect samples of potential illicit discharges at outfalls or stormwater structures	
PREPARER(S)	**REVIEWED BY**	**SITE CONTACT**	**EMERGENCY CONTACT**

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)

☐ SAFETY VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☐ GLOVES (Type nitrile)
☐ HARD HAT	☐ FACE SHIELD	☐ PPE CLOTHING	☐ FIRE EXTINGUISHER
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	TYPE:	☐ CONES
☐ SAFETY GLASSES	☐ SAFETY SHOES	☐ LIFE JACKET (PFD)	☐ OTHER

JOB STEPS	POTENTIAL HAZARDS	CRITICAL ACTIONS

Site-Specific Training Requirements:

Field Team Member Review of JHA

I have read and understand the JHA and will comply with the provisions contained herein.

Name Printed Signature Date

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Example Job Hazard Analysis (JHA)

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☐ HARD HAT	☐ FACE SHIELD	☒ PPE CLOTHING	☐ FIRE EXTINGUISHER
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	TYPE: Warm Clothing, Hi-Vis Vest	☒ CONES
☒ SAFETY GLASSES	☐ SAFETY SHOES	☐ LIFE JACKET (PFD)	☐ OTHER

JOB STEPS	POTENTIAL HAZARDS	CRITICAL ACTIONS
1. Arrive on site 2. Evaluate traffic hazard 3. Access outfall 4. Collect Sample (As Necessary) 5. Conduct field kit tests	1. Slip, trip, fall 2. Weather exposure 3. Traffic 4. Ticks 5. Poision Ivy / Posion Sumac 6. Falling into water 7. Confined Space 8. Lifting Posture While Removing Heavy Covers-Back Injuries Losing Control Of Cover While Trying To Remove, Pinched Hands & Feet 9. Pathogen exposure	1. Use appropriate foot wear. Avoid steep slopes 2. Wear clothing appropriate to conditions. Bring wet-weather clothing in case of rain. Use sunscreen as needed 3. Park car in safe location where possible. If working in roadway, park vehicle between traffic and work site, set up cones around site and vehicle, and use hazard lights. Wear high visibility vest. Be vigilant and aware of surroundings at all times. 4. Wear long sleeves and pants. Tuck pants into socks. Check for ticks upon returning, utilize tick repellant 5. Be able to recognize plant and avoid, use tecnu wash if contact made 6. Bring a change of cloths, Wear a PFD as appropriate 7. DO NOT ENTER ANY STRUCTURE OR CONFINED SPACE 8. Use magnetic manhole lifter to open structure and manipulate cover. Set up cones around open structure. 9. Wear nitrile gloves and safety glasses when collecting samples. Wash hands before eating. Keep cell phone on you in case of emergency

Site-Specific Training Requirements:

Field Team Member Review of JHA

I have read and understand the JHA and will comply with the provisions contained herein.

Name Printed Signature Date

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Safety Minute

What's wrong with this picture?



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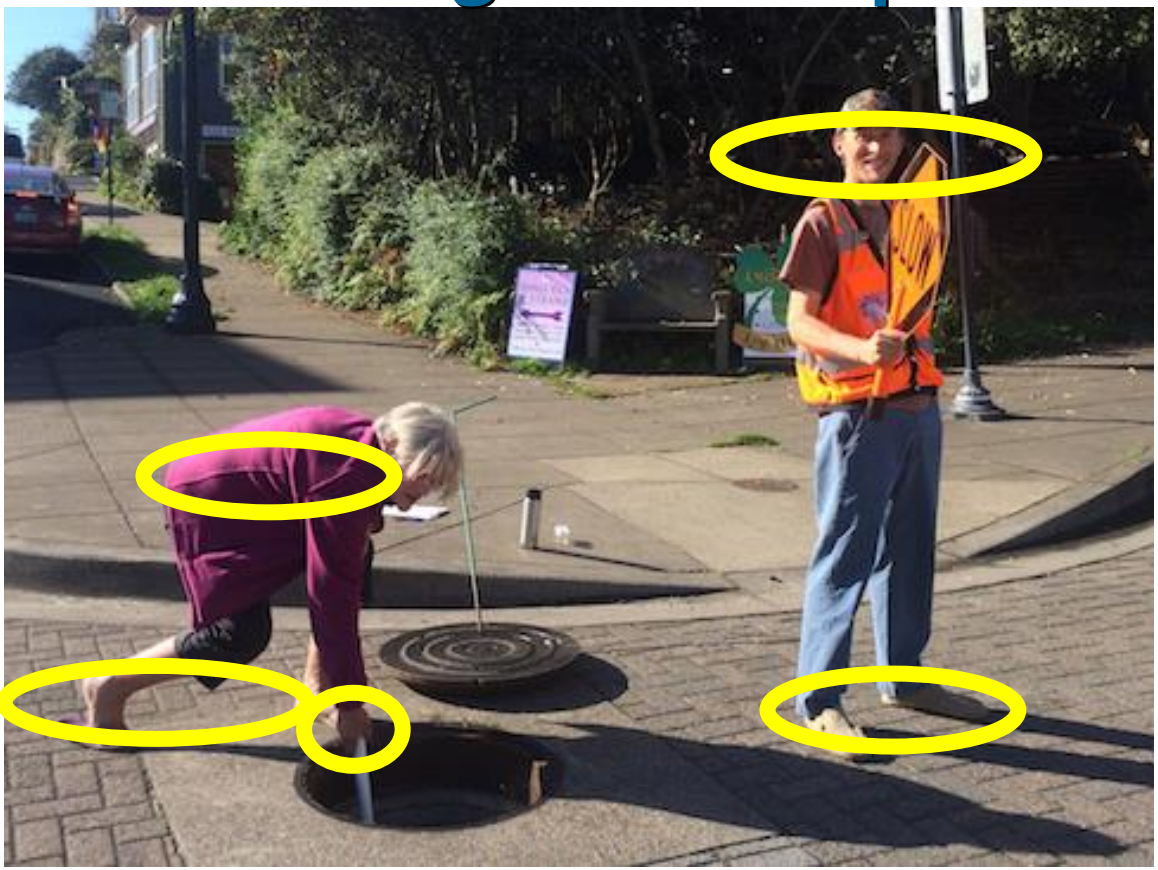
Safety Minute

What's wrong with this picture?



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IDDE Program Planning

- Equipment Checklist
- Sampling Procedure
- Data Collection Options
- Weather Considerations
- Source Identification

Outfall Sampling Checklist

Equipment needed for both screening and sampling:

- ☐ Clipboard
- ☐ Field Sheets/ Tablet
- ☐ Pens/Pencils/Permanent Markers
- ☐ Dry Erase Board and Markers
- ☐ Measuring Tape
- ☐ Flashlight/Headlamp with Batteries
- ☐ Digital Camera (or phone with a camera)
- ☐ GPS Receiver (or phone with a GPS app.)
- ☐ Manhole Cover Assisted Opener, Pry Bar, Pick, and/or Manhole Lifter
- ☐ Small Mallet or Hammer
- ☐ Appropriate footwear (Boots and/or Waders)
- ☐ Reflective Vest
- ☐ Traffic Cones
- ☐ Poison Ivy Scrub

Equipment needed for sampling:

- ☐ Sampling Pole
- ☐ Utility Knife
- ☐ Zip ties/Duct Tape
- ☐ Safety Glasses
- ☐ Nitrile Gloves
- ☐ Hand Sanitizer
- ☐ Chain of Custody Forms
- ☐ Cooler with Ice
- ☐ Water Quality Sonde (if needed/available for conductivity, temperature and pH)
- ☐ Water Quality Meter (if needed/available for ammonia, surfactants and/or chlorine)
- ☐ Test Kits (if needed/available for ammonia and surfactants)
- ☐ Labels for sample bottles
- ☐ Sample bottles (bring some extras; bacteria bottles need to be sterile)
- ☐ Sand bags (for damming low flows)

It's a lot of stuff. Stay organized and prep all gear the day before inspection/sampling.

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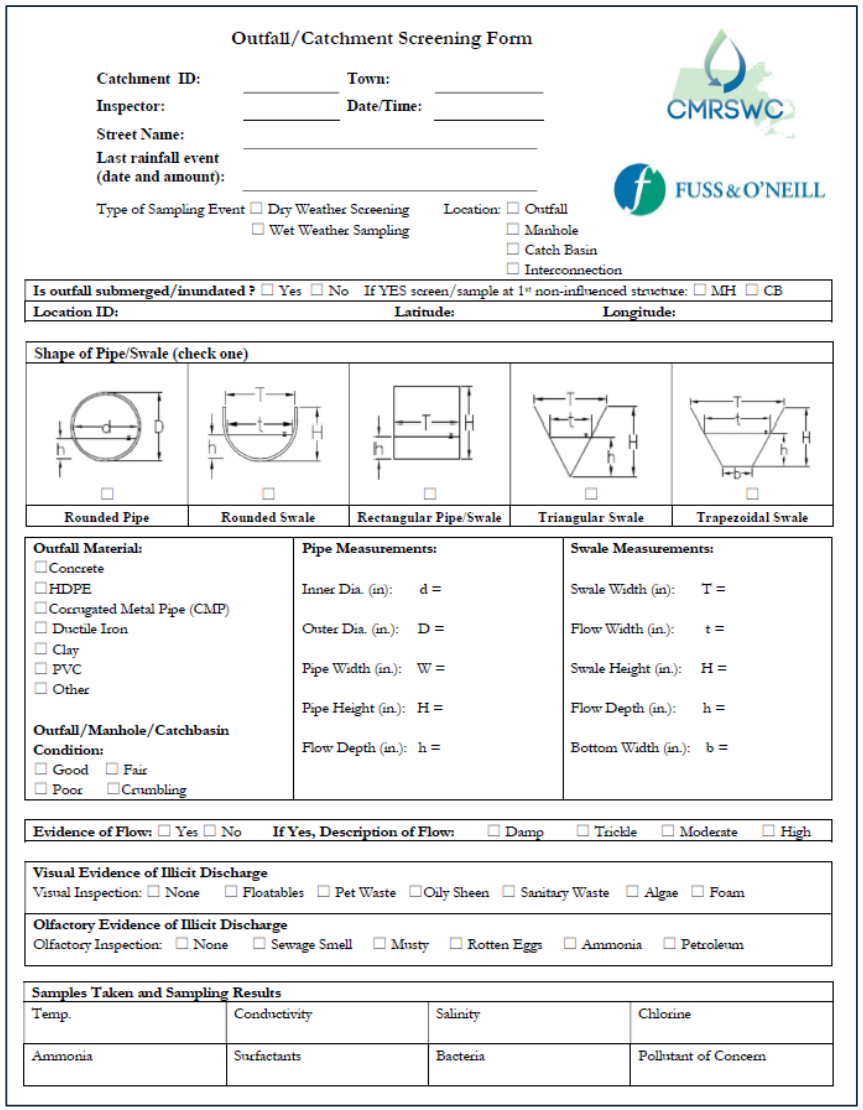
General Inspection/Sampling Procedure

1. Identify Outfall to Inspect/Sample
2. Fill out all sample information on field sheets and bottles as completely as possible
3. Conduct Visual and Olfactory Investigation
4. If sampling, put on protective gloves (nitrile/latex/other)
5. If using a sampling pole: triple rinse dipper in distilled water and then in water to be sampled (not for bacteria sampling)
6. Collect sample with pole or directly in sample containers. Do Not Disturb Sediments.
7. Collect additional samples as necessary depending on parameters
8. Conduct Test Strip and Test Kit analyses as needed
9. Conduct meter readings as needed (Rinse similar to sampling pole dipper)
10. Place Lab samples on ice, fill out Chain of Custody
11. Deliver samples to lab
12. Dispose of used test strips and test kit ampules properly

Paper vs. Digital Data Collection



Outfall/Catchment Screening Form

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Catchment ID: _____ **Town:** _____
Inspector: _____ **Date/Time:** _____
Street Name: _____
Last rainfall event (date and amount): _____

Type of Sampling Event ☐ Dry Weather Screening ☐ Wet Weather Sampling

Location: ☐ Outfall ☐ Manhole ☐ Catch Basin ☐ Interconnection

Is outfall submerged/inundated ? ☐ Yes ☐ No If YES screen/sample at 1st non-influenced structure: ☐ MH ☐ CB

Location ID: **Latitude:** **Longitude:**

Shape of Pipe/Swale (check one)

Rounded Pipe	Rounded Swale	Rectangular Pipe/Swale	Triangular Swale	Trapezoidal Swale
☐	☐	☐	☐	☐

Outfall Material:
☐ Concrete
☐ HDPE
☐ Corrugated Metal Pipe (CMP)
☐ Ductile Iron
☐ Clay
☐ PVC
☐ Other

Outfall/Manhole/Catchbasin Condition:
☐ Good ☐ Fair
☐ Poor ☐ Crumbling

Pipe Measurements:
Inner Dia. (in): d =
Outer Dia. (in.): D =
Pipe Width (in.): W =
Pipe Height (in.): H =
Flow Depth (in.): h =

Swale Measurements:
Swale Width (in): T =
Flow Width (in.): t =
Swale Height (in.): H =
Flow Depth (in.): h =
Bottom Width (in.): b =

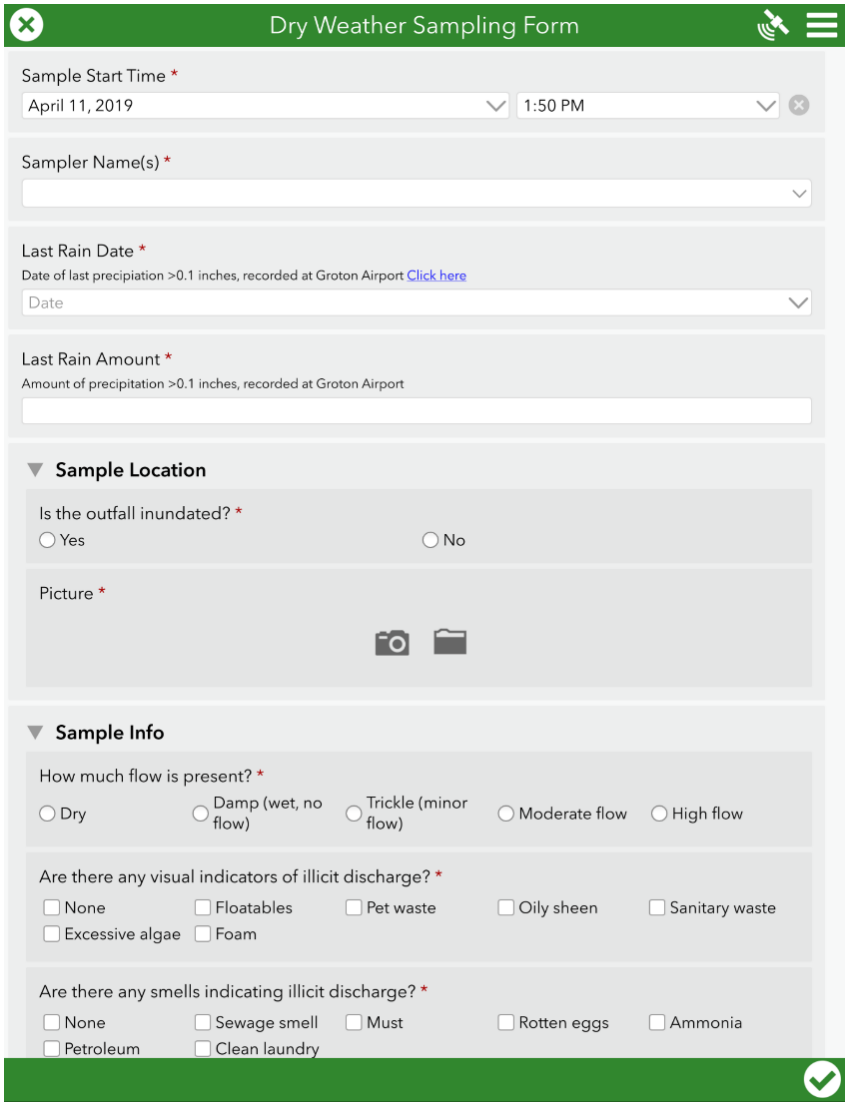
Evidence of Flow: ☐ Yes ☐ No **If Yes, Description of Flow:** ☐ Damp ☐ Trickle ☐ Moderate ☐ High

Visual Evidence of Illicit Discharge
Visual Inspection: ☐ None ☐ Floatables ☐ Pet Waste ☐ Oily Sheen ☐ Sanitary Waste ☐ Algae ☐ Foam

Olfactory Evidence of Illicit Discharge
Olfactory Inspection: ☐ None ☐ Sewage Smell ☐ Musty ☐ Rotten Eggs ☐ Ammonia ☐ Petroleum

Samples Taken and Sampling Results

Temp.	Conductivity	Salinity	Chlorine
Ammonia	Surfactants	Bacteria	Pollutant of Concern



Dry Weather Sampling Form

Sample Start Time *
April 11, 2019 1:50 PM

Sampler Name(s) *

Last Rain Date *
Date of last precipiation >0.1 inches, recorded at Groton Airport Click here
Date

Last Rain Amount *
Amount of precipitation >0.1 inches, recorded at Groton Airport

Sample Location

Is the outfall inundated? *
Yes No

Picture *

Sample Info

How much flow is present? *
Dry Damp (wet, no flow) Trickle (minor flow) Moderate flow High flow

Are there any visual indicators of illicit discharge? *
None Floatables Pet waste Oily sheen Sanitary waste
Excessive algae Foam

Are there any smells indicating illicit discharge? *
None Sewage smell Must Rotten eggs Ammonia
Petroleum Clean laundry

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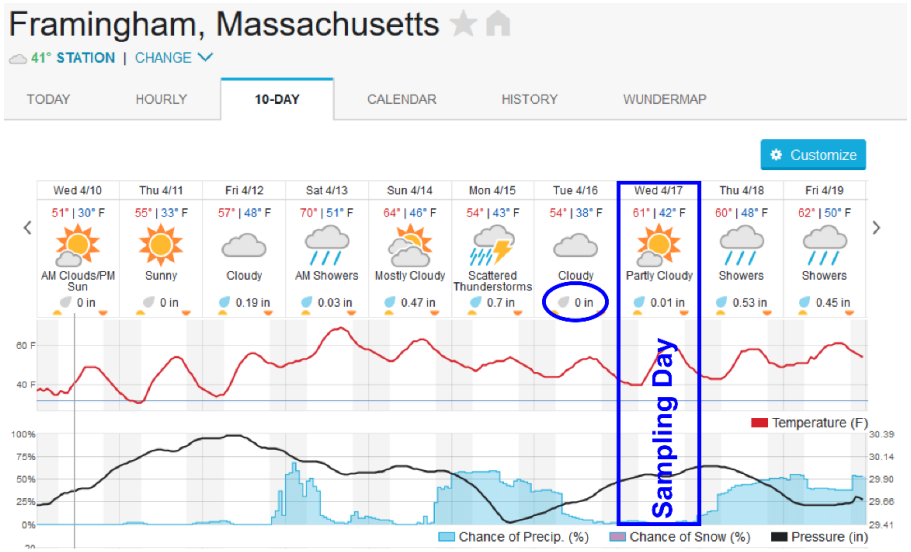
Dry-Weather Considerations

1 week prior to screening

- Look at the extended forecast for a day that will meet dry weather criteria
  < 0.1 inch of rain in the past 24 hours and no significant snow melt.
  - Get weather data
  - Use Weather Underground or similar weather service

    https://www.wunderground.com
  - Enter your town/city in the search bar. Hourly forecasts with rain totals and historical rainfall data are provided.
- Acquire all required field equipment. See the Outfall Screening Equipment Checklist.



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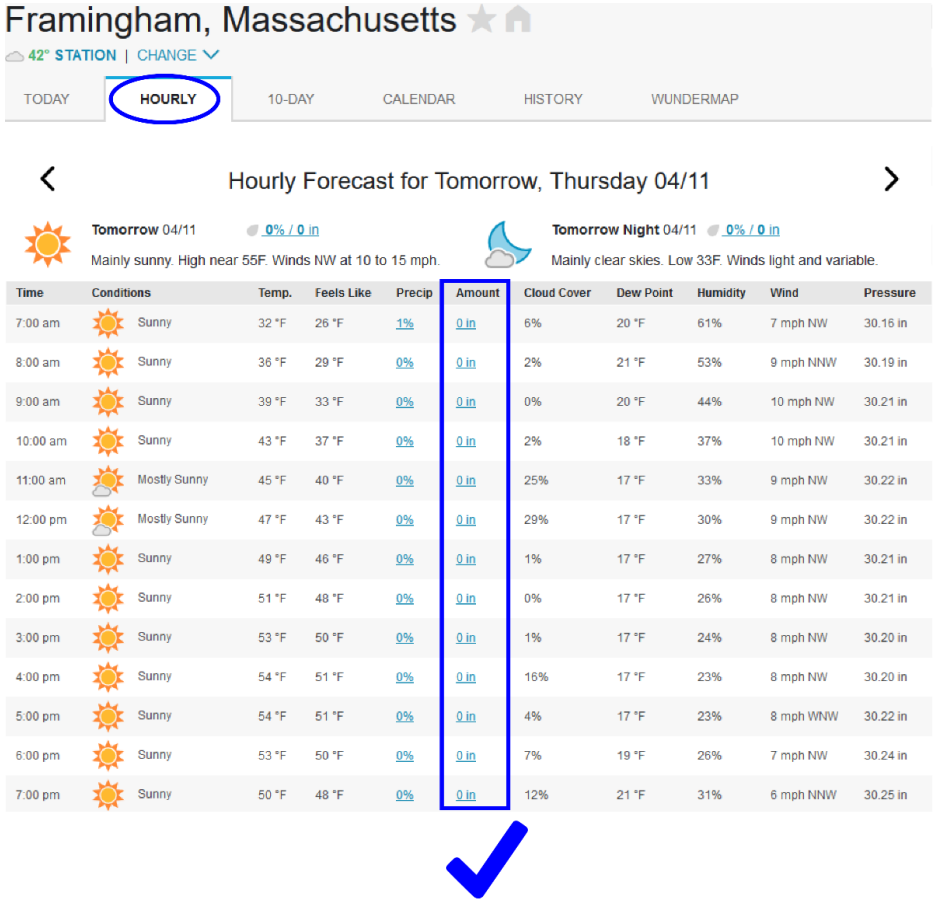
Dry-Weather Considerations

1 day prior to screening

- Verify that dry weather criteria will be met for the following day: < 0.1 inch of rain in the past 24 hours and no significant snow melt.
- Identify outfalls to be screened based on initial outfall inventory and priority ranking. Plan a route to minimize driving time.
- Gather all required field equipment. See the Outfall Screening Equipment Checklist.



Framingham, Massachusetts

42° STATION | CHANGE

TODAY | HOURLY | 10-DAY | CALENDAR | HISTORY | WUNDERMAP

Hourly Forecast for Tomorrow, Thursday 04/11

Tomorrow 04/11 — 0% / 0 in
Mainly sunny. High near 55F. Winds NW at 10 to 15 mph.

Tomorrow Night 04/11 — 0% / 0 in
Mainly clear skies. Low 33F. Winds light and variable.

Time	Conditions	Temp.	Feels Like	Precip	Amount	Cloud Cover	Dew Point	Humidity	Wind	Pressure
7:00 am	Sunny	32 °F	26 °F	1%	0 in	6%	20 °F	61%	7 mph NW	30.16 in
8:00 am	Sunny	36 °F	29 °F	0%	0 in	2%	21 °F	53%	9 mph NNW	30.19 in
9:00 am	Sunny	39 °F	33 °F	0%	0 in	0%	20 °F	44%	10 mph NW	30.21 in
10:00 am	Sunny	43 °F	37 °F	0%	0 in	2%	18 °F	37%	10 mph NW	30.21 in
11:00 am	Mostly Sunny	45 °F	40 °F	0%	0 in	25%	17 °F	33%	9 mph NW	30.22 in
12:00 pm	Mostly Sunny	47 °F	43 °F	0%	0 in	29%	17 °F	30%	9 mph NW	30.22 in
1:00 pm	Sunny	49 °F	46 °F	0%	0 in	1%	17 °F	27%	8 mph NW	30.21 in
2:00 pm	Sunny	51 °F	48 °F	0%	0 in	0%	17 °F	26%	8 mph NW	30.21 in
3:00 pm	Sunny	53 °F	50 °F	0%	0 in	1%	17 °F	24%	8 mph NW	30.20 in
4:00 pm	Sunny	54 °F	51 °F	0%	0 in	16%	17 °F	23%	8 mph NW	30.20 in
5:00 pm	Sunny	54 °F	51 °F	0%	0 in	4%	17 °F	23%	8 mph WNW	30.22 in
6:00 pm	Sunny	53 °F	50 °F	0%	0 in	7%	19 °F	26%	7 mph NW	30.24 in
7:00 pm	Sunny	50 °F	48 °F	0%	0 in	12%	21 °F	31%	6 mph NNW	30.25 in

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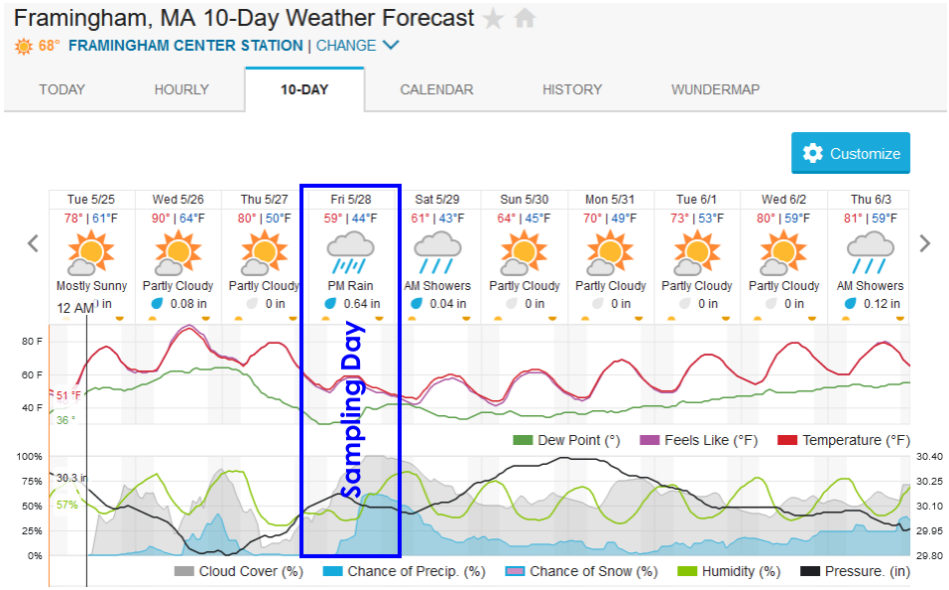
Wet-Weather Considerations

1 week prior to screening

- Look at the extended forecast for a day that will meet wet weather criteria
  Typically >0.1 inches of rain, enough to generate flow at outfall
  - Get weather data
  - Use Weather Underground or similar weather service

    https://www.wunderground.com
  - Avoid late night and weekend sampling
- Acquire all required field equipment. See the Outfall Screening Equipment Checklist.



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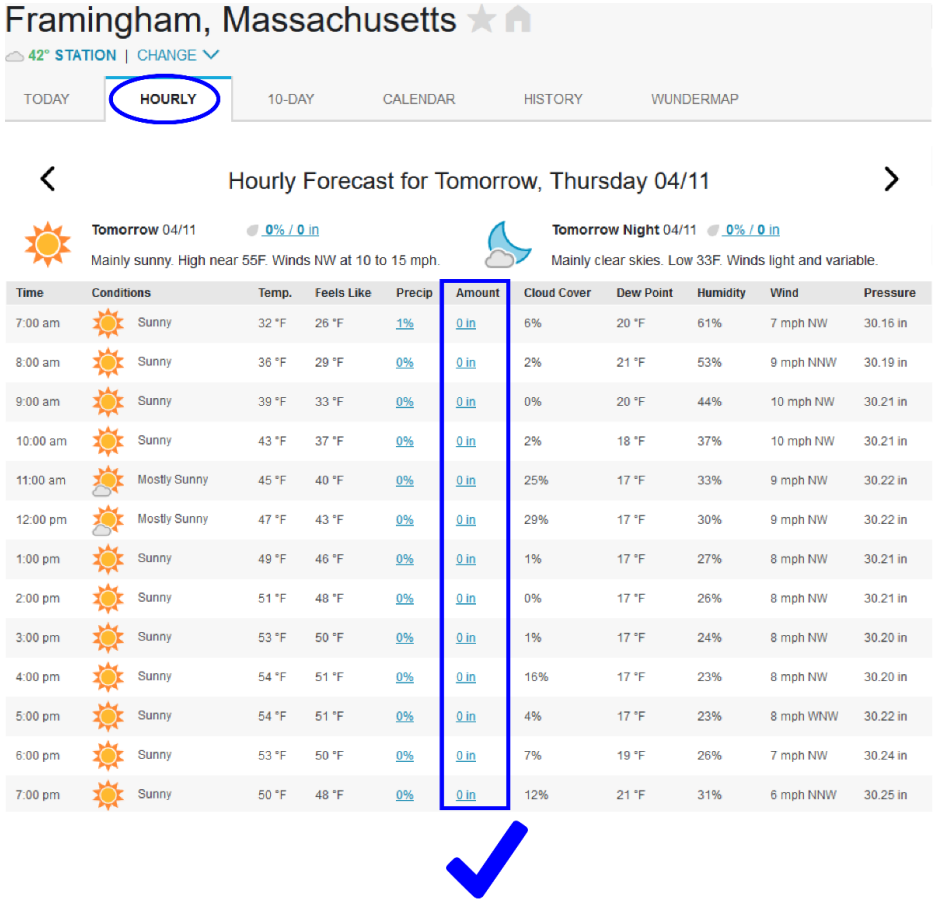
Wet-Weather Considerations

Preparation: 1 day prior to screening

- Verify that wet weather criteria will be met for the following day
- Identify outfalls to be screened based on SVF analysis. Plan a route to minimize driving time.
- Gather all required field equipment. See the Outfall Screening Equipment Checklist.



Framingham, Massachusetts

42° STATION | CHANGE

TODAY | HOURLY | 10-DAY | CALENDAR | HISTORY | WUNDERMAP

Hourly Forecast for Tomorrow, Thursday 04/11

Tomorrow 04/11 — 0% / 0 in

Mainly sunny. High near 55F. Winds NW at 10 to 15 mph.

Tomorrow Night 04/11 — 0% / 0 in

Mainly clear skies. Low 33F. Winds light and variable.

Time	Conditions	Temp.	Feels Like	Precip	Amount	Cloud Cover	Dew Point	Humidity	Wind	Pressure
7:00 am	Sunny	32 °F	26 °F	1%	0 in	6%	20 °F	61%	7 mph NW	30.16 in
8:00 am	Sunny	36 °F	29 °F	0%	0 in	2%	21 °F	53%	9 mph NNW	30.19 in
9:00 am	Sunny	39 °F	33 °F	0%	0 in	0%	20 °F	44%	10 mph NW	30.21 in
10:00 am	Sunny	43 °F	37 °F	0%	0 in	2%	18 °F	37%	10 mph NW	30.21 in
11:00 am	Mostly Sunny	45 °F	40 °F	0%	0 in	25%	17 °F	33%	9 mph NW	30.22 in
12:00 pm	Mostly Sunny	47 °F	43 °F	0%	0 in	29%	17 °F	30%	9 mph NW	30.22 in
1:00 pm	Sunny	49 °F	46 °F	0%	0 in	1%	17 °F	27%	8 mph NW	30.21 in
2:00 pm	Sunny	51 °F	48 °F	0%	0 in	0%	17 °F	26%	8 mph NW	30.21 in
3:00 pm	Sunny	53 °F	50 °F	0%	0 in	1%	17 °F	24%	8 mph NW	30.20 in
4:00 pm	Sunny	54 °F	51 °F	0%	0 in	16%	17 °F	23%	8 mph NW	30.20 in
5:00 pm	Sunny	54 °F	51 °F	0%	0 in	4%	17 °F	23%	8 mph WNW	30.22 in
6:00 pm	Sunny	53 °F	50 °F	0%	0 in	7%	19 °F	26%	7 mph NW	30.24 in
7:00 pm	Sunny	50 °F	48 °F	0%	0 in	12%	21 °F	31%	6 mph NNW	30.25 in

Source Identification









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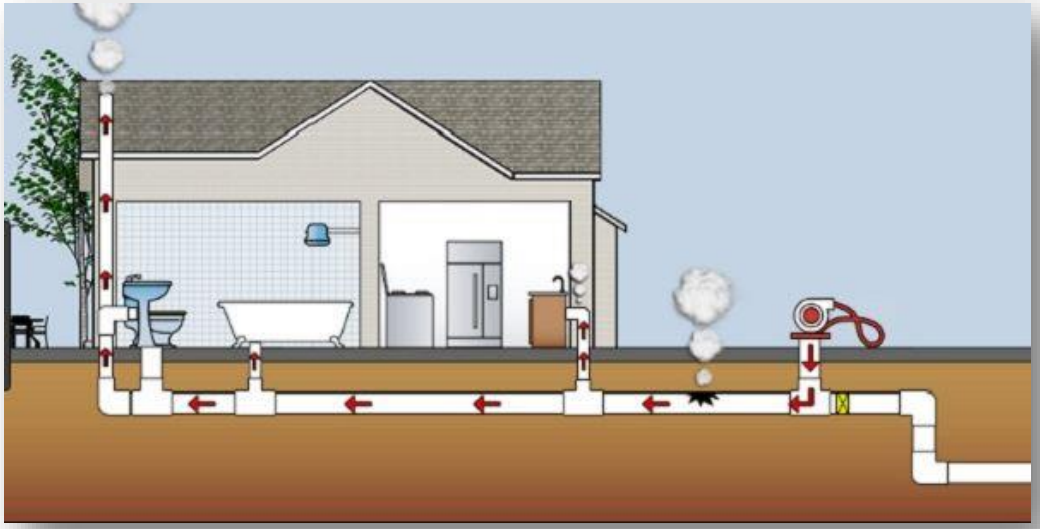
Source Identification











Source Identification

- **Identify and Remove Illicit Discharge**
- **Work with property owner and/or use bylaw enforcement**
- **Follow-up Inspection/ Sampling**



FUSS & O'NEILL

QUESTIONS?



William Guenther, MS
Senior Scientist/Project Manager
wguenther@fando.com
800.286.2469 x4579

FUSS & O'NEILL

Illicit Discharge Detection & Elimination (IDDE) Training for MS4 Permittees

Agenda

Part I

MS4 Permit & IDDE requirements 9:00–9:20
S. Nalven (VHB)

EPA Perspectives 9:20–9:30
Newt Tedder (EPA)

Successes & Hurdles Discussion 9:30–9:50
Breakout Session

Break (5 mins)

Part II

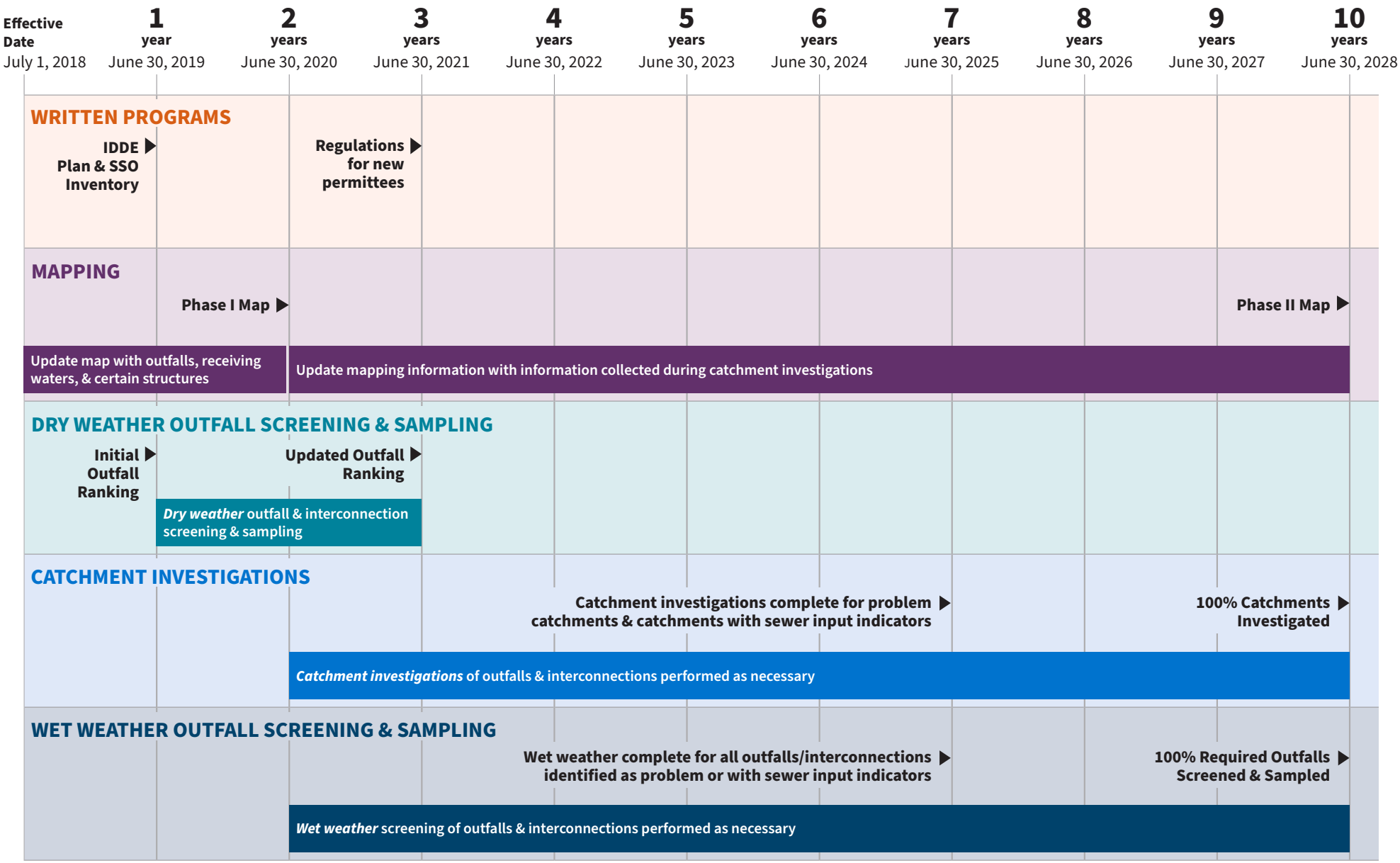
Best Practices 9:55–10:35

- Catchment Investigations
  A. Bastoni (VHB)
- Wet Weather Outfall Screening & Sampling
  S. Nalven (VHB)

Municipal Perspectives 10:35–10:45
Justin DeMarco (Maynard)

Questions & Discussion 10:45–11:00

2017 Massachusetts MS4 Permit Illicit Discharge Detection and Elimination (IDDE) Compliance Schedule



MS4 Illicit Discharge Detection & Elimination (IDDE) Fact Sheet



What is an Illicit Discharge?

An “illicit discharge” is any flow to a drainage system that is not composed entirely of stormwater, with the exception of allowable non-stormwater discharges (see below). Illicit discharges can result in high levels of pollutants, including heavy metals, toxics, oil and grease, nutrients, viruses, and bacteria entering our waterbodies. These pollutants degrade water quality and threaten aquatic, wildlife, and human health.

Examples of Illicit Discharge

- Cracked sanitary sewer pipes
- Failed septic systems
- Incorrect connection of sewer lateral to drain pipe
- Agricultural runoff
- Illegal dumping, spills or connections
- Soil erosion from construction sites
- Pet waste



Allowable Non-Stormwater Discharges*

- Water line flushing
- Discharge from potable water sources
- Landscape irrigation or lawn watering
- Diverted stream flows and natural riparian habitat or wetland flows
- Springs
- Uncontaminated ground water
- Foundation drains or footing drains (not including active groundwater dewatering systems)
- Water from crawl space pumps if possible contaminants (e.g. paint, chemicals) are not also stored in space
- Air conditioning condensation
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Fire-fighting activities
- Street wash waters
- Residential building wash waters without detergents
- Other water source not containing pollutants.

**defined by the MS4 Permit*

What to look for...



▲ *Presence of bacterial sheen, abnormal colors and odors.*





▲ *Construction site sediment entering drainage structure*



Presence of toilet paper or personal hygiene products

Signs of Illicit Discharge can include (but are not limited to):

- Signs of dumping or overland flow
- Signs of staining on pavement surrounding drainage structure
- Signs of flow during dry weather
- Bacterial sheen/scum/stains
- Sewage sheen/scum/stains
- Oily substances
- Cloudy waters
- Odors
- Suds
- Toilet paper or personal hygiene refuse
- Suspicious pipes coming into municipal property from homes or businesses

What should you do if you observe or suspect Illicit Discharge

If you need further help with MS4 compliance, IDDE Program Development, or illicit discharge elimination, contact VHB!



Annie Bastoni
Project Manager, Water Resources
abastoni@vhb.com | 617.607.2158



Sarah Nalven
Stormwater/Water Quality Specialist
snalven@vhb.com | 617.607.2646

In case of an emergency spill, contact **MassDEP 24-hour Emergency Line** at 1-888-304-1133.

vhb BAYSTATE ROADS

APPENDIX H

CONSTRUCTION AND POST-CONSTRUCTION SITE INSPECTION PROCEDURES

SOP 5: CONSTRUCTION SITE INSPECTION

Construction sites that lack adequate stormwater controls can contribute a significant amount of sediment to nearby bodies of water. The 2003 Massachusetts MS4 Permit required that permittees develop, implement and enforce a program to "reduce pollutants in any storm water runoff to the MS4" from construction activities of a certain size. The 2003 Massachusetts MS4 Permit established that permittees must implement this requirement for proposed construction that will disturb one acre (or more) of land, but some communities have applied the requirement for projects with a smaller proposed disturbance.

Each permittee was required to develop and adopt such regulatory mechanisms necessary to require erosion and sedimentation controls for these proposed projects, and to allow the use of monetary and non-monetary sanctions to enforce compliance, including any control measures in place at a construction site. If a proposed construction project exceeded the threshold (one acre of disturbance, at a minimum), the permittee was mandated to require that the proposed site operator implement an erosion and sediment control plan, which should identify stormwater Best Management Practices (BMPs) appropriate for the site, minimize the total land disturbance, and document a plan to control wastes from the site. The 2003 Massachusetts MS4 Permit also required permittees to develop a site plan review process, to begin with a preconstruction review, aimed at protecting the quality of water resources.

The objectives of the 2003 Massachusetts MS4 were reflected in USEPA's 2008 Construction General Permit (CGP) and the USEPA 2012 CGP that replaced the 2008 CGP when it expired on February 15, 2012. The CGP is required if a proposed project will disturb one or more acres, total. As such, the CGP program is a tool for municipalities to ensure compliance with the 2003 MS4 Permit. Operators of sites that required coverage under the USEPA's 2008 Construction General Permit but continue to be active should have submitted a new Notice of Intent (NOI) under the 2012 Permit.

This Standard Operating Procedure (SOP) describes the major components of a municipal Stormwater Construction Inspection Plan, as well as procedures for evaluating compliance of stormwater controls at construction sites. This SOP can be used for projects that require a CGP as well as smaller sites.

Stormwater Construction Inspection Plan

A stormwater Construction Site Inspection program is a program developed by municipalities to track, inspect, and enforce local stormwater requirements at construction sites.

This SOP assumes that the municipality has legal authority (i.e., a bylaw or ordinance) in place, per the requirements of the 2003 Massachusetts MS4 Permit, to require sediment and erosion control at construction sites. This legal authority must require construction site operators "to implement a sediment and erosion control program which includes [Best Management Practices] that are appropriate for the conditions at the construction site, including efforts to minimize the area of the land disturbance." The legal authority must also give inspectors the authority to enter the site.

A municipal stormwater Construction Site Inspection program should include or address the following:

1. Construction Site Inventory
    - A tracking system to inventory projects and identify sites for inspection.
    - Track the results of inspection and prioritize sites based on factors such as proximity to waterways, size, slope, and history of past violations.
2. Construction Requirements and BMPs
    - Municipalities provide contractors with guidance on the appropriate selection and design of stormwater BMPs.
3. Plan Review Procedures
    - Submitted plans must be reviewed to ensure they address local requirements and protect water quality.
4. Public Input
    - Per the 2003 Massachusetts MS4 Permit, a program must allow the public to provide comment on inspection procedures, and must consider information provided by the public.
5. Construction Site Inspections
    - Identify an inspection frequency for each site.
    - See more detailed information below.
6. Enforcement Procedures
    - A written progressive enforcement policy for the inspection program.
    - Sanctions, both monetary and non-monetary, shall be utilized to ensure compliance with the program
7. Training and Education
    - Municipal staff conducting inspections should receive training on regulatory requirements, BMPs, inspections, and enforcement.

Conducting Stormwater Inspections at Construction Sites

A municipal compliance inspector has the authority to place the burden of demonstrating compliance on the site operator, or contractor, to the greatest extent possible. Activities and documentation in the following sections may be performed or completed by either the site operator's inspector or a municipal inspector, so the general terms "construction site inspector" and "inspector" have been used.

The role of the construction site inspector is to ensure that site operations match the approved site plans and the Stormwater Pollution Prevention Plan (SWPPP) for the project, and that all precautions are taken to prevent pollutants and sediment from the construction site from impacting local waterways. The inspector is also expected to determine the adequacy of construction site stormwater quality control measures.

The attached Construction Site Stormwater Inspection Report shall be used by the inspector during site visits. Construction site inspectors should abide by the following guidelines:

1. Inspections to monitor stormwater compliance should be performed at least once per month at each active construction site, with priority placed on sites that require coverage under the USEPA 2012 CGP (i.e., that disturb one or more acres), and sites that are located in the watershed of any 303(d) water bodies.
2. The inspection shall begin at a low point and work uphill, observing all discharge points and any off-site support activities.
3. Written and photographic records shall be maintained for each site visit.
4. During the inspection, the inspector should ask questions of the contractor. Understanding the selection, implementation, and maintenance of BMPs is an important goal of the inspection process, and requires site-specific input.
5. The inspector should not recommend or endorse solutions or products. The inspector may offer appropriate advice, but all decisions must be made by the contractor.
6. The inspector shall always wear personal protective equipment appropriate for the site.
7. The inspector shall abide by the contractor's site-specific safety requirements.
8. The inspector has legal authority to enter the site. However, if denied permission to enter the site, the inspector should never force entry.

Prior to planning a site visit, an inspector shall determine if the project is subject to USEPA's 2012 Construction General Permit. If the site requires this coverage, the inspector shall visit the USEPA Region 1 eNOI website (http://cfpub.epa.gov/npdes/stormwater/cgpenoi.cfm or http://cfpub.epa.gov/npdes/stormwater/ noi/noisearch.cfm) to determine if the contractor filed for coverage under the 2012 and/or 2008 Construction General Permits, respectively. Print a copy of the project's NOI.

Note for municipal inspectors: If a project disturbs one or more acres and is under construction, but does not show up in either database, the project is in violation of the 2012 CGP. Call the contractor to determine if the NOI process has been started. If not, notify the contractor verbally of this requirement and the violation. Work cannot proceed on the site until a Notice of Intent (NOI) for coverage under the 2012 Construction General Permit has been approved by USEPA. The inspector may choose to print instructions on how to file an NOI and meet with the contractor to review these. The contractor proceeds with work at the site without seeking coverage under the 2012 CGP, contact USEPA's Region 1 Stormwater & MS4 Program Coordinator, Thelma Murphy, at murphy.thelma@epa.gov or 617-918-1615.

Once it has been determined that the site is in compliance with the 2012 Construction General Permit, the site inspection process can continue. The Construction Site Inspection process shall include the following:

1. Plan the inspection before visiting the construction site

   a. Obtain and review permits, site plans, previous inspection reports, and any other applicable information.
   b. Print the approved NOI from the USEPA 2012 Construction General Permit NOI website, listed previously.
   c. Inform the contractor of the planned site visit.
2. Meet with the contractor
   a. Review the Construction SWPPP (if the site includes over one acre of disturbance) or other document, as required by the municipality's legal authority. Compare BMPs in the approved site plans with those shown in the SWPPP.
   b. Review the project's approved NOI and confirm that information shown continues to be accurate.
   c. Get a general overview of the project from the contractor.
   d. Review inspections done by the contractor.
   e. Review the status of any issues or corrective actions noted in previous inspection reports.
   f. Discuss any complaints or incidents since the last meeting.
3. Inspect perimeter controls
   a. Examine perimeter controls to determine if they are adequate, properly installed, and properly maintained.
   b. For each structural BMP, check structural integrity to determine if any portion of the BMP needs to be replaced or requires maintenance.
4. Inspect slopes and temporary stockpiles
   a. Determine if sediment and erosion controls are effective.
   b. Look for slumps, rills, and tracking of stockpiled materials around the site.
5. Compare BMPs in the site plan with the construction site conditions
   a. Determine whether BMPs are in place as specified in the site plan, and if the BMPs have been adequately installed and maintained.
   b. Note any areas where additional BMPs may be needed which are not specified in the site plans.
6. Inspect site entrances/exits
   a. Determine if there has been excessive tracking of sediment from the site.
   b. Look for evidence of additional entrances/exits which are not on the site plan and are not properly stabilized.
7. Inspect sediment basins
   a. Look for signs that sediment has accumulated beyond 50% of the original capacity of the basin.
8. Inspect pollution prevention and good housekeeping practices
   a. Inspect trash areas and material storage/staging areas to ensure that materials are properly maintained and that pollutant sources are not exposed to rainfall or runoff.
   b. Inspect vehicle/equipment fueling and maintenance areas for the presence of spill control measures and for evidence of leaks or spills.
9. Inspect discharge points and downstream, off-site areas

   a. Walk down the street and/or in other directions off-site to determine if erosion and sedimentation control measures are effective in preventing off-site impacts.
   b. Inspect down-slope catch basins to determine if they are protected, and identify whether sediment buildup has occurred.

10. Meet with the contactor again prior to leaving
    a. Discuss the effectiveness of current controls and whether modifications are needed.
    b. Discuss possible violations or concerns noted during the site inspection, including discrepancies between approved site plans, the SWPPP, and/or the implementation of stormwater controls.
    c. Agree on a schedule for addressing all discrepancies, and schedule a follow-up inspection.
11. Provide a written copy of the inspection report to the contractor.
12. Follow up, as determined, and provide copy of subsequent inspection to the contractor.
13. Utilize the resources of USEPA Region 1 to enforce the contractor's compliance with the 2012 Construction General Permit and/or other document, as required by the municipality's legal authority, can be achieved.

Attachments

1. Construction Site Stormwater Inspection Report

Related Standard Operating Procedures

1. SOP 9, Inspecting Constructed Best Management Practices

CONSTRUCTION SITE STORMWATER INSPECTION REPORT

General Information

Project Name			
Project Location			
Site Operator			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Subject to USEPA Construction General Permit? Yes ☐ No ☐ If yes, has NOI been approved? Yes ☐ No ☐ If yes, attach approved NOI to this report. **If no, contact site operator immediately to determine status of NOI.**			
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			
Describe the current phase of construction			

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 ☐ No ☐	
2		Yes ☐ No ☐	

(continued)

	BMP Description	**Installed and Operating Properly?**	**Corrective Action Needed**
3		Yes ☐ No ☐	
4		Yes ☐ No ☐	
5		Yes ☐ No ☐	
6		Yes ☐ No ☐	
7		Yes ☐ No ☐	
8		Yes ☐ No ☐	
9		Yes ☐ No ☐	
10		Yes ☐ No ☐	
11		Yes ☐ No ☐	
12		Yes ☐ No ☐	
13		Yes ☐ No ☐	
14		Yes ☐ No ☐	
15		Yes ☐ No ☐	
16		Yes ☐ No ☐	
17		Yes ☐ No ☐	
18		Yes ☐ No ☐	
19		Yes ☐ No ☐	
20		Yes ☐ No ☐	

Erosion and Sedimentation Control

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 ☐ No ☐	
Is the contractor inspecting and maintaining ESC devices regularly?	Yes ☐ No ☐	
Is existing vegetation maintained on the site as long as possible?	Yes ☐ No ☐	
Is construction staged so as to minimize exposed soil and disturbed areas?	Yes ☐ No ☐	
Are disturbed areas restored as soon as possible after work is completed?	Yes ☐ No ☐	
Is clean water being diverted away from the construction site?	Yes ☐ No ☐	
Are sediment traps and sediment barriers cleaned regularly?	Yes ☐ No ☐	
Are vegetated and wooded buffers protected and left undisturbed?	Yes ☐ No ☐	
Are soils stabilized by mulching and/or seeding when they are exposed for a long time?	Yes ☐ No ☐	
Has vegetation been allowed to establish itself before flows are introduced to channels?	Yes ☐ No ☐	
Is regular, light watering used for dust control?	Yes ☐ No ☐	
Is excessive soil compaction with heavy machinery avoided, to the extent possible?	Yes ☐ No ☐	

(continued)

Issue	Status	Corrective Action Needed
Are erosion control blankets used when seeding slopes?	Yes ☐ No ☐	
Are trees and vegetation that are to be retained during construction adequately protected?	Yes ☐ No ☐	
Are areas designated as off-limits to construction equipment flagged or easily distinguishable?	Yes ☐ No ☐	
If excavated topsoil has been salvaged and stockpiled for later use on the project, are stockpiles adequately protected?	Yes ☐ No ☐	
Are temporary slope drains or chutes used to transport water down steep slopes?	Yes ☐ No ☐	
Do all entrances to the storm sewer system have adequate protection?	Yes ☐ No ☐	

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 ☐ No ☐	
Are material stockpiles covered or protected when not in use?	Yes ☐ No ☐	
Are natural resource areas protected with sediment barriers or other BMPs?	Yes ☐ No ☐	
Are perimeter controls and sediment barriers installed and maintained?	Yes ☐ No ☐	

(continued)

Issue	Status	Corrective Action Needed
Are discharge points and receiving waters free of sediment deposits and turbidity?	Yes ☐ No ☐	
Are storm drain inlets properly protected?	Yes ☐ No ☐	
Is there evidence of sediment being tracked into streets?	Yes ☐ No ☐	
Is trash/litter from the construction site collected and placed in dumpsters?	Yes ☐ No ☐	
Are vehicle/equipment fueling and maintenance areas free of spills and leaks?	Yes ☐ No ☐	
Are potential stormwater contaminants protected inside or under cover?	Yes ☐ No ☐	
Is dewatering from site properly controlled?	Yes ☐ No ☐	
Are portable restroom facilities properly sited and maintained?	Yes ☐ No ☐	
Are all hazardous materials and wastes stored in accordance with local regulations?	Yes ☐ No ☐	

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.

SOP 9: INSPECTING CONSTRUCTED BEST MANAGEMENT PRACTICES

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. Constructed BMPs are permanent site features designed to treat stormwater before infiltrating it to the subsurface or discharging it to a surface water body.

This Standard Operating Procedure provides a general summary of inspection procedures for eight common constructed 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 that document. 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.

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; and
2. Exfiltration bioretention area: Areas that are configured to recharge groundwater in addition to acting as a filter.

Inspection & 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 required water quality treatment and the recharge of groundwater.

Constructed Stormwater Wetlands

Constructed stormwater wetlands maximize the 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.

Inspection & 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, 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

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 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 to reduce 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.

Inspection & 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, which 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.

Inspection & 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 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.

Inspection & Maintenance

If properly maintained, sand and organic filters have a long design life. Maintenance requirements 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 replacement of the sand should be completed.

Maintenance Schedule: Proprietary Media 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, and if properly designed and maintained wet basins can add fire protection, wildlife habitat and aesthetic values to a property.

Inspection & 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.

Inspection & 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 quantity 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, however high failure rates often occur due to improper siting, inadequate pretreatment, poor design and lack of maintenance.

Inspection & 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

INSPECTION OF BIORETENTION AREAS / RAIN GARDENS

General Information

BMP Description	Bioretention Area / Rain Garden		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for soil erosion and repair	Monthly	Yes ☐ No ☐	
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Remove trash	Monthly	Yes ☐ No ☐	
Mulch void areas	Annually	Yes ☐ No ☐	
Remove dead vegetation	Bi-Annually	Yes ☐ No ☐	
Replace dead vegetation	Annually	Yes ☐ No ☐	
Prune	Annually	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

INSPECTION OF CONSTRUCTED STORMWATER WETLANDS
Years 0-3 of Operation

General Information

BMP Description	Constructed Stormwater Wetland		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

In addition, the following information should be recorded and mapped at least once per year:

- Types and distribution of dominant wetland plants
- Presence and distribution of planted wetland species
- Presence and distribution of invasive species
- Indications other species are replacing planted wetland species
- Percent of standing water that is not vegetated
- Replace all media and vegetation
- Stability of original depth zones and micro-topographic features
- Accumulation of sediment in the forebay and micropool and survival rate of plants

INSPECTION OF CONSTRUCTED STORMWATER WETLANDS
Year 4 - Lifetime of Operation

General Information

BMP Description	Constructed Stormwater Wetland		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Clean forebays	Annually	Yes ☐ No ☐	
Clean sediment in basin/wetland system	Once every 10 years	Yes ☐ No ☐	
Mulch void areas	Annually	Yes ☐ No ☐	
Remove dead vegetation	Bi-Annually	Yes ☐ No ☐	
Replace dead vegetation	Annually	Yes ☐ No ☐	
Prune	Annually	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

INSPECTION OF EXTENDED DRY DETENTION BASINS

Inspections should be conducted bi-annually, and during and after major storm events.

General Information

BMP Description	Extended Dry Detention Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Examine outlet structure for clogging or high outflow release velocities	Bi-Annually	Yes ☐ No ☐	
Mow upper stage, side slopes, embankment and emergency spillway	Bi-Annually	Yes ☐ No ☐	
Remove trash and debris	Bi-Annually	Yes ☐ No ☐	
Remove sediment from basin	At least once every 5 years	Yes ☐ No ☐	

INSPECTION OF PROPRIETARY MEDIA FILTERS

General Information

BMP Description	Media Filter		
BMP Location			
Media Type			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for standing water, trash, sediment and clogging	Bi-Annually (minimum)	Yes ☐ No ☐	
Remove trash and debris	Each Inspection	Yes ☐ No ☐	
Examine to determine if system drains in 72 hours	Annually	Yes ☐ No ☐	
Inspect filtering media for clogging	Per manufacturer's schedule	Yes ☐ No ☐	

INSPECTION OF SAND AND ORGANIC FILTERS

Inspections should be conducted after every major storm event for the first 3 months following completion, then every 6 months thereafter.

General Information

BMP Description	Sand/Organic Filter		
BMP Location			
Media Type			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Remove sediment, trash, and debris	Every 6 months	Yes ☐ No ☐	
Rake sand	Every 6 months	Yes ☐ No ☐	

INSPECTION OF DRY WELLS

Regular inspections should be conducted after every major storm event for the first 3 months following completion, then annually thereafter.

General Information

BMP Description	Dry Well		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			
Describe condition of dry well at time of inspection			

After a major storm event, the water depth in the observation well should be measured at 24 and 48 hour intervals and the clearance rate calculated.

INSPECTION OF WET BASINS

Inspections should be conducted after every major storm event for the first 3 months following completion, then biannually thereafter.

General Information

BMP Description	Wet Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			
Describe condition of wet basin at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Preventative maintenance	Bi-Annually	Yes ☐ No ☐	
Mow/rake buffer area, side slopes and basin bottom	Bi-Annually	Yes ☐ No ☐	
Remove trash, debris and organic matter	Bi-Annually	Yes ☐ No ☐	
Inspect and clean pretreatment devices	Every other month and after every major storm event	Yes ☐ No ☐	

INSPECTION OF OTHER BMP

General Information

BMP Description			
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	

APPENDIX I

ENCOURAGING LOW IMPACT DEVELOPMENT IN FRAMINGHAM, MA: A BYLAW REVIEW ANALYSIS, Mass Audubon, 2017
STREET DESIGN AND PARKING LOTS REPORT, Weston & Sampson, May 2022

Encouraging Low Impact Development in Framingham, MA: A bylaw review analysis



Overview

The following analysis was prepared by Mass Audubon as part of a technical assistance project providing training and technical assistance to communities in Massachusetts to apply cost-effective Low Impact Development (LID) techniques. Specifically, this report evaluates selected land use regulations in relation to models and examples from the Commonwealth of Massachusetts' Smart Growth/Smart Energy Toolkit and other sources in relation to the use of LID and Green Infrastructure (GI) techniques in development. The focus is primarily on residential development.

Best practices minimize the alteration of natural green infrastructure such as forests; minimize creation of impervious surfaces; support retention of substantial naturally vegetated buffers along wetlands and waterways; minimize grading and alterations to natural flow patterns; and support the use of LID techniques as the preferred, most easily permitted methods for managing stormwater.

This project complements existing work on rewriting existing subdivision rules and regulations and other bylaw and regulation updates that encourage LID and smart growth design. Mass Audubon applauds Framingham's work to ensure local coordination across municipal boards and permits, which is critical for supporting LID. Application of these practices can result in significant savings in infrastructure maintenance costs, as well as improved water quality and protection of water supplies, while supporting property values and overall quality of life. Sustainable development through the application of LID in all aspects of land and water management is a multi-faceted issue that can only successfully be addressed by working together among different departments and perspectives.

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Key Areas of Analysis

1. Overall site design: Open Space Residential Design (OSRD) vs. conventional subdivisions
2. Project design and layout standards in relation to LID: road layout and width, curbing, drainage, sidewalks, parking, landscaping
3. Maintenance and operations, mechanisms for enforcement: Who is responsible for maintaining drainage/LID (municipal or homeowner); easements, homeowner association option; municipal inspection and administration systems (regardless of who is responsible this is needed)

Open Space Residential Design (OSRD) Overview Analysis

Framingham's four cluster bylaws (Neighborhood Cluster Development K, Open Space Cluster Development L, Agricultural Preservation Development M, and Planned Unit Development District Section III) offer room to consolidate and clarify the intentions of each. All four also require special permits, which may deter some developers from trying to understand them all and decide the best course of action. Instead, it might be helpful to create fewer bylaws or very clearly describe the differences between their intentions and goals.

Several of the bylaws offer vague language on "working harmoniously with the existing landscape" or protecting "significant areas of public open space" without giving clear guidelines that will guide developers to a sustainable design and offer the planning board guidelines on what to look for. Contiguity of open space is required in two of the bylaws (K & M), but not in the others. Only K & L require monitoring of open space, while only L & M discuss the relationship to other plans such as the Master or Open Space Plan. Incorporating the best practices and aspects of each of these bylaws into those that are lacking that aspect would improve each of these bylaws and offer improved open space protection throughout the community.

These steps will help Framingham offer easy-to-permit, smart development choices for developers to ensure sustainable developments that preserve the community's natural resources and community character.

Zoning Bylaws, Subdivision, Site Plan Review, and Stormwater Analysis

In many ways, Framingham's bylaws and regulations go above and beyond what is required within this analysis, including encouraging complete streets that work to allow pedestrian- and bicycle-friendly ways. Framingham also requires developers completing Site Plan Review (SPR) provide a summary of how the proposed project would affect local water service infrastructure, including delivery and supply, and whether changes in that infrastructure would be required to accommodate the project. It also requires major SPR to include information on how local water bodies, the water table, and subsurface groundwater supply and how LID could mitigate these damages from stormwater runoff. This foresight in planning allows the town to easily identify projects that may affect local water supplies, addressing an increasingly critical concern for the current and future generations.

The recently adopted Land Disturbance and Stormwater Management (LDSM) Bylaw meets the "best" category for nearly every factor except not explicitly addressing ROW width, allowing bioretention to count as landscaping requirements, and rooftop runoff to be infiltrated (though LID BMPs are required in the plan). A simple correction to explicitly allow these practices would give the town a perfect score for this bylaw. The LDSM goes further than the requirements by noting that development "shall be

located in previously developed, cleared, disturbed, and/or improved areas before an applicant proposes to disturb an area that presents existing natural topography." This bylaw also innovatively allows for developers who are unable to mitigate their stormwater on-site (or where off-site provides increased benefit), the PB may allow the developer to do off-site mitigation or contribute to a Stormwater Mitigation to fund projects that offer a "net public benefit."

Similarly, the newly proposed Subdivision Rules and Regulations offer a nearly perfect rating. The only areas in which they received a "better" (mid) rating, were: common drives, permeable paving, LID in parking areas, rooftop runoff, soil stabilization, and native plantings. Again, while the overall goal of the rules and regulations encourage these best practices, they don't explicitly address these issues. However, in many other areas of both the Subdivision Rules and Regs and the LDSM, the goals of minimizing disturbance and managing stormwater and repeatedly addressed to ensure its prioritization. The newer regulations eclipse the old and are an improvement in nearly every factor (except neither address rooftop runoff).

Framingham's zoning bylaws were rated "conventional" in terms of dimensional standards, but "better" in most other categories, with a still-impressive amount of "best" practices. Opportunities exist in terms of incorporating native planting requirements, allowing common drives in areas other than scenic roadways and expanding the area of the community that has a maximum amount of impervious surfaces beyond groundwater protection districts, PUDs, and Active Adult Housing.

Overall, Framingham's commitment to the protection of its natural resources and for ensuring sustainable development that maintains the historic and cultural character of the town is inspiring. The attached chart gives a more detailed analysis of Framingham's zoning bylaw, site plan review, stormwater bylaw, and subdivision rules and regulations.

Additional Notes and Recommendations

Stormwater Calculations
Framingham's new Subdivision Rules and Regs have updated references to include the most updated data on storm intensities from the Northeast Climate Center at http://www.nrcc.cornell.edu/.

Landscaping and Recommended Trees
Ensure your local landscaping regulations require native, pollinator friendly species such as those here: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_015043.pdf

Other Considerations

Funding and Maintenance:

- Ensure sufficient funding for DPW to perform maintenance of stormwater management facilities, whether conventional or LID. Most of Framingham's regulations require homeowner associations to cover this cost, which will ensure maintenance in perpetuity.
- Consider reduced costs of paving, plowing, salt when comparing LID maintenance costs with conventional designs
- Create mechanisms for enforcement of maintenance agreements; establish regulations/fines for property owners who fail to maintain stormwater facilities.

Training:

- Provide opportunities for and encourage municipal staff and committee/board members to participate in LID workshops or conferences.

Nonpotable uses of clean stormwater:

- Local plumbing codes should allow the use of clean (e.g. rooftop) rainwater for landscape irrigation and interior non-potable uses such as toilet flushing.

Demonstration projects/public education

- Implement LID demonstration programs at city or town hall, schools, DPW, etc.

Common Acronyms

BoA	Board of Appeals
BoH	Board of Health
BMP	Best Management Practice
CC	Conservation Commission
CR	Conservation Restriction pursuant to MGL 184, S.31-33
DPW	Department of Public Works
GI	Green Infrastructure
HA	Homeowner's Association
LID	Low Impact Development
MS4	Municipal Separate Storm Sewer System
NRPZ	Natural Resource Protection Zoning
OS	Open Space
OSRD	Open Space Residential Design
PB	Planning Board
ROW	Right of Way
SP	Special Permit
SPGA	Special Permit Granting Authority

Resources and Model Bylaws/Regulations

For additional information on best practices, model LID and OSRD bylaws and regulations, case studies, and other related resources see the following websites:

- Massachusetts Smart Growth/Smart Energy Toolkit, including case studies and model bylaws: www.mass.gov/envir/smart_growth_toolkit/
- Massachusetts Smart Growth Model Open Space Design/Natural Resource Protection Zoning: www.mass.gov/envir/smart_growth_toolkit/bylaws/model-osd-nrpz-zoning-final.pdf
- Metropolitan Area Planning Council's (MAPC) LID Toolkit www.mapc.org/low-impact-dev-toolkit
- MA-APA *Neighborhood Road Design Guidebook* http://www.apa-ma.org/resources/publications/nrb-guidebook
- MAPC's Environmental Planning Services: www.mapc.org/environment
- Shaping the Future of Your Community Program: www.massaudubon.org/shapingthefuture

Acknowledgements and Disclaimer

The OSRD best practices chart is based on the Massachusetts Executive Office of Energy and Environmental Affairs' Model Open Space Design/Natural Resource Protection Zoning. The zoning, subdivision, site plan, and stormwater regulatory analysis chart is based on a checklist from the MAPC LID Toolkit.

This report was prepared by Mass Audubon as part of a technical assistance project, *Empowering MetroWest Communities to Manage Land and Water Resources for a Sustainable Future*. The project also included other outreach and information provided in collaboration with the Charles River Watershed Association (CRWA) and the Massachusetts Rivers Alliance. For more information and resources on this topic, see www.massaudubon.org/LIDCost.

Mass Audubon, CRWA, and the Massachusetts Rivers Alliance thank the Foundation for MetroWest for the grant funding and opportunity to serve the local community. Established in 1995, the Foundation for MetroWest is the only community foundation serving the 33 cities and towns in the region. The Foundation promotes philanthropy in the region, helps donors maximize the impact of their local giving, serve as a resource for local nonprofits and enhance the quality of life for all our residents. Since inception, the Foundation has granted $11.6 million to charitable organizations and currently stewards more than $15 million in charitable assets for current needs and future impact. To learn more, please visit www.foundationformetrowest.org or call 508-647-2260



Contact Us

For questions regarding this analysis or how to implement recommended changes, please feel free to contact us:

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Factors	Conventional	Better	Best	Framingham Zoning Bylaws	OLD Subdivision Rules and Regs	NEW Subdivision Rules and Regs	Site Plan Review	Land Disturbance and Stormwater Management Bylaw
DIMENSIONAL REQUIREMENTS								
Lot size	Required minimum lot sizes	OSRD/NRPZ preferred. Special permit with incentives to utilize	Flexible with OSRD/NRPZ by right, preferred option	Required minimum lot sizes. Section IV, Dimensional Regulations	*(Not applicable)*	*(Not applicable)*	*(Not applicable)*	*(Not applicable)*
Setbacks	Required minimum front, side, and rear setbacks	Minimize, allow flexibility	Clear standards that minimize and in some instances eliminate setbacks	Required mimimum setbacks, Secion IV, Dimensional Regulations	*(Not applicable)*	*(Not applicable)*	*(Not applicable)*	*(Not applicable)*
Frontage	Required minimum frontage for each lot/unit	Minimize especially on curved streets and cul-de-sacs	No minimums in some instances, tied into other standards like OSRD design and shared driveways.	Required mimimum frontage, Section IV, Dimensional Regulations	*(Not applicable)*	*(Not applicable)*	*(Not applicable)*	*(Not applicable)*
Common driveways	Often not allowed, or strict limitations	Allow for 2-3 residential units	Allow for up to 4 residential units	On scenic roads, "The use of common driveways is encouraged to preserve and to enhance the visual appearance and rural character of scenic roads" without specifying number of units allowed per driveway. Appendix 11: 10.6.2	Not addressed.	Allowed for up to 3 lots in ANRs. IX.G.11.a.	Not addressed	*(Not applicable)*
Limit impervious area in Rural Districts. In high density areas, require post-development infiltration to = or > predevelopment	Not usually addressed in zoning and subdivision regs for rural/suburban residential	<15% / post-development must match pre-development	<10% / post-development must be </= pre-development	In Planned Unit Development District (PUD), must be <40% of the total area of developable land within the district. However, roadways and sidewalks are excluded from this requirement. III.B.6.d.(1) In Groundwater Protection District, SP required for >15% impervious or 2,500sqft, whichever is greater. "In such instances, a system for groundwater recharge must be provided that does not degrade groundwater quality." III.D.9.iii. In Active Adult Housing, must be <15% impervious. V.I.2.e	"The proposed subdivision will not increase the rates, concentration or velocity of runoff, and it will minimize the volume increase of runoff from the subdivision to adjoining properties" VII.C.4	Impervious areas not limited to percentage. However, post-dvpt peak discharge must be </= predvpt for 2 and 10-yr 24hr storms. If 100-yr, 24-hr storm increases flooding offsite, must use LID BMPs to attenuate. IX.H.1.b	Projects with larger square footage require Major SPR (vs minor). May encourage smaller footprints, but doesn't directly mention limiting impervious.	Natural hydrology and water quality shall be maintained during and post construction. Projects that alter natural stormwater and drainage systems shall replicate natural conditions with respect to infiltration, evapotranspiration, and stormwater runoff.

Factors	Conventional	Better	Best	Framingham Zoning Bylaws	OLD Subdivision Rules and Regs	NEW Subdivision Rules and Regs	Site Plan Review	Land Disturbance and Stormwater Management Bylaw
Allow easy siting of LID features (bioretention, swales, etc.)	Often not addressed, may require waivers from subdivision standards	Encouraged along road ROW	Allowed on lots, common open space, or road ROW, easement recorded	Encouraged in parking areas. IV.A.i. LID BMPs should be used "throughout the site" with specific mentions of BMPs. IV.B.4.d.1&2 Neighborhood Cluster Development requires use of LID to "achieve sustainability objectives." V.K.d.8 In Open Space Cluster Development and Agricultrual Preservation Development, PB "shall require the use of non-structural stormwater management techniques and other drainage techniques that reduce impervious surface and enable infiltration utilizing LID...when feasible." V.L.b.iv / V.M.b.vi	Not addressed.	"All subdivisions planned and constructed within Framingham shall be designed to establish neighborhood character and community, enhance connectivity, ensure efficient and sustainable infrastructure, and decrease physical impacts to the natural environment by incorporating Best Management Practices (BMP), Low Impact Development (LID), stormwater anagement on-site..." IX.A.1.	Object of SPR includes to "encourage and utilize the use of low impact development techniques…" VI.F.1.c. Project must employ BMPs from MassDEP Stormwater Handbook. Requires a written summary of LID and BMPs used on site. VI.4.a.5	Any permitted topographical alterations, tree removal, earth removal/fill, and/or site improvements associated with the LDSM By-Law shall incorporate LID techniques and BMPs to the greatest extent feasible. Such features may include rain gardens, rain water harvesting, green roofs, curb breaks, native/hybrid plantings, etc. F.3.a.i.
Permeable paving	Often not addressed, may require waivers from subdivision standards	Allowed on private residential lots for parking, patios, etc.	Allowed for residential drives, parking stalls, spillover parking spaces, emergency access ways (with proper engineering support for emergency vehicles) Two track design allowed for driveways and secondary emergency access ways (where required).	*(Not applicable)*	Not addressed.	Not addressed, however, LID BMPs are encouraged.	Not addressed	Mentioned in definition of LIDs, but not specified where exactly permeable paving is permitted. Assumed to be allowed.
Parking	Specific minimums set based on projected maximum use times	Encourage minimum # needed to serve routine use (e.g. 2/residential unit with any additional/visitors parking behind in driveway or on street.	Establish Maximum Parking spaces allowed Do not require more than 2/residence	No more than two spaces required and on-site parking requirements may be reduced if a parking lot of 20+ spaces is within 300'. Section II.4.ii	*(Not applicable)*	*(Not applicable)*	Requires written report on parking impact, including ways to mitigate effects of project and promote instead bicycles, and public transit. No direct limitation on parking, but encourages thought on minimization.	*(Not applicable)*
Commercial Parking	Specific minimums set based on projected maximum use times adding all on-site uses together.	Some flexibility to reduce minimums based on street or other available nearby parking or transit.	Allowed shared parking for uses with different peak demand times. Provide model agreements/deed restrictions. Reduce parking requirements near transit. Limit parking stall size (9ftx18ft max), with up to 30% smaller for compact cars	Allowed shared parking, shuttle service, car sharing and carpooling to reduce required parking (IV.B.1.). Smaller parking stalls permitted and pervious material allowed (IV.B.2-4).	*(Not applicable)*	*(Not applicable)*	Requires written report on parking impact, including ways to mitigate effects of project and promote instead bicycles, and public transit. No direct limitation on parking, but encourages thought on minimization.	*(Not applicable)*

Factors	Conventional	Better	Best		Framingham Zoning Bylaws	OLD Subdivision Rules and Regs	NEW Subdivision Rules and Regs	Site Plan Review	Land Disturbance and Stormwater Management Bylaw
LID in Parking Areas	Often not addressed, may require waivers e.g. for planting islands to drain down rather than built up surrounded by curbs	Allow LID/bioretention within parking areas	Require landscaping within parking areas, as LID/bioretention		Encourage LID techniques (IV.A.1.i) and utilize LID and BMPs throughout site (IV.B.4.d) and use rain gardens and bio-swales (IV.B.5.b&c).	Not addressed.	Shade trees required to be retained in parking areas. However, LID not specifically required in parking areas, but is generally encouraged.	Object of SPR includes to "encourage and utilize the use of low impact development techniques…" VI.F.1.c. Project must employ BMPs from MassDEP Stormwater Handbook. Requires a written summary of LID and BMPs used on site. VI.5.d. Does not specify in parking areas.	Encourages use of LID, though does not specify parking.
Site Plan Requirements	LID may not be addressed	Encourage use of LID features in site design	Count bioretention and other vegetated LID features toward site landscaping/open space requirements.		*(Not applicable)*	*(Not applicable)*	*(Not applicable)*	Site design must relate to historical and natural character of neighborhood and minimize disruption. Consistent with MP, OS plan. IV.F6.f.1. Specific landscaping requirements not addressed.	LDSM site plan requires location and plan detail for each different type of BMP and LID used on site and encourage preservation of open space and native species, promoting contiguous areas. Specific landscaping requirements not addressed.
Rooftop runoff	Prohibit directing clean roof runoff into closed municipal drainage systems.	Allow clean roof runoff to be directed to landscaped or naturally vegetated areas capable of absorbing without erosion, or infiltration	Require directing clean roof runoff to landscaped or naturally vegetated areas capable of absorbing, or infiltration		*(Not applicable)*	Only mentions estimating runoff by percentage of roofs and pavements into drain piping, infiltration stuctures or other closed drainage systems. VII.C.20 Roof runoff (and other sw runoff) must be managed "through a storm drainage system and maintenance plan which will not have adverse impacts on abutting or downstream properties" without mention of LID	Not addressed, however, LID is generally encouraged.	LID encouraged, but roof runoff not specifically addressed.	Rooftop runoff not addressed specifically, but LDSM plan requires LID BMPs.
Overall stormwater design; piping and surficial retention vs. LID	Conventional stormwater system design standards		LID design standard. Allow surficial ponding of retained runoff for up to 72 hours		*(Not applicable)*	Detention basins shall be landscaped and made and maintained as an integral part of the streetscape. Section VII.C.7.	LID standard. "Subdivisions are expected to exceed compliance for all regulations that are set forth in federal, state, and local statutes and those regulations that relate to stormwater discharge and management." IX.E.2c.i.	Stormwater drainage systems shall incorporate LID BMPs.	LID design standard. Stormwater management shall exceed federal and state requirements. Any topographic alterations or improvements shall incorporate LID techniques and BMPs to the greatest extent feasible.

Factors	Conventional	Better	Best		Framingham Zoning Bylaws	OLD Subdivision Rules and Regs	NEW Subdivision Rules and Regs	Site Plan Review	Land Disturbance and Stormwater Management Bylaw
Stormwater management O&M plan	Typically only addressed if municipality has a stormwater or LID bylaw, or for areas subject to wetlands permitting	Required	Required, surficial bioretention and swales preferred. Closed/underground systems requiring specialized inspection and clean out discouraged.		*(Not applicable)*	Stormwater and Surface Water Drainage and Management Plan will detain stormwater on the land at the site of the development to the maximum extent practicable utilizing the wise use of natural features of the site and BMP's, including groundwater infiltration. VII.C.	"Stormwater management shall be designed using BMPs and LID to manage stormwater on the site of the development to the maximum extent practicable." IX.H.2.f. "The water quality of the receiving waters or MS4 will not be degraded by the stormwater run-off from the development site. Provision for attenuation of runoff pollutants and for ground water recharge shall be incorporated into the stormwater management design." IX.H.2.j.	Requires written report on stormwater and sw maintenance (major SPR only). Includes impact on local waterways, subsurface ground water, and water tables, as well as ways to mitigate damage through LID. Doesn't specifically discourage grey infrastrcuture.	Long-Term Operations and Management LDSM Plan for all features installed on-site pursuant to BMPs and LID techniques to mitigate the impacts of stormwater, erosion, sedimentation, and other land disturbance effects caused by the project. This document shall contain a plan for erosion, land disturbance, and stormwater management for the long term operation and management of the project post-construction. Furthermore, this document shall contain a description of long term maintenance once the project is complete and taken over by the owner. Article 6.3
Construction Erosion and Sedimentation Plan required	Basic general requirements	Required, contents specified	Goes beyond minimum NPDES requirements, requires minimization of site disturbance		*(Not applicable)*	Requires minimization of site disturbance, incorporate BMPs, cause no adverse erosion impacts or reduction in land's water-holding capacity. Slopes require terracing to avoid sever cuts/fills and retaining walls. VII.S. PB considers mitigation of stormwater runoff and erosion/sedimentation control measures to reduce alteration of existing natural drainage. VI.D.2.r	"Erosion and sediment controls shall be designed using Best Management Practices (BMP) and Low Impact Development (LID) to manage construction site stormwater runoff on the site of the development to the maximum extent practicable." IX.H.3.	Environmental impact report must include information on sedimentation and erosion control. PB considers erosion and sedimentation	Incorporated into LDSM site plan and long term plan which requires minimization of site disturbance.
SUBDIVISION RULES AND REGULATIONS/ROAD DESIGN STANDARDS									

Factors	Conventional	Better	Best		Framingham Zoning Bylaws	OLD Subdivision Rules and Regs	NEW Subdivision Rules and Regs	Site Plan Review	Land Disturbance and Stormwater Management Bylaw
Street location	Numeric and geometric standards based primarily on vehicular travel and safety, with basic pedestrian requirements e.g. sidewalks	Flexibility in applying standards, to reduce area of impact, grading, avoid key natural features	OSRD design preferred by-right. Require locating streets to minimize grading and road length, avoid important natural features		*(Not applicable)*	Horizontal and vertical alignment shall be such that existing contours and natural features will be preserved to the maximum extent possible. VII.B.2.c	"All subdivisions planned and constructed within Framingham shall be designed to establish neighborhood character and community, enhance connectivity, ensure efficient and sustainable infrastructure, and decrease physical impacts to the natural environment...Subdivisions shall be sited on a parcel of land with the intent of preserving historic and natural resources, retaining contiguous tracks of open space, stone walls, large trees, geological and archaeological features, and vegetation where possible." IX.A.1. "Lands within a subdivision that are identified as sensitive or unsuitable for development shall be protected and set aside for benign uses that do not cause or present any danger or harm to public health, safety, and welfare." IX.A.2. "Protection of natural water resources and courses, flood control areas, wetland areas, animal and plant habitats, topographical features, and/or lands classified as Moderate Slopes." I.E.8.	Site design must relate to historical and natural character of neighborhood and minimize disruption. Consistent with MP, OS plan. IV.F6.f.1.	*(Not applicable)*
Road width	Major and minor categories, 24-30'	Wide, medium, narrow categories. 22-24' max, plus 2' shoulders	Wide, medium, narrow, and alley categories. 20-24' widest for 2 travel lanes, 18-20' low traffic residential neighborhood, plus 2' shoulders Allow alleys and other low traffic or secondary emergency access and all shoulders to use alternative, permeable materials		*(Not applicable)*	24-26' in Zoning District R-4; 24-28' in all other Zoning Districts. Section VII.B.2.gTable 1	Flexibility offered. "All roads or ways shall be contiguous, of uniform width, coordinated, and aligned with each other and with the existing street system in a manner consistent with best current traffic engineering and planning practices." IX.G.4.d. "Street dimensional standards shall be in accordance with standards set forth by the Massachusetts Highway Department Project Development & Design Guide (MassDOT PDDG), latest edition, and the Town of Framingham, Department of Public Works Construction Standards, Roadway Construction Standards, as amended." IX.G.7.e.	*(Not applicable)*	*(Not applicable)*

Factors	Conventional	Better	Best	Framingham Zoning Bylaws	OLD Subdivision Rules and Regs	NEW Subdivision Rules and Regs	Site Plan Review	Land Disturbance and Stormwater Management Bylaw
Road ROW width	50-75', fully cleared and graded	40-50', some flexibility in extent of clearing	20-50'depending on road type	Not addressed.	70-80' in Zoning District R-4; 60' for all other Zoning District; Section VII.B.2.g Table 1	Flexibility offered. "All roads or ways shall be contiguous, of uniform width, coordinated, and aligned with each other and with the existing street system in a manner consistent with best current traffic engineering and planning practices." IX.G.4.d. "Street dimensional standards shall be in accordance with standards set forth by the Massachusetts Highway Department Project Development & Design Guide (MassDOT PDDG), latest edition, and the Town of Framingham, Department of Public Works Construction Standards, Roadway Construction Standards, as amended." IX.G.7.e.	Not addressed	Not addressed
Access Options	No common drives allowed, dead end allowed with limit on length and # of units	Allow dead end with limit on length and # of units. Allow common drives up to 2-3 units	Allow one way loop streets. Allow common drives up to 4 units	*(Not applicable)*	Common drives not addressed, dead ends allowed for </= 25 units. Must be 250-500' in length (or waived to 700' with additional	Common drives allowed on ANR lots. Dead ends allowed for </= 25 units and max 500' in length. U loops allowed. IX.G.9.c. and IX.G.9.g.iii.	*(Not applicable)*	*(Not applicable)*
Dead Ends/Cul-de-sacs	120 ft or more minimum turnaround	Minimize end radii – 35 ft	Allow hammerhead turnaround	*(Not applicable)*	Radius of cul-de-sac must be 60-70'. Section VII.B.2.g Table 1	Alternative cul-de-sac designs such as U loops, Y-heads, and hammerhead allowed. Minimum radius 26' for alternative design or 48' for cul-de-sac. IX.G.9.g.i.a.&b and IX.G.9.g.iv.	*(Not applicable)*	*(Not applicable)*
Cul-de-sacs	Full pavement standard	Encourage center landscaping with bioretention	Require center landscaping with bioretention	*(Not applicable)*	An open cul-de-sac turnaround with a central island shall be provided at the end of a permanent dead-end street. No landscaping mentioned. SectionVII.B.3e	Cul-de-sac common area/centers are required to have landscaping with bioretention. IX.G.9.g.iv	*(Not applicable)*	*(Not applicable)*
Curbing	Curbing required full length both sides of road	Allow curb breaks or curb flush with pavement to enable water to flow to vegetated LID features	Open drainage with roadside swales and no curbs preferred	*(Not applicable)*	Curbing required full length both sides of road. Section VII.B.5	"Curbing and gutters shall be required along roads or ways only when storm sewers are required. Curbs and gutters may not be required along roads or ways that utilize an open drainage system that includes the use of Best Management Practices (BMPs) and Low Impact Development (LID) techniques that are utilized to allow stormwater to infiltrate into the ground." IX.G.12.a "Where curbing is required curb cuts may be utilized.." for LID IX.G.12.c	Not addressed	Curb cuts specifically addressed as potential LID BMP. F.3.a.i.
Roadside Swales	Allowed as an option	Preferred over closed drainage	Preferred, with criteria for proper design.	*(Not applicable)*	Not addressed specifically. However, plan must detain SW on site to maximum extent practicable utilizing natural features and BMPs, "including groundwater infiltration."	"Curbs and gutters may not be required along roads or ways that utilize an open drainage system that includes the use of Best Management Practices (BMPs) and Low Impact Development (LID) techniques that are utilized to allow stormwater to infiltrate into the ground." IX.G.12	Must include buffer strip between sidewalk/roadway when feasible and incorporate LID BMPs.	Swales and other LID BMPs preferred. F.3.a.i.

Factors	Conventional	Better	Best	Framingham Zoning Bylaws	OLD Subdivision Rules and Regs	NEW Subdivision Rules and Regs	Site Plan Review	Land Disturbance and Stormwater Management Bylaw
Utilities	Off sets required contributing to wide road ROWs	Not specified, flexible	Allow under road, sidewalks or immediately adjacent to roads to enable placement of roadside swales.	*(Not applicable)*	All utility services must be installed 2' beyond street sideline. Utilities shall be provided by underground wiring within easements or within the proposed dedicated public rights-of-way. Section VII.G.&H.	All utilities shall be installed underground within easements or within dedicated public rights-of-way. IX.F.4.a.	The placement of electric, telephone and other utility lines and equipment, such as water, sewer or gas, shall be coordinated together and placed underground and located to eliminate all adverse impacts on the groundwater levels	*(Not applicable)*
Sidewalks	Concrete or bituminous	Some flexibility in material and design	Prefer permeable pavement	*(Not applicable)*	Concrete only. Section VII.B.6.a.	"Where possible, an applicant/developer is strongly encouraged to utilize pervious pavement and/or bricks." IX.G.13.c.i.d.	Not addressed	*(Not applicable)*
Sidewalks	Required both sides of road	Allow on only 1 side of road especially in low density neighborhoods	Prefer siting with land contours and for best pedestrian utility (e.g. connect with common areas and shared open spaces) – not necessarily immediately parallel to road.	*(Not applicable)*	Required on both sides for all districts other than R-4, where allowed on one side. Section VII.B.6.a. Doesn't specfically allow for non-parallel sidewalks.	Preferred one one side only when possible. "An applicant/developer may propose a meandering path that follows the contour of the land where a formal sidewalk is not suitable, the topography of the land does not allow, and/or a wooded trail is preferable." IX.G.13.c.i.g.	Required along street frontage with a buffer strip between roadway and sidewalk where feasible. Doesn't specfically allow for non-parallel sidewalks.	*(Not applicable)*
Sidewalks	Drains to road closed drainage system	Not addressed	Disconnect drainage from road system – e.g.adjacent green strips or within vegetated areas that can absorb sheet flow	*(Not applicable)*	A strip of grassed or landscaped area at least 3' wide, not including curbing, shall separate all sidewalks from adjacent curbs. Not necessarily used as drainage, but potential. Section VII.B.6.a.	"A strip of grass, pervious surface, or decorative brick buffer a minimum of five feet wide shall be installed between the curb of the road or way and the sidewalk." IX.G.13.c.i.d. Assumption is used for drainage since specifies as pervious.	Vegetated buffer required between sidewalk and street, though not specified as use for drainage.	*(Not applicable)*
Soils managed for revegetation	Not addressed	Limitations on removal from site, and/or requirements for stabilization and revegetation	Prohibit removal of topsoil from site. Require rototilling and other prep of soils compacted during construction	*(Not applicable)*	Not addressed except for sideslopes which shall be loamed, seeded and rolled. Section VII.B.6.&18	"The applicant/developer shall employ erosion control techniques to ensure that sediment from exposed soils is stabilized during construction and other land disturbance activities." IX.H.1&3 No mention of revegetation or prohibiting removal of topsoil.	Requires a written report of blasting or soil compaction that takes place during contruction. Disruption to natural areas should be minimized as much as possible. IV.F.4.a.8 Minimizes adverse environmental impacts including soil removal and grade changes. IV.F.6.f.	Projects shall be designed to disturb the minimal amount of land possible F.3.a.ix Earth removal shall be limited to areas that have been previously disturbed and/or impervious. F.3.d.i. Soil removed from the property shall be stockpiled and reused on-site where possible. F.3.d.ii.
Limit clearing, lawn size, require retention or planting of native vegetation/naturalized areas	Not addressed or general qualitative statement not tied to other design standards	Encourage minimization of clearing/ grubbing	Require minimization of clearing/grubbing with specific standards	Prevent and minimize the negative effects of erosion, clearing etc. Section V.F. Land Disturbance	General statements about protecting and preserving natural features. Right of way shall be cleared except for trees that meet requirements. Section VII.A.5, R and F.3.	"Subdivisions shall be designed to retain natural features and environmental resources, avoid environmental degradation and sensitive areas, and minimize negative impacts that will alter natural features to the greatest extent feasible." Specific sensitive landscapes described. IX.A.1&2	Minimize removal of trees and existing vegetation and minimize impact to natural features. IV.F.6.a.2 Minimizes adverse impacts to open space usage and retention and is integrated into the natural landscape. Minimizes adverse environmental impacts to such features as wetlands, floodplains, and aquifer recharge areas and minimizes tree, vegetation, and soil removal, and grade changes. IV.F.6.f.	Conditions of approval require erosion and sedimentation control measures during construction with an approved plan and BMPs. Permanent erosion control and vegetative measures required in accordance with LID techniques. Landscape features must be protected and trees and wildlife areas preserved to maximum extent feasible.

Factors	Conventional	Better	Best		Framingham Zoning Bylaws	OLD Subdivision Rules and Regs	NEW Subdivision Rules and Regs	Site Plan Review	Land Disturbance and Stormwater Management Bylaw
Require native vegetation and trees	Require or recommend invasives	Not addressed, or mixture of required plantings of native and nonnative	Require at least 75% native plantings		Not addressed.	Not addressed.	Cul-de-sacs must be planted with "drought-tolerant" plants, (IX.G.9.g.iv.b.) but otherwise native vegetation not addressed.	Propose landscape design favoring native and drought-tolerant species and avoid invasives. IV.F.6.f.4	LDSM plan requires native tree species used for replacing any tree removed.

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REPORT

May 2022

CITY OF
Framingham
MASSACHUSETTS

Year 4 MS4 Permit Compliance
Street Design and Parking Lots Report

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ATTACHMENTS

Attachment A – Regulatory Review Matrix

1.0 INTRODUCTION

1.1 Regulatory Requirement

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 are required to implement various Best Management Practices (BMPs) for each of the following six minimum control measures:

- Public Education and Outreach
- Public Participation/Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Stormwater Management in New Development and Redevelopment (Post-Construction Stormwater Management)
- Good Housekeeping and Pollution Prevention for Municipal Operations

As part of the minimum control measure for Post-Construction Stormwater Management, Section 2.3.6 of the 2016 MS4 Permit requires regulated communities to assess current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover, and to summarize those findings in a report. The purpose of this exercise is to determine if changes to existing design standards can be made to support low impact design options and, where appropriate, propose recommendations and proposed schedules to incorporate policies and standards into the relevant regulatory mechanisms to minimize impervious cover in parking areas and street designs.

The City of Framingham shall implement all recommendations included in this report in the specified timeframe. The status of this assessment and any planned or completed changes to the relevant regulatory mechanisms shall be reported in each MS4 annual report.

1.2 Applicable Regulatory Mechanisms and Assessment Procedure

The following ordinances, rules & regulations, plans, policies, and design standards address the creation of impervious cover in Framingham:

- City of Framingham Zoning Ordinance
- Rules & Regulations Governing the Subdivision of Land in Framingham
- City of Framingham Department of Public Works Construction Standards
- Policy on Complete Streets (January 2015)
- Framingham Planning Board Rules & Regulations and Project Review Guidelines
- City of Framingham Master Land Use Plan (2020 Update)
- Framingham Transportation Master Plan

- Draft Accessory Dwelling Unit Ordinance

Each regulatory mechanism listed above was reviewed using the matrix included in Attachment A. The mechanisms were reviewed using a list of key questions in five categories, and the degree to which each mechanism addresses a key question was rated as Conventional, Better, or Best using a system based on the Local Bylaw and Regulation Assessment Tool developed by MassAudubon.[1] The definition for each rating is as follows:

- Conventional: The key question is not addressed, or no flexibility is allowed in design requirements. Dimensional standards include required minimums but no maximum (i.e., includes a minimum driveway width but no maximum).
- Better: The key question is addressed, and some flexibility is allowed in design requirements, usually by special permit. LID design practices, including minimizing created impervious cover, are encouraged but not required.
- Best: The key question is addressed, and flexibility in design is allowed by-right. LID practices, including minimizing created impervious area, are required or incentivized.

The results of this analysis are summarized in Section 2.0. Recommended updates to the assessed regulatory mechanisms are included in Section 3.0, and a proposed timeline for implementing those updates is presented in Section 4.0.

[1] Supporting LID in Your Community, Local Bylaw and Regulation Assessment Tool, MassAudubon, 2017. https://www.epa.gov/npdes-permits/stormwater-tools-new-england#pcsm

2.0 REVIEW OF REGULATORY MECHANISMS

The matrix included in Attachment A was used to review how Framingham's regulatory mechanisms and design standards address the creation of impervious cover in Framingham in the following categories:

- Impervious Area Management – Streets
- Impervious Area Management – Driveways
- Impervious Area Management – Sidewalks
- Impervious Area Management – Parking Lots

This section summarizes the results of the analysis for each category.

2.1 Category 1: Impervious Area Management – Streets

Category 1 includes key questions such as the minimum roadway widths in Framingham, required right-of-way widths, and allowable designs for dead end streets. Maximum widths for residential and non-residential streets are defined in the Department of Public Works (DPW) Construction Standards, with different minimum widths based on road type. The DPW Construction Standards also set minimum right-of-way widths, which vary depending on street type, and allowable usage of the right-of-way is discussed in the City's Green Streets Policy and Master Land Use Plan. Multiple allowable dead end street designs are outlined in the Subdivision Rules & Regulations, and standards are included for turnaround design. Both the Subdivision Rules & Regulations and the Planning Board Project Review Guidelines include curbing requirements for private properties and within the right-of-way. No language relating to the categories below was found in the Zoning Ordinance.

Minimum Residential Roadway Width & Determinant

This section was rated "better" because, while there are strict minimum pavement widths in residential areas, the Complete Streets Policy encourages the use of lane narrowing and traffic calming in certain areas to make streets more accessible to pedestrians and bicyclists. The smallest minimum roadway width for residential access roads is 24 feet, with little flexibility in width based on speed limit or anticipated traffic volumes.

Minimum Non-Residential and Mixed-Use Pavement Widths and Determinants

This section was rated "conventional" since the City's regulatory mechanisms defer to the Massachusetts Highway Department Project Development & Design Guide to set minimum required road and right-of-way widths in non-residential areas.

Road Right-of-Way Widths

This section was rated "conventional" due to the 60-foot minimum right-of-way width for residential access roads. Required right-of-way widths for non-residential roads defer to state standards.

Allowable Dead End Street Design

This section was rated "best" since the Subdivision Rules & Regulations allow for multiple dead end street designs, including Y-head, hammerhead, half hammerhead, center common island loop, U-

loop, or cul-de-sac designs with an island. Cul-de-sacs without a center planter or green space are prohibited, and design standards are included for each type of dead end street.

Cul-de-sac Design Standards

This section was rated "best" since both minimum and maximum curb radii are established for cul-de-sacs and because islands are required. Islands must be landscaped, have a minimum radius of 20 feet, and are explicitly allowed to contain low impact development (LID) practices.

Curb Cuts/Flush Curbs

This section was rated "best" due to the provision that curbing is not required where roads use an open drainage system or include LID practices. Curb cuts are also allowed to direct runoff into LID practices.

2.2 Category 2: Impervious Area Management – Driveways

Category 2 includes key questions such as minimum and/or maximum driveway widths, required front yard setbacks, and whether or not shared driveways are allowed in Framingham. The zoning ordinance and DPW construction standards set minimum and maximum driveway widths for different uses. The zoning ordinance includes a table of setback requirements for different districts, the smallest of which is ten feet in the central business (CB) district. Shared driveways are allowed in certain districts and in subdivisions. No language relating to the categories below was found in the Planning Board Project Review Guidelines, the Green Streets Policy, or the Master Land Use Plan.

Required Minimum Driveway Width

This section was rated "better" due to the presence of both a minimum and maximum driveway width for different uses. The minimum residential driveway width is 12 feet; the maximum width is 20 feet.

Ability to Reduce Minimum Driveway Width

This section was rated "conventional"—no language was found relating to the ability to reduce minimum driveway widths.

Required Front Yard Setback

This section was rated "better" due to the flexible nature of front yard setbacks—the zoning ordinance establishes required minimum front yard setbacks for different uses, but sets provisions for taller buildings to increase their front yard setback relative to their height.

Allowable Driveway Design/Materials

This section was rated "conventional"—there is no language explicitly allowing or prohibiting different driveway designs (i.e. two-track design) or the use of pervious pavement for driveways.

Driveways

This section was rated "better" since shared driveways are allowed in certain zoning districts and in subdivisions with restrictions. For example, shared driveways cannot serve more than three lots that were created through an approved subdivision plan. There is no language explicitly allowing or prohibiting shared driveways in residential areas outside of a subdivision.

2.3 Category 3: Impervious Area Management – Sidewalks

Category 3 includes key questions such as sidewalk placement requirements, minimum sidewalk widths, and allowable sidewalk materials. The subdivision regulations require sidewalks on both sides of the street except on local roads; the complete streets policy encourages sidewalks to be provided on both sides to reduce pedestrian crossings. Multiple regulatory mechanisms require sidewalks to be five feet wide in accordance with ADA guidelines. Both the zoning ordinance and the DPW construction standards create flexibility in required sidewalk materials. No language relating to the categories below was found in the Master Land Use Plan.

Sidewalk Placement Requirements

This section was rated "better" because of the flexibility surrounding sidewalk placement requirements depending on expected pedestrian traffic.

Sidewalk Width

This section was rated "conventional"—sidewalks are required to be five feet wide with no flexibility in minimum width.

Sidewalk Material

This section was rated "best" due to the allowed flexibility in sidewalk material. Sidewalks in off-street parking areas are explicitly allowed to be made of pervious material; the Planning Board's project review guidelines allow walkways to be constructed with concrete, brick, or an "alternative material that enhances site design".

2.4 Category 4: Impervious Area Management – Parking Lots

Category 4 includes key questions such as required parking ratios, required parking space dimensions, and whether landscaping is required in parking lot designs. The zoning ordinance establishes off-street parking minimums and maximums for various uses. Shared parking as well as reductions in required off-street parking spaces are allowable by special permit, and supported by provisions in the Master Land Use Plan. The zoning ordinance set minimum parking space dimensions for both angled and head-in parking, and establishes different minimum drive aisle widths depending on if the aisle abuts parking spaces or not.

Parking areas can be surfaced with asphalt, concrete, or other material deemed suitable by the Planning Board. The zoning ordinance includes requirements for the amount of landscaping and street trees that must be installed depending on the number of spaces in the proposed parking area. LID practices are encouraged in parking areas and in overall site design. No language relating to the categories below was found in the DPW Construction Standards or in the Green Streets Policy.

Required Parking Ratios

This section was rated "best" because parking minimums and maximums are established for each use. The total number of proposed parking spaces cannot be greater than 125% of the minimum number of required spaces for each use.

Allowable Off-Street Parking for Commercial and Mixed Uses

This section was ranked "better" since cooperative and shared parking are allowable in commercial and mixed-use areas by special permit. The Planning Board project review guidelines as well as the Master Land Use Plan encourage below-grade or structured parking wherever possible.

Off-Site Parking Distance Limit

This section was rated "better"—off-site parking structures are allowed within 1000 feet of principle uses and encouraged to provide cooperative parking.

Ability to Reduce Parking Requirements

This section was rated "better"—required parking ratios can be reduced by special permit for providing cooperative or shared parking, for providing a shuttle service, providing a car-share program, providing a carpooling/vanpooling program, or where the proposed development property is within a half-mile walking distance of a rail transit station.

Shared Parking Agreements

This section was rated "better" since shared parking is allowed by special permit but encouraged in long-term development policies like the Master Land Use Plan.

Model Shared Parking Agreement

This section was rated "conventional" since no model shared parked agreement was provided in any of the reviewed regulatory mechanisms.

Parking Space Dimensions

This section was rated "best" as different allowable parking space dimensions are provided for different parking angles. There is flexibility to reduce parking space dimensions in compact car spaces or in valet parking areas.

Drive Aisle Width

This section was rated "conventional" as there are established minimum drive aisle widths for different cases with no maximum or flexibility in design.

Ability to Reduce Drive Aisle Width

This section was rated "better" as minimum drive aisle widths can be reduced from 28' to 24' by special permit.

Allowable Parking Lot Materials

This section was rated "better" since alternatives to asphalt and concrete may be used with permission of the Planning Board. If the footprint of a proposed parking area exceeds the floor area of its affiliated building, the difference between those two areas must be constructed with pervious pavement.

Required Landscaping in Parking Lots

This section was rated "better"—a certain number of landscaped areas and street trees are required depending on the proposed number of parking spaces, and the use of LID practices is encouraged in overall site design, however there is no language explicitly allowing landscaped areas in parking lots to be used for vegetated stormwater best management practices.

3.0 RECOMMENDED REGULATORY UPDATES

This section includes recommended regulatory updates identified as a result of the analysis summarized in Section 2.0. The recommended language will update Framingham's regulatory mechanisms to meet the following goals:

- Promote efficient, compact development patterns and infill
- Promote smart designs for streets and parking lots that reduce overall impervious area and directly connected impervious area[2]
- Support low impact design[3] options

The updates recommended in this section will be implemented in the timeframes included in Section 4.0.

3.1 Updates to Zoning Ordinances

The following updates to the Zoning Ordinances should be considered to meet the goals outlined above:

- Update Section IV.B.2 to include design requirements for driveways, including allowable material and layout (i.e., allow two-track driveway designs, allow permeable materials for driveways on private property).

- Update Section IV.B. or Section IV.E. to allow or encourage shared driveways in all zoning districts so long as on-site stormwater management requirements are met.

- Update Section IV.B.1 to allow for reductions in required parking ratios by-right rather than by special permit. This recommendation is consistent with Sections 4.7 and 4.13 of the Master Land Use Plan Update.

- Update the appendices of the Zoning Ordinances to include a model shared parking agreement. This recommendation is consistent with Section 5.5 of the Master Land Use Plan Update.

- Update Section IV.B.2. to allow reduced minimum drive aisle widths by-right and to set maximum allowable drive aisle widths. Ensure new minimums still meet requirements for passage of emergency response vehicles.

[2] Directly connected impervious area (DCIA), or effective impervious area, is the portion of impervious cover that creates a direct conveyance of stormwater to a storm drain or waterway.
[3] Low impact development (LID) is defined by EPA as a management approach and set of practices that can reduce runoff and pollutant loadings by managing stormwater runoff as close to its source(s) as possible and promoting the use of natural systems to manage stormwater by infiltration, evapotranspiration, and rainwater harvesting/reuse.

- Update Section IV.B.5. to explicitly allow LID practices and vegetated stormwater best management practices to count toward the landscaping requirement in parking lots.

3.2 Updates to Subdivision Rules & Regulations

The following updates to the Subdivision Rules & Regulations should be considered to meet the goals outlined above:

- Update Section VIII.G.10 to allow common driveways to serve up to four residential units so long as on-site stormwater management requirements are met.

- Update Section V.G.12.c. to incentivize the use of permeable materials for sidewalks in subdivisions where the sidewalks will be maintained by a private entity. Include language encouraging flexible sidewalk siting, considering existing contours, open space, and pedestrian utility rather than placing sidewalks immediately parallel to the road, but ensuring that all proposed designs maintain ADA compliance.

- Update Section VIII.I.2. to explicitly allow LID and stormwater practices in public landscape areas such as buffer strips. This recommendation is consistent with Section 4.7 of the Master Land Use Plan Update.

3.3 Updates to Department of Public Works Construction Standards

The following updates to the DPW Construction Standards should be considered to meet the goals outlined above:

- Update Section 5.2.1 to reduce minimum required roadway widths in residential districts depending on speed limits and traffic volumes. The required minimum right-of-way widths can also be reduced depending on speed limits, road type, and expected traffic volume. Ensure minimum roadway widths are consistent with MassDOT guidance for Complete Streets as well as maneuvering requirements for emergency response vehicles.

- Update Section 5.3.B to provide flexibility in minimum driveway widths.

- Update Section 5.2.1 to match the language in the Green Streets Policy requiring sidewalks to meet ADA design requirements.

3.4 Updates to Complete Streets Policy

No updates are proposed to the Complete Streets Policy.

3.5 Updates to Planning Board Rules & Regulations and Project Review Guidelines

The following updates to the Planning Board Project Review Guidelines should be considered to meet the goals outlined above:

- Update Article 2, Section 2.6.6. to allow curb cuts around parking islands where that island contains a stormwater management best management practice.

- Update Article 2, Section 2.6.6 to explicitly allow or incentivize pervious pavement to be used for walkways and sidewalks around parking areas on private property.

3.6 Changes to the Draft Accessory Dwelling Unit Ordinance

The following changes to the Draft Accessory Dwelling Unit Ordinance should be incorporated to meet the goals outlined above:

- Update Section 4, General Standards and Requirements, item (e) to require shared driveways on properties with accessory dwelling units (ADUs).

- Update Section 5, Design Standards and Requirements, item (e) to explicitly require properties with ADUs to conform to the most recent City of Framingham Drainage Connection Regulations, which prohibit the discharge of runoff from private property to the City's drainage system.

4.0 IMPLEMENTATION TIMEFRAMES FOR REGULATORY UPDATES

Under Section 2.3.6.b. of the 2016 Massachusetts MS4 Permit, the City of Framingham shall implement recommended updates to their regulatory mechanisms included in this report in the timeframes outlined in this section. The timeframes reflect the regular meeting schedule of the relevant City departments and boards, and consider any other planned updates to the regulatory mechanisms. Implementation timeframes for the recommended updates to each document, with the exception of the Draft Accessory Dwelling Unit ordinance, which has not yet been adopted, are summarized in Table 4.1.

Table 4.1: Implementation Timeframes for Regulatory Updates

Regulatory Mechanism	Appropriate Review Board	Complete First Draft of Updates	Complete Internal Review	Present Updates to Appropriate Review Board	Adopt Proposed Changes
Zoning Ordinances	Planning Board	December 2022	June 2023	September 2023	June 2025
Subdivision Rules & Regulations	Planning Board	September 30, 2022	December 2022	March 2023	June 2023
DPW Construction Standards	Department of Public Works	September 30, 2022	November 2022	December 2022	February 2023
Planning Board Project Review Guidelines	Planning Board	September 30, 2022	December 2022	March 2023	June 2023

City of Framingham MS4 Permit Compliance

Street Design and Parking Lots Report Attachment A- Regulatory Review Matrix

Key Question	Zoning Ordinace		Subdivision Rules & Regulations		DPW Construction Standards		Planning Board Project Review Guidelines		Green Streets Policy		Draft Accessory Dwelling Unit Ordinance		Master Land Use Plan		Score	Comments
	Section Reference	Language	Section Reference	Language	Section Reference	Language	Section Reference	Language	Section Reference	Language	Section Reference	Language	Section Reference	Language		
Category 1: Impervious Area Management - Streets																
Minimum residential roadway width & determinant			VIII.G.6.a-c.	"All roads or ways within a subdivision… shall be designed … in accordance with standards set forth in the MassDOT Project Development & Design Guide & the City of Framingham DPW Construction Standards","The length, width, and shape of the road or way shall be designed to comply with the Framingham Zoning Ordinance while ensuring fire and police access, protection, and emergency services"	5.2.1.	Non R-4 zoning district: 28' minimum for collector and 24' minimum for access; in R-4, 26' minimum for collector and 24' for access roads.			6.c.	Incorporate bicycle, pedestrian, and transit facilities in projects except where "the existing right-of-way is constrained in a manner that inhibits simple addition of transit, bicycle, or pedestrian improvements. In this case, the City shall consider alternatives such as lane reduction, lane narrowing, on-street-parking relocation or reducing, shoulders, signage, traffic calming, pavement markings, or enforcement"					Better	MassAudubon recommends a minimum residential street width of 18-20' in lowest-trafficked areas.
Minimum non-residential and mixed-use roadway pavement widths & determinants				Defers to state standards (Massachusetts Highway Department Project Development & Design Guide)											Conventional	Consider being more stringent than state standards or setting roadway width maximums.
Road right-of way widths					5.2.1	60' minimum for both residential subcollector & residential access in all zoning districts except R-4; 80' minimum for residential subcollector in R-4; 70' minimum for residential access in R-4									Conventional	MassAudubon recommends a maximum residential ROW width of 50'.
Road right-of-way allowable usage							Section 12 of CBD design standards	Where possible, include small setbacks to accommodate plantings and/or outdoor restaurant seating	5.e	"Along roadway segments, greater separation of motor vehicle and non-motorized users should be considered by implementing cycle tracks, buffered or conventional bicycle lanes, bicycle boxes, shoulders, or buffered sidewalks"			4.7.1.g	Promote road diets and lane width reductions for streets and ways throughout the city to increase pedestrian and bicycle access, in addition to building traffic calming features	Better	Language does not explicitly allow siting of LID features in the right-of-way.
Turnarounds for dead end streets - are various designs allowed?			VIII.G.8.	"If a dead end road or way is proposed then the applicant/developer shall construct either a Y-head, hammerhead, half hammerhead, center common island loop, a U-loop or a cul-de-sac with a planter/common green space wherever a subdivision road or way does not extend beyond the boundary of the subdivision and its continuation is not required by the Planning Board for access to any adjoining property. Cul-de-sacs without a planter/common green space shall be prohibited as a dead end". Design standards are included for all allowable dead end designs.												Best	
Minimum/maxium cul-de-sac diameter - are islands allowed?			VIII.G.8.g.ii.	Yes- islands are required. "The end radius of the center common island/landscape planter/common green space/ center common island loop shall be designed to meet the minimum required turning radius of the Fire Department's largest emergency apparatus"... "The center common island... shall be landscaped with street trees that at a minimum run the length of the loop. Furthermore, this area may include Low Impact Development (LID) and the use of Best Management Practices (BMPs) for the purposes of stormwater management". Ouside cul-de-sac radition: minimum 48'. Center Planter: Minimum 22' radius.	5.2.1	Minimum cul-de-sac radii: 60' for street sideline radius, 45' curb radius, 20' island radius. Maximum cul-de-sac radius: 70'									Best	
Use of curb cuts/flush curbs allowed			VIII.G.11.	Yes- curbs are not required along roads or ways that utilize an open drainage system that includes the use of BMPs and LID. Curb cuts may be used to direct runoff from roads into vegetated swales, bioretention areas, rain gardens, etc.			Article 2: Landscape Design Guidelines - 2.6.6 Parking and Walkways	"Parking islands and walkways should be defined by verical curbing constructed of durable granite or precast concrete that will withstand snowplowing, site maintenance, and traffic".							Best	Planning Board Guidelines should be updated for consistency.
Category 2: Impervious Area Management - Driveways																
Required minimum driveway width	IV.D.a	(For service stations & outdoor auto sales): "The maximum width of driveways at the lot line shall be 30' and the minimum width, 20' ".			5.3.B	Residential driveways (not on scenic roads) shall have a minimum width of 12 feet and a maximum width of 20 feet									Better	Driveway minimums and maximums should be established for all uses.
Ability to reduce minimum driveway width															Conventional	There is no language relating to this key question.

City of Framingham MS4 Permit Compliance

Street Design and Parking Lots Report Attachment A- Regulatory Review Matrix

	Zoning Ordinace		Subdivision Rules & Regulations		DPW Construction Standards		Planning Board Project Review Guidelines		Green Streets Policy		Draft Accessory Dwelling Unit Ordinance		Master Land Use Plan			
Key Question	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Score**	**Comments**
Required front yard setback	IV.E.2	Table of Dimensional Requirements sets different front yard setbacks for different uses. The height factors requires an additional 5' front yard setback for every 5' of building height above 20'.													Better	
Two-track designs allowed?															Conventional	There is no language relating to this key question.
Shared driveways allowed?	V.A.2.c; V.K.3.d.13	"B-3 district… buildings should be located along the street frontage, with parking in the rear or to the side, while promoting shared-access driveways, circulation, and parking facilities where possible…"; Neighborhood Cluster Dev. District: "Access to residences may be provided by common or shared driveways not to exceed 1,000 ft in length"	VIII.G.10.	"Common driveways may be used for access to lots within a subdivision or from an ANR lot that is under the ownership of the applicant/developer". Shared driveways cannot serve more than 3 lots that were created through the ANR process or an approved subdivision plan.							4.e	There shall be at least 3 off-street parking spaces provided on the property, of which one space shall be for the use of the occupants of the ADU. Required parking may be no more than two (2) cars deep. No required parking spaces shall be located within the boundary of a street right of way.			Better	Shared driveways should be allowed for all uses. MassAudubon recommends allowing common driveways to serve up to four residential properties. Consider explicitly requiring shared driveways on properties with Accessory Dwelling Units.
Category 3: Impervious Area Management - Sidewalks																
Requirements for sidewalk placement (ie, are sidewalks required on both sides of the street?)			V.G.12.c.i.c.	Sidewalks are required on one side of local roads; required on both sides of arterial or collector roads or mixed-use roads.					5.a.	"In urbanized areas, continuous sidewalks should be provided on both sides of a roadway, minimizing the number or pedestrian crossings required"					Better	Consider allowing more flexible sidewalk siting.
Minimum width (probably 4' for ADA compliance)			V.G.12.c.i.a.	Sidewalks are required to be 5' wide in residential subdivisions and 6' wide in commercial subdivisions.	5.2.1	Minimum sidewalk width: 5' on both residential collector & residential access streets	Section 12 of CBD design standards	Sidewalks shall provide adequate space for all users, street furniture, trees/plantings, and bicycle parking		"All new and reconstructed sidewalks must be accessible to and usable by persons with disabilities in accordance with the Americans with Disabilities Act (ADA) and the Massachusetts Architectural Access Board (MAAB)".					Conventional	These standards should all be consistent.
Are permeable/pervious sidewalks allowed?	IV.B.4.c.1-2	"Sidewalks within a non-residential off-street parking facility shall be a minimum of 5' in width and constructed of concrete or pervious material"; "Crosswalks within an off-street parking facility shall be a minimum of 8' in width and constructed of color stamped concrete with contrasting color from the pavement. Stamped concrete shall not be painted but shall be entirely of a solid color"	V.G.12.c.i.d.	Applicants/developers are strongly encouraged to utilize pervious pavement and/or bricks for sidewalk buffer strips. There is no clear language relating to required sidewalk material unless the MA 2010 ADA Standards require concrete.	5.6		Article 2: Landscape Design Guidelines - 2.6.6 Parking and Walkways	"Walkways should be constructed with aggregate or precast concrete, brick, or alternative material that enhances site design, color contrast, and durability."						Best	
Category 4: Impervious Area Management - Parking Lots																
Current required parking ratios	IV.B.1.a; IV.B.1.d	Table of Off-Street Parking Regulations sets parking minimums for different land uses; "The total number of off-street parking spaces shall not be greater than 125% of the minimum number of off-street spaces for a given use"									4.e	There shall be at least 3 off-street parking spaces provided on the property, of which one space shall be for the use of the occupants of the ADU. Required parking may be no more than two (2) cars deep. No required parking spaces shall be located within the boundary of a street right of way.			Best	Assuming the parking maximum will apply to properties with Accessory Dwelling Units.
Allowable off-street parking for commercial/mixed uses?	IV.B.1.e; IV.B.1.g	"The Planning Board may grant by special permit, a reduction in the required number of off-street parking spaces where deemed appropriate. Project proposals are encouraged to provide shared parking, cooperative parking, bicycle accomodations, increase in stormwater facilities (LID, BMPs, etc), landbanked parking spaces, consolidation of curb cuts and driveways, and other on-site amenities to alleviate the demand for parking as well as to mitigate the adverse impacts of impervious surfaces" ; Parking Programs are in place for reductions in off-street parking (special permit required): cooperative/shared parking facility (not on same property, shuttle service, car-sharing program, carpooling/vanpooling, proximity to rail transit station"					Section 7 of CBD Design standards; Section 11; Section 2 of Nobescot Village guidelines	"Below-grade or structured parking should be encouraged wherever possible. To encourage an active, pedestrian environment, surface vehicle parking shall be located behind or to the side of buildings; loading areas… shall be screened with fencing and/or landscaping; On a large property, multiple types of parking including on-street parking on internal access ways, should be integrated to reduce large parking lots"						Better	Consider allowing parking reductions by-right rather than by special permit.
Off-site parking distance limit	IV.B.1.g	1000 feet for off-site cooperative parking structures.													Better	
Potential to reduce parking requirements where public transportation is available?	IV.B.1.g	Yes by special permit (see above).											4.13.9.2	All proposed access and parking policies in the corporate mixed-use district/technology park encourage this and reductions related to shared parking.	Better	Consider allowing parking reductions by-right rather than by special permit.

City of Framingham MS4 Permit Compliance

Street Design and Parking Lots Report Attachment A- Regulatory Review Matrix

	Zoning Ordinace		Subdivision Rules & Regulations		DPW Construction Standards		Planning Board Project Review Guidelines		Green Streets Policy		Draft Accessory Dwelling Unit Ordinance		Master Land Use Plan			
Key Question	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Section Reference**	**Language**	**Score**	**Comments**
Other ability to reduce parking ratios?	IV.B.1.g	Yes by special permit (see above).											4.7.7.a; 4.13.8.4.c-d	"Improve design & performance of state highway corridors… by providing zoning that encourages pedestrian connections, lot coverage rather than floor area ratio, mixed-use development, shared parking, reduces traffic congestion, decreases the amound of off-street parking required, reduces the need for auto travel between activities, encourages public transportation, and provides bicycle trails/facilities; encourage developers to reduce the size and impact of project parking; encourage parking garages to reduce surface parking and increase building development."	Better	Consider allowing parking reductions by-right rather than by special permit.
Current required parking space dimensions	IV.B.2.a	Minimum width and lengths of parking spaces for each angle: 9' width for parallel/90 degree; 18' length for 90 degree. Applicants have the option to reduce space size to 8'x16' in shopping centers with appropriate signage (i.e. "compact cars only") or in valet parking areas.													Best	
Allow for shared parking agreements	IV.B.1.e	Yes by special permit											5.5.4.8	Proposed new parking standards are part of a Form-Based code approach, which sets coordinated standards for public and private development. New Parking standards would minimize surface parking and promote higher density development, setting minimum and maximum parking requirements but encouraging shared uses.	Better	Consider allowing parking reductions by-right rather than by special permit.
Provide a model shared parking agreement															Conventional	No model shared parking agreement is provided.
Current required drive aisle dimensions	IV.B.2.a	Different minimum widths are provided for 1-way to 2-way, with or without parking spaces. Minimum width is 11' for 1-way with no spaces; 28' for 2-way with parking spaces. Special permit available to reduce required drive aisle width to 24'.													Conventional	Consider setting maximum drive aisle widths as well.
Ability to reduce minimum drive aisle width	IV.B.2.a	Special permit is available to reduce minimum drive aisle widths from 28' to 24'.													Better	Consider allowing reduced drive aisle widths by-right rather than by special permit.
Is the use of structural permeable pavement allowed?	IV.B.4.a.6; IV.B.4.a.1	"Parking areas shall be graded, surfaced with asphalt, concrete, or other suitable non-erosive material, and drained in a manner deemed adequate by the Planning Board to prevent nuisance of erosion or excessive water flow across public ways or abutting properties, and natural drainage courses shall be utilized insofar as possible"; "In the event that the off-street parking area must exceed the gross floor area of the building, the Planning Board shall required the difference between the off-street parking area and the gross floor area to be constructed as pervious parking spaces"					Section 2 of Nobscot Village Design Guidelines	Parking areas near building or site entry plazas should be designed to support flexible use and events by integrating alternative paving materials						Better	Consider allowing the use of permeable paving in private parking lots by-right rather than only with special permission.
Is spillover parking allowed to be pervious?															Conventional	There is no language discussing spillover parking.
Required landscaping in parking lots?	IV.B.5.a-d	There are many set requirements for tree planting in parking lots. "The use of bioswales, pervious pavers and pavement, underground storage and infiltration of stormwater systems/facilities, green roofs, rainwater use for irrigation, shared parking/stormwater facilities, and/or rain gardens shall be incorporated into the site". Section d includes a table of required landscaped areas depending on number of parking spaces, in addition to street trees.					Article 2: Landscape Design Guidelines - 2.6.6 Parking and Walkways	Parking islands are required to be vegetated, preferably with groundcover and shrubs to discourage pedestrians and bicylists from moving through them						Better	Consider explicitly allowing LID features to be sited in parking islands/buffers.

APPENDIX J

INVENTORY OF POTENTIAL CITY-OWNED PROPERTY RETROFITS

City of Framingham

City-owned properties that could potentially be modified or retrofitted with BMPs to reduce the frequency, volume, and pollutant loads for stormwater discharges to and from its MS4 through redution of impervious area

NPDES MS4 Permit requirements 2.3.6.d.

	Complete	Complete	Complete	Complete	Complete	Complete	1	2	3	4	5
Project	Commuter Rail Parking Lot	Farm Pond Park - skatepark	High School Junior Parking Lot	Little Farm Road cul-de-sac	Fuller Middle School renovation	Speen St Pump Station	Fountain Street Improvements	Arlington St Utility Project	Mary Dennison Park	Walnut Street Flood Mitigation	Waushakum Beach Bioretention
Address	Waverly Street	Dudley Road	A Street	Little Farm Road	Flagg Drive	81 Speen Street	Fountain Street	Arlington St neighborhood	Beaver Street	Walnut Street	Nipmuc Road
Completion Date	Jun-17	Apr-18	Jul-19	2019	2022	Sep-21	TBD	TBD	Jun-26	Jun-25	Sep-24
Designer	GPI	in-house	--	EPG	CDW Consultants	in-house	EPG	Green International	Weston & Sampson	Weston & Sampson	Weston & Sampson
Type of Stormwater BMP	Infiltration basin (under new parking lot)	Retrofit retention area & swales for bioretention	Reduce pavement, install water quality units	Reduce pavement	Reduce impervious cover (demo old middle school and parking lot), add stormwater BMPs	Reduce impervious cover (demo old sewer pump station and access drive, establish pervious parking area	Potential green infrastructure at outfall at Farm Pond Park	Outfall improvements, inclusion of BMPs	Green infrastructure that provide WQ improvements & flood compensatory storage; stream restoration	Nature based alternatives	Replace outfall closest to public beach and install a bioretention system upstream of replacement outfall.
Purpose	Infiltration from new impervious, improve stormwater quality to Farm Pond	Improve stormwater quality to Farm Pond	Improve stormwater quality to Sudbury River	Improve stormwater quality to Sudbury River	New school - improve drainage, comply with new SW regs	Sewer pump station decommissioning	Improve stormwater quality to Farm Pond	Improve stormwater quality & flood mitigation	Improve stormwater quality & flood mitigation at Beaver Dam Brook	Improve stormwater quality & flood mitigation	Improve stormwater quality to Lake Waushakum.
Receiving Water Body	Farm Pond	Farm Pond	South Saxonville - Sudbury River	North Saxonville - Sudbury River	Sudbury River	Cochituate Brook	Farm Pond	Beaver Dam Brook	Beaver Dam Brook	Sudbury River	Lake Waushakum
Discharge to impaired waterbody?	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes
Cost of Project (Approximate)	Unknown	$75,000	Unknown	Unknown	$98.3 million	Unknown	$3.8 million (includes intersection improvements)	Unknown	$19.7 million	$3.2 million	$450,000
Funding Source	MWRTA	319 grant	General fund (Fire Station)	Water/Sewer enterprise	General Fund (school project) & state funding (MSBA)	Water/Sewer Enterprise	General fund	TBD	General fund, settlement with other responsible party	FEMA grant for study, MVP grants, General fund	319 grant & General fund
City Department	DPW	Parks & Recreation	Capital/Facilitiies	DPW	Schools	DPW	DPW	DPW	Parks & Recreation	DPW/Conservation/ Parks & Recreation	DPW/ Parks & Recreation
Notes			Completed in conjunction with new Saxonville Fire Station, as stormwater mitigation	Completed in conjunction with 4 pump station improvements project.			Fountain Street project spilt between water, sewer, & roadway/drainage		Requires remediation under MCP. Project commenced April 2024 with anticipated 2 year construction.		

APPENDIX K

OPERATION & MAINTENANCE PROCEDURES
PARKS & OPEN SPACE
BUILDINGS & FACILITIES
VEHICLES & EQUIPMENT

Operations and Maintenance SOP
Municipal Buildings and Facilities

Introduction

An operations and maintenance program for municipal buildings and facilities is required under the Phase II MS4 Permit minimum control measure for Pollution Prevention/Good Housekeeping 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.*

Required BMPs*:*

- *Within two (2) years from the effective date of the permit (i.e. June 2020), the permittee shall develop, if not already developed, written (hardcopy or electronic) operations and maintenance procedures for the municipal activities for buildings and facilities. These written procedures shall be included as part of the Stormwater Management Plan (SWMP).*
- *Within two (2) years of the effective date of this permit (i.e. June 2020), the permittee shall develop an inventory of all permittee owned facilities within the categories [parks and open space, buildings and facilities, and vehicles and equipment]. The permittee shall review this inventory annually and update as necessary.*

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.

Municipal Buildings & Facilities Inventory

Inventories are maintained by the following City of Framingham departments which manage municipal buildings & facilities:

- School Department
- Department of Public Works
- Capital Projects and Facilities Management

Procedures

Framingham will implement the following procedures for municipally owned or operated buildings and facilities to reduce the discharge of pollutants from the MS4:

General

- Remove (sweep or shovel) materials such as trash, mulch, and grass clippings from areas surrounding buildings, parking lots, sidewalks, and the stormwater system.
- Do not clean up any unidentified or possibly hazardous materials found during maintenance; notify a supervisor immediately.
- Sweep parking lots with a street sweeper and dispose of street sweepings in designated areas.

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.
- Never wash debris into 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, including rooftops.

Parking Lots

- 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.
- All parking areas should be swept and/or cleaned a minimum of once per year in the spring.
- Sweep as soon as possible after snow melt and following winter activities such as sanding to capture sand and debris before it is washed into the storm drainage system.
- Consider more frequent sweeping for targeted areas based on pollutant load reduction potential, inspections, pollutant loads, catch basin cleaning or inspection results, land use, impaired waters, or other factors.
- In accordance with impaired waters requirements, Framingham will conduct more frequent sweeping for municipally-owned driveways and parking lots in areas that drain to impaired waters. Sweeping will be performed in these areas 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). The following municipal parking lots will be targeted:
    - Memorial Hall (150 Concord Street)
    - Former Danforth Museum (121 Union Avenue)
    - Pearl Street garage (3 Pearl Street)
    - Farm Pond Park (Dudley Road)

  - Longs Park (Dudley Road)
  - Cushing Park and Memorial Chapel (80 Dudley Road)
  - Barbieri Elementary School (100 Dudley Road)
  - Loring Arena (165 Fountain Street)
  - Lake Waushakum Beach (Nipmuc Terrace)
  - Anna Murphy park (16 Cover Avenue & Lake Avenue)
- When necessary, enact parking bans to facilitate sweeping.
- Sweepings are classified as solid waste and need to be disposed of at an approved solid waste disposal site.

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 17: 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.
- Ensure there are enough trash and recycling containers at appropriate areas.
- Monitor waste and recycling containers at heavily-used sites and on holidays to ensure that there is no overflow.

Storage of Petroleum Products and Potential Pollutants

- All municipal buildings and facilities should be periodically inspected to address potential pollutant sources (e.g., leaks).
- 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.
- Floor drains in storage areas should be disconnected from the stormwater system.
- Routinely inspect buildings and facilities for areas of potential leaks.

Snow Removal

- Snow should not be pushed or dumped into waterbodies or wetlands, into stormwater drainage swales or ditches, or on top of catch basins.
- Snow should not be stored near waterbodies or wetlands.
- Avoid storing snow in areas that are unstable, areas of potential erosion, or high points where snow may melt and collect debris as runoff before it enters the stormwater system.
- Consider sun exposure when storing snow. Snow in areas with higher sun exposure will melt faster but may require deicers if the snowmelt refreezes.
- Store salt or sand for snow & ice indoors under a roof or in a covered container and on impervious surfaces.
- Any damage done to vegetated areas caused by plows or deicing materials should be repaired as early as possible in the spring.

Equipment Maintenance

- Follow the Operations and Maintenance SOP for Municipal Vehicles and Equipment for equipment.

Employee Training

- Employees who perform work on/with at municipal parks and open spaces are trained 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.

Operations and Maintenance SOP
Parks and Open Spaces

Introduction

An operations and maintenance program for parks and open space is required under the Phase II MS4 Permit minimum control measure for Pollution Prevention/Good Housekeeping 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.*

Required BMPs*:*

- *Within two (2) years from the effective date of the permit (i.e. June 2020), the permittee shall develop, if not already developed, written (hardcopy or electronic) operations and maintenance procedures for the municipal activities for parks and open space. These written procedures shall be included as part of the Stormwater Management Plan (SWMP).*
- *Within two (2) years of the effective date of this permit (i.e. June 2020), the permittee shall develop an inventory of all permittee owned facilities within the categories [parks and open space, buildings and facilities, and vehicles and equipment]. The permittee shall review this inventory annually and update as necessary.*

Parks and open space operations and maintenance activities commonly involve the operation of equipment such as mowers and tractors; disposal of waste from mowing, planting, weeding, raking, pruning, and trash collection; application of pesticides, herbicides, and fertilizers; cleaning and maintenance of park amenities such as play equipment, restrooms, and structures; and snow removal. These activities have the potential to generate contaminants such as sediments and toxic chemicals that may be picked up by rainwater, thereby entering the storm drainage system and receiving waters.

The goal of this written Standard Operating Procedure (SOP) is to provide guidance to municipal employees to reduce the discharge of pollutants from the MS4 and to receiving waters as a result of parks and open space operations and maintenance. 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.

Parks and Open Space Inventory

An inventory is included in the City's Open Space and Recreation Plan available at:
https://www.framinghamma.gov/1510/Open-Space-and-Recreation-Plan

Procedures

Framingham will implement the following procedures at municipal parks and open spaces to reduce the discharge of pollutants from the MS4:

General

- Repair damage to landscaped or mulch or vegetated bare areas as soon as possible to prevent erosion. If there are areas of erosion or poor vegetation, repair them as soon as possible, especially if they are within 50 feet of a surface water (e.g., pond, lake, or river).
- Remove (sweep or shovel) materials such as soil, mulch, and grass clippings from parking lots, streets, curbs, gutters, sidewalks, and drainage swales.
- Do not clean up any unidentified or possibly hazardous materials found during maintenance; notify a supervisor immediately.
- Wastewater from power washing signs, structures, or bleachers should not be discharged into the stormwater system.
- Never wash debris from parking lots into the storm drain.
- When painting park equipment, use a drop cloth and clean up any spills immediately.
- Do not leave open containers on the ground where they may accidentally tip over.
- Sweep parking lots with a street sweeper and dispose of street sweepings in designated areas.

Mowing

- Remove debris and trash from landscaped areas prior to mowing.
- Collect grass clippings and leaves after mowing. Do not blow or wash them into the street, gutter, or storm drains.
- Properly recycle or dispose of organic waste after mowing, weeding, and trimming.
- Reduce mowing frequencies wherever possible by establishing low/no-mow areas in lesser-used spaces.
- Brush off mowers (reels and decks) and tractors over grassy areas or in contained washout areas.
- Leave clippings on grassy areas or dispose of them in the trash or by composting.
- Do not hose off mowers over paved areas that drain into the storm drains or directly to surface waters.
- Do not allow grease from mowers to fall onto areas where they can be washed into the stormwater system.

Landscaping

- When establishing new plantings, use alternative landscaping materials, such as drought resistant or native plants to reduce the need for irrigation and extensive application of fertilizers and pesticides.
- Follow proper fueling procedures for all equipment.
- Fertilizers, herbicides, and pesticides used for landscaping should be properly used, stored, and handled.

Fertilizer & Pesticide 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.
- Proper spill protocol should be followed to prevent chemicals from entering the stormwater system.

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.
- 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.

Irrigation

- 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.
- Repair broken sprinkler heads as soon as possible.
- Only irrigate at a rate that can infiltrate into the soil to limit run-off.
- Avoid irrigating close to impervious surfaces such as parking lots and sidewalks.

Snow Removal

- Snow should not be pushed or dumped into waterbodies or wetlands, into stormwater drainage swales or ditches, or on top of catch basins.
- Snow should not be stored near waterbodies or wetlands.
- Avoid storing snow in areas that are unstable, areas of potential erosion, or high points where snow may melt and collect debris as runoff before it enters the stormwater system.
- Consider sun exposure when storing snow. Snow in areas with higher sun exposure will melt faster but may require deicers if the snowmelt refreezes.
- Store salt or sand for snow & ice indoors under a roof or in a covered container and on impervious surfaces.
- Any damage done to vegetated areas caused by plows or deicing materials should be repaired as early as possible in the spring.

Trash Management

- All waste and recycling containers must be leak-tight with tight-fitting lids or covers.
- Place waste and recycling containers indoors or under a roof or overhang whenever possible.
- Clean and sweep up around outdoor waste containers regularly.
- Arrange for waste and recyclables to be picked up regularly and disposed of at approved disposal facilities.
- Do not wash out waste or recycling containers outdoors or in a parking lot.
- Conduct periodic inspections of waste areas to check for leaks and spills.
- Ensure there are enough trash and recycling containers at appropriate areas.
- Monitor waste and recycling containers at heavily-used sites and on holidays to ensure that there is no overflow.

Equipment Maintenance

- Follow the Operations and Maintenance SOP for Municipal Vehicles and Equipment for equipment used for parks & open space (e.g. lawn mowers).

Other Activities

- Provide pet waste stations with bags and trash receptacles where pets are permitted. Post signs describing the proper disposal of pet waste.
- All portable toilets should be staked down in flat, secure locations where they are less likely to be knocked down or blown over. They should be placed in a location that would retain any spillage from washing into the MS4 or receiving waters. Ensure routine maintenance and cleaning of portable toilets.
- Identify undesirable waterfowl congregation areas and take steps to prevent waterfowl droppings from entering the stormwater system or surrounding waterbodies.
    - Take measures to discourage congregation near waterbodies and the storm system (e.g., use strobe lights or reflective tape, establish no-mow zones to reduce available feeding areas, or plant thick vegetation along waterlines). If waterfowl congregation cannot be managed, then isolate the drainage from congregation areas away from the storm system and waterbodies.
    - Install signage to educate the public on the negative effects of waterfowl feces entering the stormwater system or nearby waterbodies in order to discourage public feeding.

Employee Training

- Employees who perform work on/with at municipal parks and open spaces are trained 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.

Operations and Maintenance SOP
Municipal Vehicles and Equipment

Introduction

An operations and maintenance program for municipal vehicles and equipment is required under the Phase II MS4 Permit minimum control measure for Pollution Prevention/Good Housekeeping 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.*

Required BMPs*:*

- *Within two (2) years from the effective date of the permit (i.e. June 2020), the permittee shall develop, if not already developed, written (hardcopy or electronic) operations and maintenance procedures for the municipal activities for vehicles and equipment. These written procedures shall be included as part of the Stormwater Management Plan (SWMP).*
- *Within two (2) years of the effective date of this permit (i.e. June 2020), the permittee shall develop an inventory of all permittee owned facilities within the categories [parks and open space, buildings and facilities, and vehicles and equipment]. The permittee shall review this inventory annually and update as necessary.*

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.

Vehicle and Equipment Inventory

Inventories are maintained by the following City of Framingham departments which manage fleets of vehicles and equipment:

- School Department
- Department of Public Works
- Police Department
- Fire Department
- Parks, Recreation, and Cultural Affairs
- Capital Projects and Facilities Management
- Conservation Commission
- Inspectional Services
- Library

Vehicle and Equipment Maintenance

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.

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 on impervious surfaces and under cover or indoors whenever possible. Fueling areas should be evaluated to ensure that pollutants (e.g., gasoline or oil) do not enter the MS4.

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.
    - 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.
- 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, drip pans 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. 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.

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.
- 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.

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.

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.
- Dry cleanup methods are recommended within garage facilities. Do not wash down floors and work areas with water.
- Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities.

Outdoor Vehicle Washing Procedures

Outdoor washing of municipal vehicles should be avoided. 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.

Heavy Equipment Washing Procedures

Heavily soiled vehicles or vehicles dirtied from salting or snow removal efforts should follow the SOPs in the "Heavy Equipment Washing Procedures" below.

- 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.
- Floor drains should be connected to a sanitary sewer or tight tank.
- 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.

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.

- 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 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 L

STREET SWEEPING PROCEDURES



CITY OF FRAMINGHAM
URBAN STREET SWEEPING PROGRAM

A PROACTIVE APPROACH TO STOP POLLUTANTS

- To complement existing programs for catch basin cleaning, storm drain outfall monitoring and culvert cleanouts, this program collects litter, debris, pollutants and sediments from street surfaces BEFORE they enter the stormwater system and discharge to a body of water.
- Lake Waushakum, Farm Pond, Learned Pond, and Beaver Dam Brook will be directly impacted.





PROGRAM BENEFITS

- This program designates 29.85 lane miles of urban roadways to be swept on a monthly basis and 5.3 lane miles every night.

- The Urban Sweeping Program will:
  - Support local businesses
  - Provide cleaner, more attractive neighborhoods
  - Comply with the new MS4 Stormwater Regulations
  - Enable cleaner waterways/waterbodies





STREET SWEEPING

- The City has made considerable investments in street sweeping capabilities.

- Public Works staff currently operates mechanical and vacuum sweepers.





PROGRAM PARKING RESTRICTIONS

The sweeping program shall utilize best practices to ensure effective results.

- On-street parking significantly prohibits the sweepers' ability to effectively collect debris, as most debris collects within 24 inches of the curb.

Solution:

- Restricting on-street parking in identified residential areas during the daytime, one Tuesday per month for a three hours period.
- Downtown business district restricted overnight parking for three hours per night.





PROGRAM COMPONENTS



- Installation of Signage
- Parking Enforcement
- Public Outreach and Notification
- Disposal of Collected Waste
- Training Program

PROGRAM GOALS

- Curb-to-curb street cleaning
- Regularly scheduled and monitored
- Minimal impact to businesses and residents
- Post-season evaluation, lessons learned, and adjustments





URBAN SWEEPING SCHEDULE

AREA	DAY OF THE MONTH	AREA EFFECTED	LENGTH OF ROUTE (MILES)
A	1ST TUESDAY	ROADS OFF OF UNION AVE/CONCORD ST	7.5
B	2ND TUESDAY	CEDAR ST/COBURNVILLE	8
C	3RD TUESDAY	SOUTH ST/ARLINGTON	6.75
D	4TH TUESDAY	BEAVER ST AREA	7.6
	EVERY NIGHT	UNION AVE, WAVERLEY ST, AND CONCORD ST	5.3
		TOTAL	35.15 LANE MILES


AREA - A
AREA - B
AREA - C
AREA - D
MONTHLY SWEEPING - APRIL / DECEMBER
First Tuesday / 7.5 Miles
Second Tuesday / 7.1 Miles
Third Tuesday / 8.5 Miles
Fourth Tuesday / 7.6 Miles
Night Sweeping / 3AM-5AM No Parking / 5.4 Miles

APPENDIX M

WINTER OPERATIONS GUIDE

City of Framingham

Department of Public Works

Snow and Ice Guide



Public Works Operations Center
100 Western Avenue Framingham, MA 01702
Phone: 508-532-6030 Fax: 508-620-4801 http://www.framinghamma.gov

Snow and Ice Policy

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City of Framingham · Department of Public Works

SNOW AND ICE POLICY

Snow and Ice operations are among the most important responsibilities charged to the Department of Public Works. No activity performed by a City entity encompasses more uncontrollable factors, nor has a greater impact on the community than does that of the proper handling of snow and ice events. Those factors include weather, the amount of snowfall, rate of snowfall, duration of the storm, and type of precipitation. Not only do these factors have to be considered, but their impact on resources and costs, including manpower, equipment, and materials must be understood and appropriately managed.

Objective

The objective of this policy is to provide a clear and reasonable expectation and understanding of how the Department of Public Works responds to snow and ice events. Additionally, technical information is provided in regards to the way in which the roadways are kept safe and passable. This document is intended to formalize the City's level of service in respect to the removal of snow and ice and the application of anti and de-icing materials. It is not intended, however, to create a duty to any individual or entity. This policy may be affected in whole or part due to equipment breakdown, weather conditions, personnel shortage and any other unforeseen or uncontrolled occurrences. Departure from the policy may take place in unusual or unexpected circumstances.

Mission

The Department of Public Works' Snow and Ice Program is designed to provide safe roadways and sidewalks for those traveling in and through the City of Framingham. The objectives are as follows:

- Reduce the hazards of icy conditions to vehicular and pedestrian traffic
- Facilitate safe and reasonable traffic flow
- Promote system integrity of utilities to minimize emergencies requiring the response of Police, Fire, and utility providers. And in the event of an emergency, to facilitate movement of emergency equipment
- Match the level of response to the event in order to execute reasonable and safe road conditions
- Provide an effective and cost efficient winter maintenance program

The level of service that the City of Framingham provides is mainly determined by the type of roadway in question. The City's policy is to clear all roads from "curb to curb" in anticipation of future storms and provide safe traveling for motorist as well as safe access for emergency vehicles and personnel.

LEVEL OF SERVICE

Snow and Ice Route Plan

The City of Framingham is divided into 3 geographical areas; North, South, and West, each of which is managed by a Highway supervisor. Each of these geographical areas is then subdivided into 4 zones, for a total of 12 zones managed by zone supervisors. Each zone is divided into 4 or 5 routes, totaling 57 routes.

1. North
    - Zones 1, 2, 3, & 4
    - Hub Routes 13 & 14
2. South
    - Zones 5, 6, 7, & 8
    - Hub Routes 15 & 16
3. West
    - Zones 9, 10, 11, 12

Framingham's arterial roadways, such as Concord Street, are designated as hub routes. There are 4 hub routes which handle the highest volume of traffic with the greatest speeds. The primary roadways of each route are specified as point 1 routes, such as Brook Street.

Anti-icing and De-icing Procedures

In addition to the City's densely populated residential and urban areas, there is also a great deal of commuter traffic due to the technology parks and location as a transportation hub. Therefore, it is necessary to keep the hub routes and point 1 routes functioning and safe during winter storm events. Consistent road surfaces on hubs and point 1 routes are maintained by deploying trucks simultaneously throughout the City areas. The Department utilizes a fleet of 21 spreader trucks equipped with computerized material distribution systems that provide uniform application rates. Materials are applied to the roadway in order to achieve the following objectives:

1. Prevent icy conditions on roadways and bridge decks
2. Melt freshly fallen snow on Hub and Point 1 routes
3. Remove ice or hard packed snow during and after plowing operations
4. Improve tire traction

Anti-icing agents are used to pretreat Hub and Point 1 routes when conditions warrant such action. Spreader trucks equipped with liquid distribution systems are able to pre-wet material prior to application. The Department strives to assign a dedicated employee to each spreader truck. These employees are assigned to routes with which they have a level of familiarity, experience, and training. All spreader trucks are equipped with plows, belly scrapers, and two-way radios. Area supervisors determine

application rates and the type of material to be used. The Department's policy is to use the appropriate level of response to match existing or forecasted conditions.

All ice control chemicals work the same way; they lower the freezing point of water and melt ice. A combination of liquid and dry chemicals work quickly and sticks to the surface more effectively than dry chemicals. This can result in increased efficiency and reduced cost.

Anti-Icing (pre-treating) is a strategy utilized to prevent an ice-to-pavement bond. Pre-wet materials or chemicals that will create a brine solution (water saturated or nearly saturated with salt) are utilized to lower the temperature at which water freezes. The key to an effective anti-icing strategy is to pre-treat, meaning ice control chemicals are applied to the road surface before precipitation or ice formation begins.

Deicing is the process of removing ice from the roadway surface. It is important to recognize that for equivalent end results, a deicing strategy for the same snow or ice event will generally require significantly more ice control chemicals than an anti-icing strategy. It is important to coordinate mechanical removal of snow and ice with the use of chemicals, either additional plowing equipment, or the use of belly scrapers attached to spreader trucks. By spreading chemicals on freshly plowed surfaces, the chemicals will dilute less and last longer. Vehicle traffic is beneficial to a de-icing strategy because it works with the brine to break up the snow or ice and is particularly important when there is no other heat source (sun/temperatures).



Abrasives have a specific role in snow and ice control. Abrasives, such as sand, are typically used for pedestrian traction and during working fires to ensure proper footing for emergency personnel. The Department tries to minimize loss by pre-wetting materials.

Effectiveness of Ice Control Chemicals

There are three primary factors that influence the effectiveness of ice control chemicals. Pavement or surface temperature, chemical dilution, and traffic volume and speed are all major aspects to consider when applying material. Surface temperature impacts how quickly an ice control chemical will melt ice and ultimately, how much ice it will melt. The ice content of snow can vary greatly. Light "dry" snow has an ice content of around 10 percent, whereas heavier "wet" snow has around 80 percent ice or water. Freezing rain is nearly 100 percent ice or water. A higher ice percentage will dilute ice control chemicals more rapidly. A high ice content event, falling at a high rate of accumulation is usually a worst case scenario.

One method that increases the effectiveness of material is the way in which it is applied to the roadway. On most roadways, operators of spreader trucks distribute pre-wet material onto the crown of the road. This allows the slope of the road to aid in the effective distribution of materials into travel lanes without significant loss onto the shoulder or side of the road.

Variable Weather Conditions

The following are several weather conditions that supervisors take care to monitor, affect snow and ice operations, and may require

Ambient temperature – surrounding air temperature

Clear night sky radiation – Clear night skies with little or no wind, allows road surfaces to cool quickly, which often results in surface temperature being colder than the adjacent air temperature. This condition can cause black ice to form on the surface.

Runoff on rural roadways is another condition that must be monitored and maintained to prevent dangerous ice conditions.

During dangerous snow and ice road conditions, it is the responsibility of the motorist to use care and caution when operating their vehicle. The City will not post any additional warning or regulatory signs due to winter weather conditions.

Plowing of Roadways

Based on our GIS mapping systems and assessments, the Department has developed a strategic, integrated route plan that distributes resources uniformly throughout three geographical areas that integrate City and contracted equipment on the same routes. This allows the Department to ramp up or ramp down the response as conditions warrant.

In most cases, the Department will plan to begin plowing operations on secondary roadways when snow has accumulated on road surfaces at a depth of three or more inches. At this stage in the storm response, it is necessary for the Department to utilize all available resources from each Public Works Division:

Highway, Sanitation, Water, Sewer, Fleet Maintenance, Engineering, and Administration and Finance. The City also contracts private snow removal equipment and personnel to assist in plowing operations by integrating private equipment with City plowing equipment this allows for better control and accountability. Contracted equipment is used on a case by case basis depending on the forecasted accumulation, timing and duration of the storm, prior or subsequent storms, and type of precipitation.

Hub routes are given the highest priority, followed closely by Point 1 routes and secondary roadways, respectively. Hub routes shall be plowed curb to curb continuously using two or more large plowing vehicles grouped in such a manner so as to clear snow from the road center line to the curb in one pass. This process shall last for the duration of the storm. Point 1 routes shall be plowed curb to curb continuously for the duration of the storm using one or two large plowing vehicles. Secondary roads and cul-de-sacs will be plowed and maintained so as to remain open to residential traffic. These roads will be plowed curb to curb at the end of the storm under normal conditions. It may be necessary for plowing equipment to return in order to widen roads after a major snow fall. In some instances, roads may require de-icing treatment after they have been plowed, drains may need clearing, and some snow banks may need to be pushed back due to sight line issues.

Worcester Road and its entrance and exit ramps are designated as State Highway Route 9. Route 30 from the Southborough line to the Mass Pike Bridge and Route 126 from the Ashland line to Winthrop Street are also State Roads. These roads are therefore treated, plowed, and maintained by the Massachusetts Department of Transportation. If there are any concerns regarding pavement conditions, including potholes, they should be directed to MASSDOT Highway Division District 3 at 508-929-3800. Likewise, the Department of Public works is not responsible for the plowing or maintenance of private roads.

Plowing of Sidewalks

The Department is responsible for plowing just over 90 miles of sidewalks, which are divided into 9 routes. During ice or snow events, the Department will deploy, small tracked sidewalk tractors with power angle plows and in some cases, spreaders to manage sidewalks within the City's Downtown Business District for the duration of the storm. The Department utilizes both wheeled and track type tractors equipped with V-plows, straight blade power angle plows, and snow blower attachments to clear sidewalks. The plowing of sidewalks shall commence as soon as reasonably possible after the storm and will be completed as conditions, equipment, and manpower permit. Not all City sidewalks are plowed. Although it is not mandatory, it is recommended that owners, tenants, or occupants of homes in the City of Framingham remove snow and ice from sidewalks adjacent to residential properties after snow ceases to fall.

Downtown Business District

The City's Downtown Business District intersects three major arteries: Concord Street (Rt. 126), Waverly Street (Rt. 135), and Union Avenue. On average, there are over sixty-eight commuter rail and freight grade crossings in this area daily. Rt. 126 and Rt. 135 facilitate critical north/south and east/west traffic flow.

Maintaining dominate traffic flow and pedestrian safety requires a coordinated effort in managing all personnel and equipment involved in a systematic manner.

During moderate to major storm events on-street parking is restricted and aggressively enforced. Instead of plowing curb to curb, snow is plowed into the on-street parking spaces. Sidewalks are plowed away from storefronts and pushed off the curb line into parking spaces. Stored snow is then removed and hauled away. The primary objective is to remove all snow from this area in order to allow dominant traffic flow and safe pedestrian access to commuter transportation and businesses.

Plowing of City Owned Lots

The Department is responsible for plowing twenty five City owned lots and sixteen school parking lots. During snow events, the Department will maintain the throughways of parking lots during the hours of their operation. The plowing of parking lots will begin after roadways have been cleared and are safely passable. Many School parking lots are not only plowed and treated, but required snow removal from drop-off and pick-up zones, and in some cases, snow is required to be hauled off site due to lack of snow storage space.

Crosswalks and School Crossing Guard Stations

Snow will be removed from designated crosswalks, school crossing guard stations, and student loading areas as soon as conditions, equipment, and manpower permit.

Sand Barrels

50 sand barrels are distributed in various locations usually near hills or intersections for use by residents. Sand barrels are refilled as necessary after an event. A sand/salt mix is also available in small amounts for residents at the Recycling Center located at 255 Mount Wayte Avenue with a valid permit during its hours of operation.

Fire Hydrants

The clearing of snow from fire hydrants is the responsibility of the Framingham Fire Department. The Water Division attaches hydrant flags to hydrants on main roads and on hydrants located in cul-de-sacs. Additionally, the Highway Division has begun to affix blue reflectors in the roadway, adjacent to the hydrants, so they can be more easily located.

Trash and Recycling Receptacles

The Sanitation Division collects trash and recycling respectively regardless of conditions. Only in hazardous conditions will the Division delay pickup. It is advisable to take in receptacles as soon as possible after collection to reduce the likelihood of damaged during snow operations. It is also important that residents do not place toters in the sidewalk, as this will inhibit the progress of the sidewalk tractors, requiring operators to get out and physically push back its toter in its path.

CITY SNOW POLICIES

City-wide Parking Regulations

Annual odd/even parking restrictions will run from January 1st to December 31st. Parking will be permitted on the even side of the road in an even year and on the odd side in an odd year, unless otherwise posted. Parked or disabled vehicles obstructing snow removal equipment will be ticketed and towed.

During a declared snow emergency, parking is banned on both sides of all posted snow arteries:

Beacon Street
Belknap Road
Bishop Street
Brook Street
Central Street
Cochituate Road
Concord Street
Edgell Road
Franklin Street
Gates Street
Grove Street
Hartford Street
Hollis Street
Irving Street
Lincoln Street
Potter Road
Salem End Road
School Street
Summer Street
Temple Street
Union Avenue
Water Street
Waverley Street
Winter Street
Winthrop Street





City Bylaws on Parking Restrictions

Article V, Section 15. Snow Removal

15.2 The Director of Public Works or other officers having charge of ways of the Town shall have the authority, for the purposes of removing or plowing snow, or removing ice from any way in the Town, to remove or cause to be removed to some convenient place, including in such term a public garage, any vehicle interfering with such work.

15.3 The owner of any such vehicle so removed shall be liable for the reasonable cost of such removal and storage, and delivery of the vehicle to said owner may be withheld by the Director of Public Works or other officer having charge of ways in the Town, until such reasonable costs shall be paid.

15.4 Whenever any vehicle is so removed, the Police Department of the Town shall be notified and said department shall render all necessary assistance to the Director of Public Works or other officer having charge of ways, in enforcing this Bylaw.

Mailbox Policy

The City of Framingham is not responsible for mailboxes hit by City snowplows, or snow thrown from plowing operations, if the mailbox is located in the City Right of Way (ROW). Although the City ROW varies from road to road and often house to house, generally, it extends approximately 10-20 feet on either side of the roadway. Residents should make sure that they are not obstructing the ROW and assume responsibility for damage to private property in the ROW. If residents b

Miscellaneous Damage

If a resident experiences damage to their property they should call the Highway Division at 508-532-6030. Some damage such as lawn, mailbox, and fence damage can be repaired by the Division's staff. If damage is found to have occurred on private property, steps will be taken to either repair the damage or inform the property owner on how to file an insurance claim with the City.

Driveways

The Department's snow removal equipment discharges snow in driveways during the course of plowing operations. It is not done with willful intent, but is a result of normal plowing operations and the movement of snow. This action will not change due to individual residents' requests.

No snow is to be plowed, shoveled, blown, or otherwise placed into a City roadway, as it may pose a safety hazard.

City Bylaws Regarding Snow Removal

Article V, Section 15. Snow Removal

15.5.1 No person or entity, regardless of their ownership, tenancy, or other status or relationship to any property, nor any agent, employee, contractor or servant of any person or entity shall place, throw, plow or in any way move any snow or ice onto any portion of the Town's streets, ways, sidewalks, or land, except with the approval of the director of Public Works or his designee. Notwithstanding the foregoing, this bylaw shall not be construed to prohibit owners or lawful occupants of residential premises from place snow and ice on the sidewalk while leaving unobstructed room for pedestrian passage, and from placing snow or ice from pavement edge to no more than one foot (12") out into the street, immediately adjacent to the driveway opening.

15.5.2 Anyone violating the prohibitions of this bylaw shall be subject to a specific penalty of a fine in an amount up to three-hundred dollars ($300) for each offense. The fine structure shall be as follows:

Residential (Less than 6 dwelling units)
First violation ..... $ 25.00
Second violation ..... $ 50.00
Third or more violations $100.00

Commercial and 6 or more residential units
First violation ..... $ 50.00
Second violation $100.00
Third or more violations $300.00

DEPARTMENT RESOURCES

Employees

The employees of the Highway Division, all personnel assigned to sanders, supervisors, and administrative personnel are trained on general snow and ice operations, as well as the Department's Snow and Ice Operations. Personnel assigned to sanders, or as backup sander operators are provided with extensive training by experienced operators on their assigned routes. Additionally, some Public Works employees have attended incident command training.

Snow and Ice Operations utilize employees from all Divisions. It is important to note that although these employees are necessary to provide an adequate level of service during snow and ice events, they are also required to perform their daily responsibilities to ensure quality of life services are consistently delivered to the residents of Framingham. Pump Station employees must constantly maintain the City's fifty water and wastewater pump stations, wet wells, and water tanks. Sanitation employees are required to collect trash and recycling. Water and Sewer employees must be ready and able to respond to any main breaks or other interruptions in service.

The way in which City equipment and contracted equipment are assigned to particular areas, zones, and routes, allows the Department to reallocate equipment or recover from a loss of equipment more easily if employees are needed for simultaneous emergencies.

City Equipment

The City of Framingham utilizes 72 pieces of equipment across Division lines for snow and ice operations. The following is the City equipment assigned to City employees:

4x4's
1 Tons Dump Trucks
6 and 10 Wheel Dump Style Bodies
Sanitation Packers and Dumpster Trucks
Backhoes
Front End Loaders
6-Yard Sanders
12-Yard Snow Fighters
Truck or loader Mounted Snow Blowers

Contracted Equipment

The City contracts private companies to aid in snow and ice operations when the Department cannot effectively manage the event with only City resources. Contractors are called in for a minimum of four hours, but are usually required for much longer periods of time. Additional equipment is contracted at a total cost of $7,500 an hour. Contracted equipment is equally dispersed through City Areas and Zones.

The City also contracts a private tree removal service for any hazard trees that pose an imminent treat during a snow and ice event. Hand shoveling crews are also utilized in the removal of snow from the Downtown Business District.

Snow Operations Center

The Department's Snow Operations Center is located at the Public Works Colonna Facility at 100 Western Avenue and is in operation prior to, during, and after storm events. The responsibilities charged to Snow Operations Center are as follows:

- Serve as central communication for all snow related equipment, Public Works Divisions, City Departments, emergency agencies and utilities companies
- Assign and monitor personnel and equipment
- Manage and monitor movement of equipment and personnel
- Track and record the condition of plow routes
- Monitor weather conditions and deviations in weather trending from those forecasted
- Coordinate logistical support and supplies for snow related equipment and personnel
- Monitor resources that provide essential services and their ability to respond to emergencies

Record keeping is an important aspect to the command center's operations. Personnel monitor and record weather, pavement conditions, begin and end times of roadway treatment, and employee hours. When contracted equipment and personnel are necessary, an additional administrative center is open at the Henry Street facility. This operations center tracks and records contractor hours and locations, towing operations, contracted tree removal operations, and police details.

SUMMARY

The City of Framingham faces a multitude of challenges when dealing with winter operations. The City's 550 miles of road and 166 miles of sidewalk are comprised of urban, suburban, and rural roadways, as well as much hilly terrain. Framingham hosts a number of commercial, industrial and retail business centers, as well as the Framingham State University campus. Combined, these factors generate considerable traffic volume throughout the City.

Weather conditions can vary greatly in different parts of City and must be managed independently. New England weather is often unpredictable and difficult to forecast. The Department designates equipment during the winter months for the purpose of managing snow and ice events. The following variables contribute to the effectiveness of snow operations:

- Accurate weather forecast
- Storm intensity and duration
- Temperature (ambient and road surface)
- Day of the week and time of day
- Traffic conditions
- Disabled vehicles
- Availability of anti-icing and de-icing materials
- Availability of private contractors
- Condition of and availability of City equipment
- Condition and health of employees
- Simultaneous Public Works emergencies (i.e. water and sewer main breaks)

WINTER OPERATIONS EQUIPMENT



12 Yard Hub Sander with Wing Plow



12 Yard Point 1 Sander with Wing Plow



Truck Mounted Snow Blower



Sidewalk Tracker with V-Plow Attachment



SNOW AND ICE OPERATIONS 2020-2021

Framingham Public Works

Snow and Ice Program

Snow and Ice Mission

TO PROVIDE SAFE AND REASONABLE ROAD CONDITIONS FOR ALL WHO TRAVEL IN FRAMINGHAM



Not a One-Size-Fits-All Approach





- Level of Service
- Storm to Storm Challenges
- Utilization of Contractors
- Resources
- Trash and Recycling Collection
- Water and Sewer Breaks
- Sustainability

Framingham's Challenges



- Parking Issues
- Regional Transportation Hub
- 44% of Jobs in Metrowest are Located in Framingham
- School Choice Policy
- Challenging Geographical Features
- Politically Engaged Community
- Metrowest Medical Center

Accomplishing Our Mission



- ASSESS
- ADJUST
- ADAPT
- ACCOMPLISH

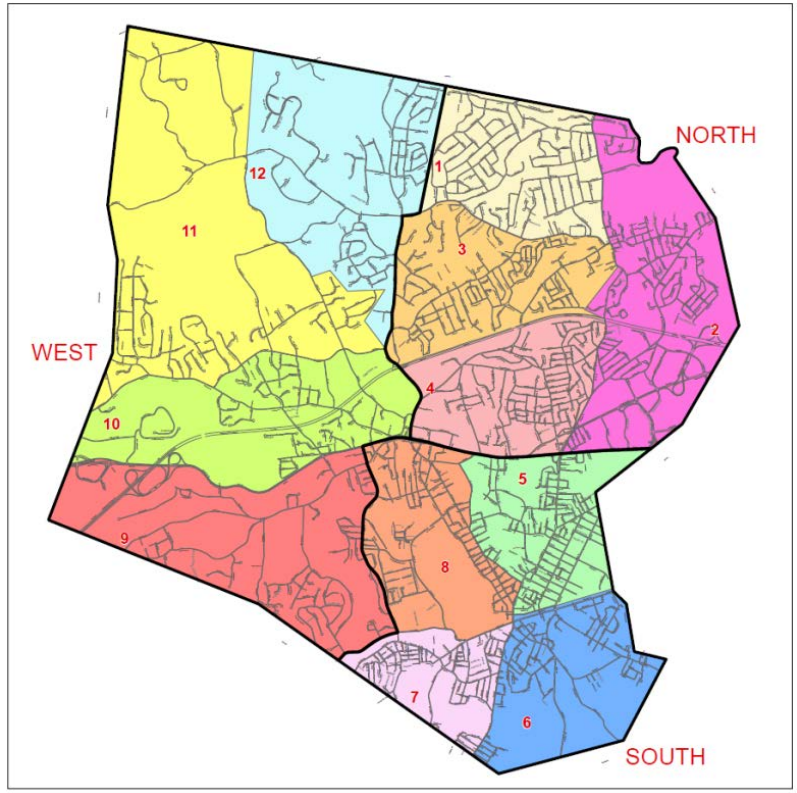
COVID-19 Changes

- Check-In Procedures/Snow Room
- Maintenance
- Henry Street
- Sander Training

- Personnel
  - 5 Eliminated Positions: Highway (3), Water/Sewer (1), Fleet (1)
  - 4 Vacancies: Highway (3), Water/Sewer (1)
  - 2 L/T Workers Comp: Highway (1), Water/Sewer (1)

- Schools Starting Hybrid in January 2021
  - Anticipated Traffic Issues from Increased Parent Drop-Offs

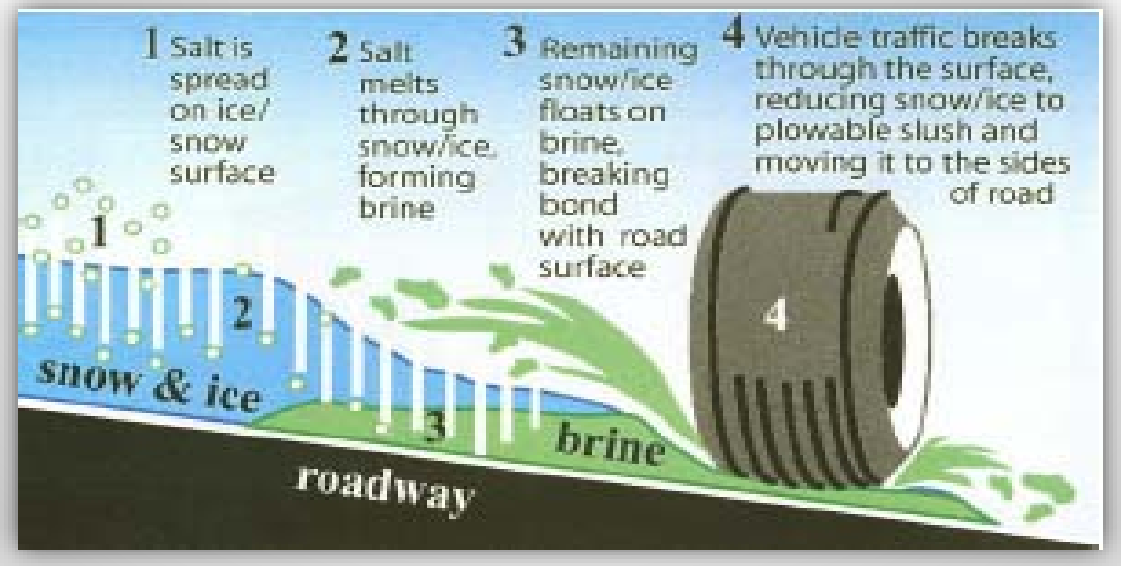
Snow and Ice Route Plan



- Systematic Route Plan
- Distribute Resources Uniformly Throughout Three Geographic Areas
- Prioritize Main Roads with Greater Traffic Volumes and Higher Speeds
- Ensure Secondary Roads are Reasonably Passable
- Control and Accountability
- Integration of City and Contracted Resources

Anti-Icing and Deicing

- Anti-Icing
  - Prevents snow and ice from bonding to the pavement by creating a salt brine
  - Uses 6x less material than would be needed to treat 1” of snow from the top down
- De-Icing
  - Removes snow and ice deposits
- Extreme Temperatures = More Material



Sander Components





- 20 Available Sanders
- Sanders are Equipped With:
  - Computerized ground speed distribution systems
  - Front plows and some wing plows
  - Center scrapper blades
  - Two-way radios
  - On-board liquid distribution systems
  - GPS Units

  - *Check Gates
  - Fill Mag
  - Mag Pump Training

Automated Ground Speed Distribution Systems

- Supervisory Control: Ability to Assess and Adjust
- Ability to Vary Distribution Rates
- Reports Application Rates and Speeds
- Calibrated to Pre-Set Rate of Application



Training





- Restricted Use of Vacation Time
  - Available to Work December-April,
- Report within 1 Hour of Being Called
- Check In & Out of Snow Room
- Check Assigned Truck or Equipment
- Two-Way Radio Protocol
  - Answer with Truck Number & Location
  - Emergencies
- Communicate with Zone Supervisor
  - Status
  - Maintenance Issues

Training





- Hooking Up
- Ballast – Dumping in Correct Place
- Plow Blades – 2 Finger Rule
- Right Turns
- In & Out vs. Pushing Back – Avoiding Damage
- Don't Plow in the Sidewalks
- Plowing Parking Lots and Schools
- Running Tandem
- Damage – Report to Snow Room
- Vehicle Inspection – Slips to Snow Room
- Park in Correct Spot at End of Storm

Storm Preparations



- Personnel Availability
- Equipment Condition
- Contractor Availability
- Hook up Plows
- Tire Chains
- Material Supply
- Short and Long Term Forecasts

The Storm





Every Storm is Different:

- Timing
- Forecast
- Duration
- Sustainability of Personnel
- Condition of Equipment
- Salt Availability
- Declared Emergency
- Emergency Infrastructure Repairs

Downtown Removal

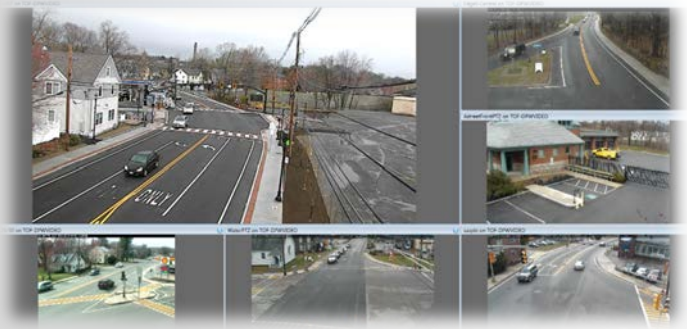




- Tractor/Mechanical Removal
- Contracted Shoveling Crew
- Live Loading Removal Operations

Snow Room





- Monitors:
  - Personnel & Equipment Assignments & Status
  - Route Completion Status
  - Private & Public Weather Forecasts and Radar
  - Forecast Trends
  - Temperature Sensors, River Height Sensors
  - Traffic Cameras
  - GPS
  - GIS
  - Kronos Payroll Software
  - Two-Way Radio Communication System

Post Storm





- Main Maintenance
- Push Back and Cul-De-Sacs
- Sidewalks and School Paths
- Parking Lots and Drop off/Pick Up Areas
- Mid-Block Crosswalks and Crossing Guard Stations
- Snow Hauling
- Posting Crew
- Yard Maintenance

Recovery



- Main Maintenance
- Material Orders
- Resident Calls and Complaints
- Collect Trash & Recycling
- RDC Operations
- Water Breaks and Frozen Pipes
- Roadway Repairs
- Wash and Service Equipment
- Personnel Recovery


Questions?

APPENDIX N

AUTOMATED STREAM GAUGES USER MANUAL

CITY OF FRAMINGHAM
DEPARTMENT OF PUBLIC WORKS
FRAMINGHAM, MASSACHUSETTS 01702

"Dedicated to Excellence in Public Service"

PETER A. SELLERS
EXECUTIVE DIRECTOR | FDPW
PAUL G. BARDEN
DEPUTY DIRECTOR | FDPW
DIANE CONNER
ASSISTANT DIRECTOR | FDPW
WILLIAM R. SEDEWITZ - PE
CHIEF ENGINEER | FDPW

To: Engineering Files
From: Kerry Reed
Date: March 2019
Re: Automated Stream Gauges

The City of Framingham installed surface water level sensors and communications equipment at five (5) sites in 2011 and upgraded equipment in 2018/2019. These sensors provide information on water elevation to help Highway Department staff monitor major problem areas during major storms. The system is operated and managed by the Engineering and Highway & Sanitation Divisions of the Department of Public Works (DPW). Access to data is via the Internet maintained by the City's Technology Services Department, DPW Operations staff, and Emergency Operations Center staff.

1. Background

The City's Multiple Hazard Mitigation Plan (MHMP) includes a recommendation for the installation of automated stream gauges in several locations along the City's rivers and brooks. During storms, the City's DPW staff are often deployed to areas of potential flooding or that might require emergency management without knowing when the staff are actually needed at the locations. Staff often must sit in vehicles at potential flooding sites and constantly visually monitor river levels to be available should the need for emergency operations arise. One of the main benefits of the automated stream gauges would be to free up staff to provide support for emergency operations in other locations.

1.1 The MHMP Working Group worked with DPW staff to identify areas where gauges would be most helpful in managing operations during severe storms. The criteria for selection of sites included:

1.1.1 Proximity to areas of frequent or severe flooding that pose safety hazards;

1.1.2 Proximity to areas of frequent or severe flooding that may cause significant damage to property;

1.1.3 Proximity to City buildings that can house a base radio;

1.1.4 Automation of the Saxonville Levee staff gauge;

1.1.5 Locations where debris buildup is historically significant and can cause flooding; and

1.1.6 Ease of installation and maintenance.

1.2 Five locations were selected based on the above criteria. These locations include:

1.2.1 Watson Place (Saxonville Levee) at the outlet for the drainage from the Saxonville Levee Pump Station. This location requires constant monitoring by DPW staff during severe storms to perform levee-related emergency operations.

1.2.2 Beaver Dam Brook at Taralli Terrace. The most significant controllable factor in flooding in this area is the buildup of debris at various culverts including Second Street and Taralli Terrace. Currently during storms, DPW staff must constantly monitor this location for potential flooding. Taralli Terrace was selected for a gauge due to its upstream proximity to Second Street and its proximity to the Framingham Police Substation at Taralli Terrace. Installation of the stream gauge at this location would provide information on the level of the brook, releasing staff from constantly monitoring the site.

1.2.3 Sudbury River at Main Street. This area was selected because it is a significant indicator of situations where the Sudbury River might quickly rise and back up into tributaries such as Sucker Brook, which runs through a wetland east of Walnut Street. Originally, the bridge at Worcester Road (Route 9) was selected as a site due to its location in the middle of the river reach between the Winter Street Dam and the Central Street Dam. However, the location of the gauge along the bridge and its potential for vandalism were considered too risky. The location at the northwest abutment of the Main Street bridge provide the same proximity to the Worcester Road Pump Station, as well as proximity to other locations such as Bowditch Field buildings or the Callahan Center when the Worcester Road Pump Station is planned to be removed in the next 5 to 10 years. Installation of a gauge at this site would provide information for the potential for flooding of surrounding areas.

1.2.4 Dunsdell Brook at McAdams Road. This location was selected due to the frequent flooding caused by buildup of debris in front of the culvert in the roadway. The culvert was constructed with two 90-degree bends which requires a trash gate on the upstream headwall. The trash gate has historically clogged significantly over time, requiring constant monitoring during severe storms. The trash gate was modified in 2011, but still clogs on occasion. Currently during storms, DPW staff must constantly monitor this location for potential flooding. Installation of the stream gauge at this location would provide information on the level of the brook, releasing staff from constantly monitoring the site.

1.2.5 Hop Brook at 62 Hemenway Road. This location was selected due to the flooding that occurred in July 2009. Flooding was due in part to sediment buildup in the railroad culvert and downstream of the culvert. Although the sediment was cleared in the spring of 2010, there is a potential for future clogging. Currently during storms, DPW staff must constantly monitor this location for potential flooding. Emergency operations include operation of a portable pump, kept at the Hemenway Sewer Pump Station. This pump can be brought to the top of the rail bed to pump water from the upstream area to the downstream area. Installation of the stream gauge at this location would provide information on the level of the brook, releasing staff from constantly monitoring the site.

2. Description and Location of Sensing Equipment

Table 1 shows locations of five river level sensing gauges. See also Attachment A for location information.

Table 1. Locations of Stream Gauges

Priority	Location	Nearby facility	Base gauge elevation (Ft, NGVD29)	High Alarm (Ft, NGVD29)	High-High Alarm (Ft, NGVD29)
1	Watson Place, at lower manual gauge near observation platform	King Sewer Pump Station	117.40 * Display = 4.9	119.40 * Display = 6.9	121.40 * Display = 8.9
2	Beaver Dam Brook at Taralli Terrace (upstream	Police Substation at Taralli Terrace and	143.93	148.3	149.8

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	headwall)	Beaver Park Road			
3	Sudbury River, northwest abutment of Main Street bridge	Worcester Road Pump Station	149.34	152.5	156
4	Dunsdell Brook at McAdams (upstream headwall)	Edgell Road Water Pump Station	203.72	205.2	206.7
5	Hop Brook at 62 Hemenway Road (downstream headwall)	Hemenway Pump Station	165.40	167.4	168.4

* The display for the Watson Place gauge is set to match the existing staff gauge, which is in turn used to drive the action levels for management of the Saxonville Levee emergency operations, as described in the DPW's Stormwater Management Plan and the U.S. Army Corps of Engineers Saxonville Levee Operations Manual.

2.1 Each sensor is a pressure transducer within a submersible level field unit.

2.2 Sensor data and operations

The sensors record data for river height, time, day, sensor location, and battery level.

The system is operational at all times, including during storms where power outages may occur. Each sensor unit requires a battery (approximately 10 year life-span based on the frequency of data transmission). The sensors can withstand being in a dry environment or a freezing environment.

3. Alarm Operations

3.1 The system has alarms that are triggered based on pre-programmed water levels. Each site has pre-set alarms for High water level (call to alert) and for High-high water level (call to action). See Table 1 for these levels.

3.2 Each alarm level triggers an automated text message to a pre-programmed phone number.

3.3 The Framingham Emergency Operations Center is not called.

3.4 Once the system has reached an alarm level, the alarm is not repeated unless:

3.4.1 The water level reaches another alarm stage, or

3.4.2 The water level drops below the current alarm level and later returns to the level if more than half an hour has passed. The alarm is not repeated more frequently than every 30 minutes to prevent redundant alerts during uneven water flows.

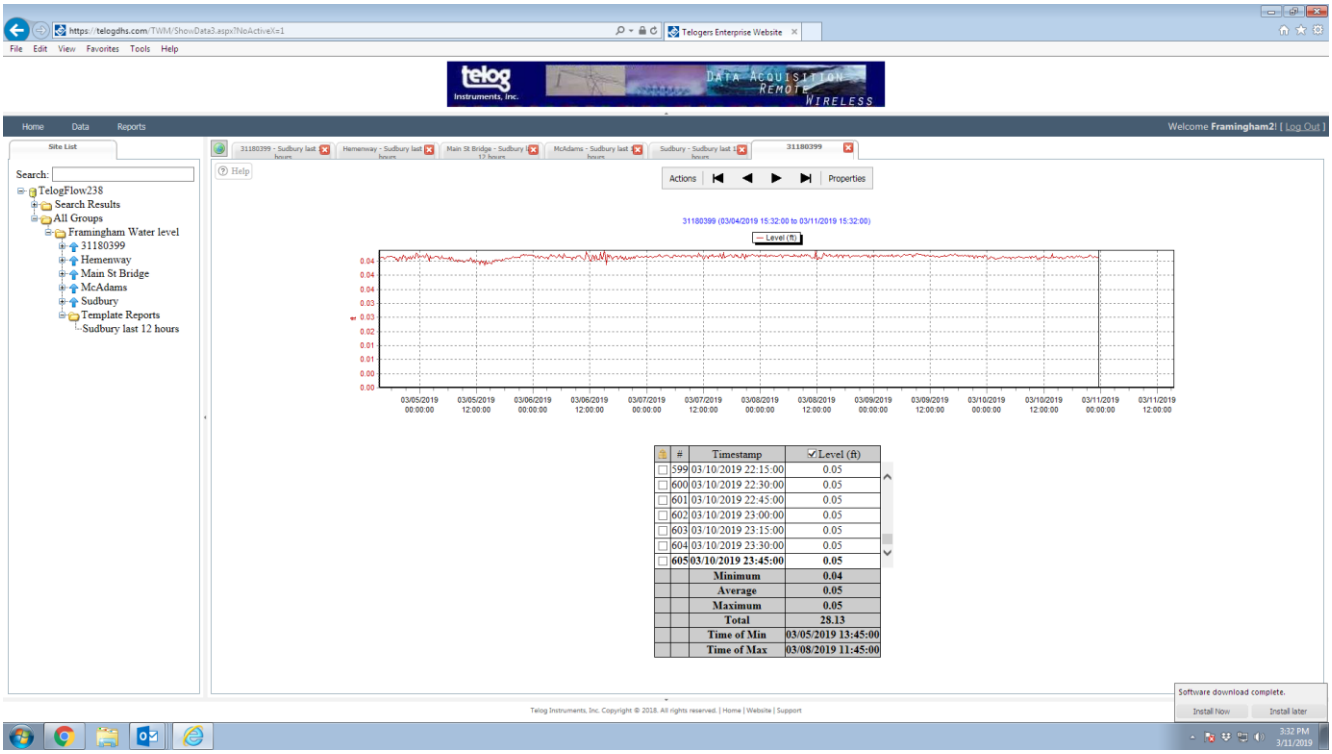
3.5 Each of the following parameters is programmable: High set point, High-High set point, users and their access levels, phone numbers for alarm notification, time between system calls to each phone, message provided for each stream and alarm type.

4. Data

4.1 The data can be accessed at: https://telogdhs.com/TWM/DesktopLoginPage.aspx?ReturnUrl=%2fTWM%2f. The password and user name are: Framingham2.

4.2 An example of the website and reports follows:

OPERATIONS CENTER | 100 WESTERN AVENUE | FRAMINGHAM, MASSACHUSETTS 01702 | TEL 508-532-6010 | FAX 508-424-3428



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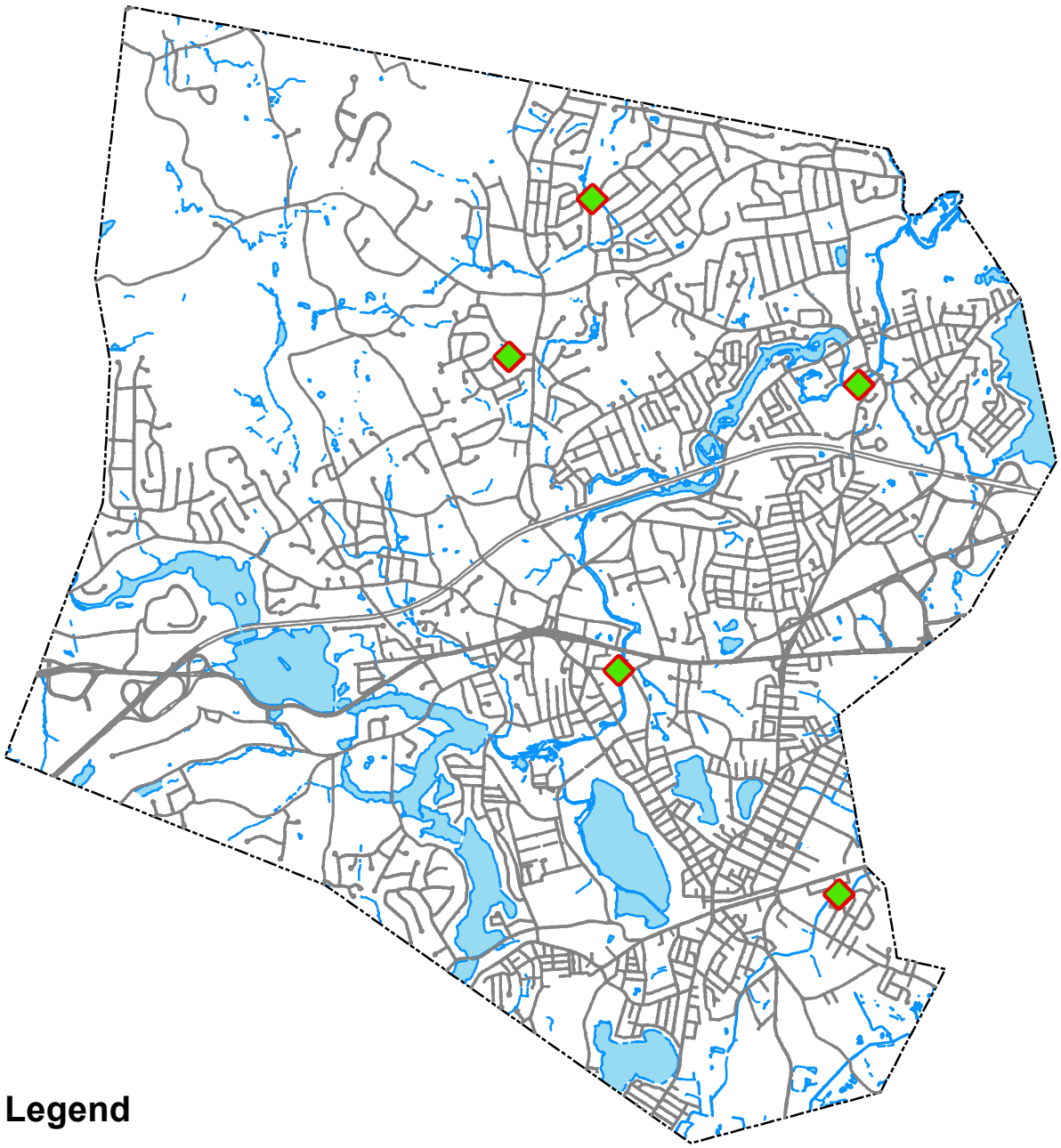
Framingham Stream Gauges



Legend

- Automated Stream Gauges
- Brooks
- Waterbodies
- Municipal Border

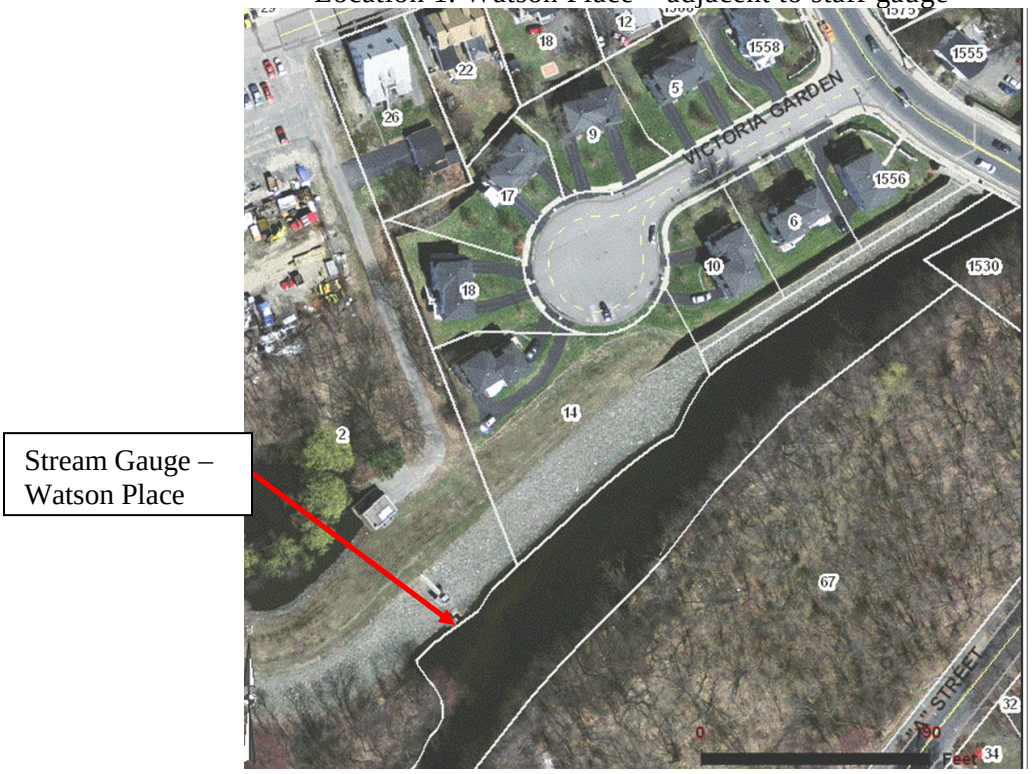
LAST REVISED: June, 2019

Department of Public Works
Engineering and Transportation Division

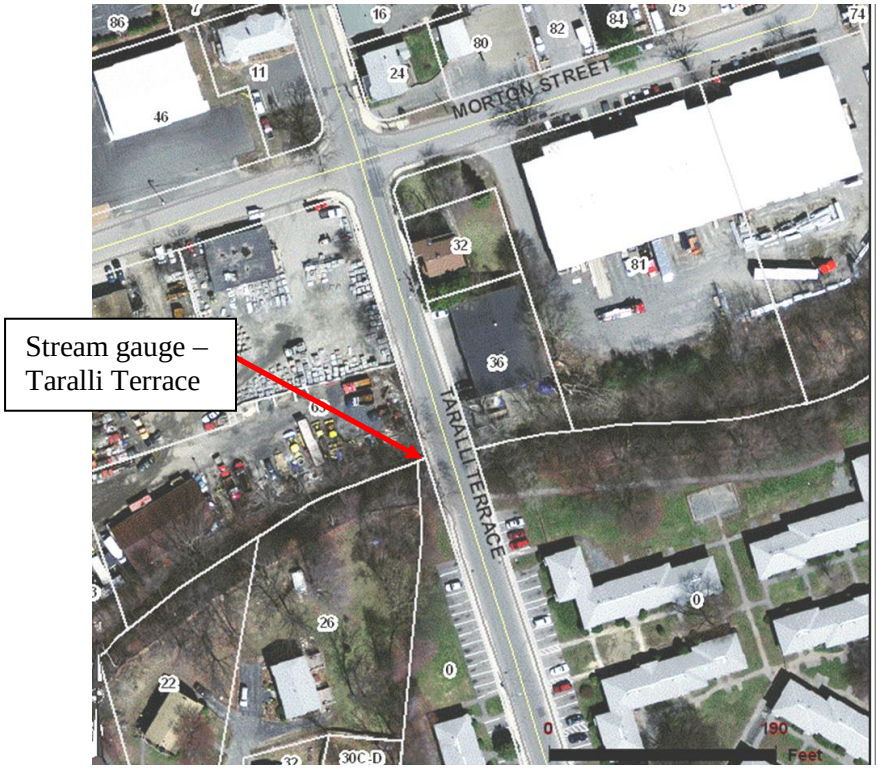
William R. Sedewitz, P.E.
Director

Attachment A. Locations of Automated Stream Gauges

Location 1. Watson Place – adjacent to staff gauge



Location 2 Beaver Dam Brook at Taralli Terrace – east abutment



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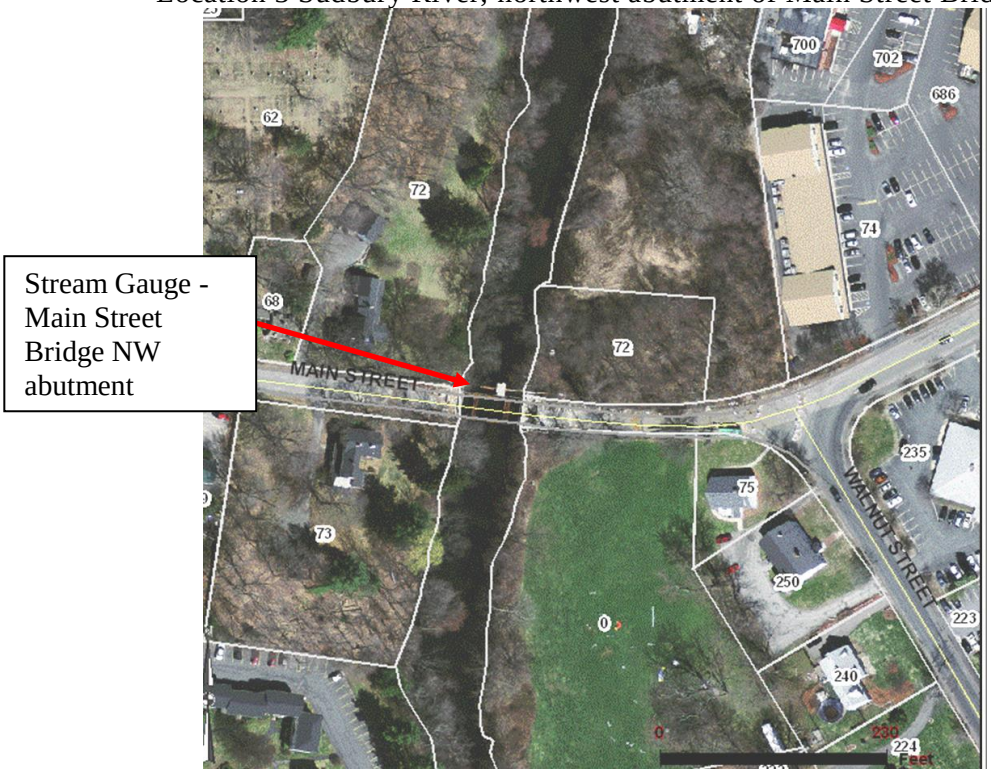
Attachment A. Locations of Automated Stream Gauges

Location 3 Sudbury River, northwest abutment of Main Street Bridge



Location 4 Dunsdell Brook at MacAdams (north, upstream side)



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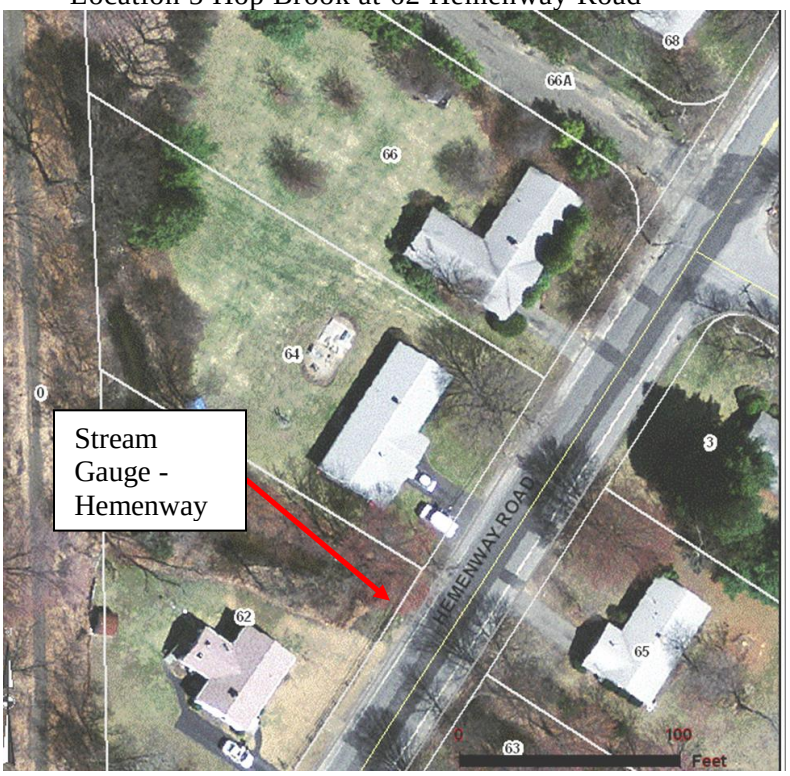
Attachment A. Locations of Automated Stream Gauges

Location 5 Hop Brook at 62 Hemenway Road



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Trimble water

Telog PR-32A/32iA

WIRELESS BATTERY-POWERED PRESSURE RTU WITH IMPULSE MONITORING OPTION



WATER SYSTEM PRESSURE AND LEVEL MONITORING WITH OPTIONAL TRANSIENT CAPTURE WAVEFORM

The Telog PR-32A and Telog PR-32iA are versatile instruments intended to monitor water system pressures or water levels (e.g. underground aquifers, surface reservoirs or water tower levels). When you combine the Telog PR-32A series with a Trimble software option, you have a powerful system of wireless water infrastructure monitoring that is consistently delivering real-time data from the field straight to your desktop. Imagine.....all your data on one platform straight to your computer screen.

In addition to performing the measurement and recording functions of the Telog PR-32A, the impulse recording option feature of the Telog PR-32iA units stores the waveform of captured pressure transient waves detected on the monitored network. The Telog PR-32iA can store up to 125 events of variable duration that may occur over many months of on-site monitoring, recording up to a maximum of 2.5 minutes of transient data at 256 samples/second.

Wireless Communication
The power of every Telog 32 series recorder from Trimble Telog is wireless data transfer capability. Using cellular technology enables unmanned monitoring of remote sites as well as instant updates and alarm notifications. The Telog PR-32A/32iA series uses a low power, LTE/Cat 1 cellular communication modem certified on Verizon Wireless.

Collecting Data
The Telog PR-32A/32iA series may be configured to call its host application on a schedule (e.g. once per day; every four hours, etc.) and/or in response to site alarm conditions (e.g. in response to a high level event). The recorder can sample the pressure sensor up to four times/second (Telog PR-32A) or up to 256 times/second (Telog PR-32iA). Data may be stored in the recorder at user defined intervals (e.g. five minutes, one minute, etc.) without concern for data loss because the recorder will store up to 82,000 values, depending on input type, before overwriting the oldest data.

Packaging
The cellular modem, antenna, process signal conditioning, data recorder and battery are in a small IP68 rated Nema 6P enclosure for a combined weight of 2.5 pounds and measuring 4"L x 4"W x 3"H [102mm L x 102mm W x 76mm H].

Battery Powered
The Telog PR-32A and Telog PR-32iA recorders use a user replaceable Telog BP-4 lithium battery pack. At one call per day the battery pack will last up to five years on a PR-32A RTU. The battery life with a PR-32iA depends on the sampling resolution chosen in addition to the call schedule (see table below for examples). With user configurable call and sampling rates, you get to choose the best configuration for your application.

Software Support
Trimble Telog wireless recorders are compatible with all Trimble software applications, including Trimble Unity, Telog Online (cloud), Telog Enterprise and Telogers for Windows application software. This ensures that utilities have a complete solution addressing all their remote monitoring requirements delivered in a manner that suits each individual utility's operations and IT needs.

Applications

- Water system pressure monitoring
- Water level monitoring
- Tank level monitoring
- High speed sampling to 256 samples/second

Benefits

- Improve asset performance, reduce leakage and pipeline failures
- Monitor and optimize water and site operations and compliance
- Real-time situational awareness of overflows and high/low level events
- Battery operated

Features

- Wireless communication via cellular (LTE)
- Alarm notification
- Time stamped events
- Sensor installs in 2" wells
- Automatic barometric pressure correction
- Integral antenna
- User programmable
- IP68 Rating

DATASHEET

Telog PR-32A/32iA SPECIFICATIONS

RECORDER MODEL: Telog PR-32A and Telog PR-32iA

Type	Single channel pressure recorder
Measurement	
Resolution	12 bits (0.025%)
Accuracy	±0.075% of full scale at 73°F ±40 ppm/°F
Temperature range	40°F to +149°F [4° to 65°C]

NOTE: For applications below this operating range please contact your Trimble Telog support team.

Recording with PR-32 (no impulse option included)

Sample Rate	4 per second to 1 per 8 hours; programmable
Clock Accuracy	0.01%
Memory Size	31,000 data values
Storage Method	Wrap around (first-in; first-out)

Recording with PR-32i (with impulse option included and on)

Note: When using PR-32i which includes the impulse option, the normal mode specified above will operate whether the impulse mode is on or off.

Data Recorded	Normal mode interval data plus transient event waveforms
Transient Trigger	Pressure rate-of-change; either positive or negative; user configurable
Impulse Memory	Up to 100 transient events to a maximum of 37,000 samples after which new data will overwrite oldest data.

Communication			
Local RS-232	4 pin circular connector rated IP-67 Auto-selected baud rate to 19.2K		
Cellular	Internal Telog WM2/L1 cellular modem LTE Category 1 certified Verizon Wireless		
Battery	Factory installed, field replaceable Telog BP-4 lithium battery pack		
Battery Life	Up to 2800 data calls to host computer		
Examples:	Call Frequency	Sampling Frequency	Battery Life
PR-32A	1/day	1/second	5 years
PR-32iA	1/day	4/second	5 years
PR-32iA	1/day	128/second	2 years
PR-32iA	1/day	256/second	1 year
	(@ medium to excellent signal strength)		

Enclosure	
Size	4"L x 4"W x 3"H [102mm L x 102mm W x 76mm H]
Weight	2.5 lbs. [1.2Kg]
Weight	2 lbs [.9 kg]
Material	Polycarbonate
Environmental	
Temperature	40 to 158°F [4° to 70°C]

Note: For applications below this operating range please contact your Trimble Telog support team.

Rating	NEMA 6P (IP68)
Support Software	
S-3PC	Telogers for Windows® 6.51 or later
S-3EP	Telog® Enterprise 6.51 or later
DHS-Service	Telog Online
TW-UNITY	Trimble Unity

SENSOR SPECIFICATIONS

PR-32A Sensor	
Model	PT-DS
Type	Strain gauge pressure sensor
Range	Selectable 5,10,30,100,300 PSIG and 1000 PSI
Accuracy over the calibrated temperature range including zero and span setting and the effects of non-linearity, hysteresis and repeatability	0.25% FS
Cable	Vented Polyurethane 0.225" diameter [5.715mm]
Pressure Over Range	2x full scale with negligible calibration change 4x containment pressure up to 2900psi max
Temperature	
Range	25°F to 140°F [-3.8° to 60°C]
Temperature Effect	±0.01%/°F (32 to 90°F)
PR-32iA Sensor	
Model	PT-30b
Type	Strain gauge pressure sensor
Range	Selectable 200, 300, 500 PSIG
Accuracy	
Non-linearity	±0.15% of span; BFSL
Repeatability	±0.03% of span; BFSL
Hysterisis	±0.03% of span; BFSL
Cable	Vented Polyurethane 0.310" diameter [7.87mm]
Pressure Over Range	4x full scale with negligible calibration change 6x containment pressure up to 2900psi max
Temperature	
Range	25°F to 140°F [-3.8° to 60°C]
Temperature Effect	±0.01%/°F (32 to 90°F)
Physical	
Pressure Fitting	1/4" NPT female
Environmental	Submersible to NEMA 6P (IP-68)
Sensor Length	4.5" [114mm]
Sensor Diameter (max)	1.0" [25.5mm]
Sensor Body Material	316 stainless steel
Cable Weight	0.027 lbs./ft

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The PR-32iA is covered by U.S. Pat. No. 7,219,553 and 7,357,034.
Windows® is a registered trademark of Microsoft Corporation. Verizon Wireless™ is a trademark of Verizon Trademark Services.
Specifications within this brochure are subject to change without notification. (4/2018)

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APPENDIX O

SAXONVILLE LEVEE EMERGENCY ACTION PLAN



Saxonville Levee
Emergency Action Plan

Town of Framingham
Department of Public Works

October, 2009

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   - 2.5 Saxonville Levee Breech Operations 4

1. Objectives

This Saxonville Levee Emergency Action Plan (EAP) is established by the Town of Framingham Department of Public Works (Public Works). Its purpose is to provide procedures under which Public Works and the Town's Emergency Operations staff operate under various levels of emergency at the Saxonville Levee area.

2. Saxonville Levee Operations during Emergencies

Appendix B of the Saxonville Levee O&M Manual provides procedures for comprehensive emergency actions at the pump station, vehicular gate, sluice gate, and Danforth Street. The following describes emergency operations for the levee system.

In addition, Table 2.1 provides emergency contact information for staff during Saxonville Levee emergency operations. The DPW's Emergency Operations Manager (EOM) directs all emergency responses for Saxonville Levee operations. The EOM also notifies the Town's Emergency Preparedness Officer (EPO) in case of road closings and levee breeches. The EPO notifies the Massachusetts Emergency Management Agency (MEMA), who is responsible for statewide emergency response. Also included is contact information for the Town of Framingham's Department of Public Works Fleet Department, who is responsible for operations and maintenance of the pump station at the levee.

Table 2.1 Emergency Response Contact Information

Task	Responsible Person (Title and Name)	Contact Information
Operate Watson Place Pump Station	EOM – Daniel Nau	EOM: Office: 508-532-6030 Cell: 508-958-0889
Close Sluice Gate at Central Street Dam	EOM – Daniel Nau	EOM: Same as above
Close Vehicular Gate at Concord Street	EOM – Daniel Nau EPO – Deputy Chief Steven Trask MEMA -	EOM: Same as above EPO: Office: 508-872-1212 x4925 Cell: 508-328-0875 MEMA: 508-820-2000 (24 hrs)
Close Danforth Street	EOM EPO MEMA	EOM: Same as above EPO: Same as above MEMA: Same as above
Levee Breech Operations	EOM EPO MEMA	EOM: Same as above EPO: Same as above MEMA: Same as above
Levee Pump Station Operations & Maintenance	Framingham DPW Fleet Supervisor – William Nelson	Pager: 508-806-1468 Office: 508-532-6070 Cell: 774-573-0890

2.1 Procedures for Operating the Watson Place Pump Station

- Activate the pump station when the river level reaches 20 feet (8.5 feet on the staff gauge).
- Shut off the automatic sump pump.
- Open the 26" and 42" sump gates and close the 48" gravity conduit gate.
- Start the pumps. Alternate No. 1 and No. 2 pumps as follows:
  a. No. 1 pump – start at river level of 20 feet.
  b. No. 2 pump – start at river level of 20.5 feet.
- If the inflow to the pump station is such that the pump operating cycle is less than 20 minutes between start of a diesel engine, open the bypass valve on the discharge line to allow water to be recycled into the pump station sump to maintain diesel engine operation.

2.2 Procedures for Sluice Gate at Central Street Dam

- The sluice gate is located on the eastern side of the Central Street Dam. It normally remains in the closed position.
- If it is open prior to flooding events, close the gate when the river level reaches a height of 20 feet (7.5 feet on the staff gauge). Reopen when the river levels falls below 20 feet.

2.3 Procedures for Closing the Vehicular Gate at Concord Street

- Mobilize the gate closure crew when the river level reaches 24.5 feet (12 feet on the staff gauge).
- Start closure procedures when the river level reaches 26 feet (13.5 feet on the staff gauge).
- Notify the police and fire department of the gate closing to prevent traffic over the river.
- Erect warning signs on either side of the bridge to read "FLOOD GATES CLOSED - DETOUR".
- Clean obstructions from the roadway.
- Fill sand bags and have ready for placement.
- Close the gate
  a. Unlock the padlocks and remove bolts locking gate doors to abutment walls (at the mitre end of the gate)
  b. Release the gate jack. If heavy winds, use guy ropes to control gate doors.
  c. Insert eyebolts and pins to hold gate doors together.
  d. Tighten turnbuckles at top and bottom of gate to achieve final closure.
  e. Engage the jacks on each gate door by cranking the jacks down.
  f. Lower the movable plates at bottom of each gate door to be in contact with the roadway.
- Place sandbags on the river side of the gate.

2.4 Procedures for Closing Danforth Street

- Mobilize road closure crew when the river level reaches 29 feet (16.5 feet on staff gauge).
- Place sandbags diagonally across Danforth Street.

- Return to normal operations (re-open the vehicular gate, remove sandbags) when the river level returns to the mobilization levels (26 feet for vehicular gate, 29 feet for Danforth Street, 20 feet for sluice gate).

2.5 Saxonville Levee Breech Operations

If the levee appears to be in imminent danger of being breached, the DPW Emergency Operations Manager (EOM) shall notify the Town's other emergency personnel, including Fire and Police (Emergency Preparedness Officer) to coordinate emergency actions, which may include but are not limited to evacuation of the area that may be flooded in case of breach. The Emergency Preparedness Office (EPO) r is responsible for coordinating emergency actions and notifying appropriate state and local agencies as shown on Table 2.1. The EPO is also responsible for identifying the properties within the levee protection and using the Town's emergency notification system to automatically telephone owners and residents to alert them to emergency procedures. This includes all properties bounded by the levee to the south, east and west and by Central Street and Danforth Street to the north.

The attached Flood Insurance Rate Map shows all areas that may be impacted by a breech in the levee. The areas marked as part of the 500-year Flood Zone inside the levee are areas that FEMA has designated would be impacted if a one-percent (100-year) flood were to occur if the levee did not exist.



Saxonville Levee

APPENDIX P

SAMPLE FORMS FOR EMERGENCY BEAVER DAM MANAGEMENT

10-DAY EMERGENCY BEAVER OR MUSKRAT APPLICATION AND PERMIT FORM

Name: Framingham Department of Public Works Permit # _____

Address: 100 Western Avenue, Framingham, MA

Authorized Agents Name: XXXX

Complaint Location: XXXXXX

In accordance with and pursuant to provisions contained in Chapter 131 of the Massachusetts General Laws Section 40, 80A and 321 Code of Massachusetts Regulation 2.08 and 10.00 (Wetlands Protection Act), the permittee(s) above named may immediately remedy the threat to human health and safety by one or more of the following options:

(a) the use of conibear or box or cage-type traps for the taking of beaver or muskrat, subject to the regulations promulgated by the Division of Fisheries and Wildlife

(b) the breaching of dams, dikes, bogs or berms, so-called*

(c) employing any non-lethal management or water-flow devices*

* If the permittee chooses option(s) b and/or c, he/she must appear before the local conservation commission to obtain an emergency certification regarding specifications for breach size and/or water-flow device installation in accordance to M.G.L. 131, s. 40 (Wetlands Protection Act).

The Board of Health has determined that the beaver or muskrat activity constitutes a threat to human health and safety as stated in M.G.L. c.131, s.80A.
Specify : Beaver dam raises level of wetland, flooding nearby homes and posing potential damage to [XXX DPW site]

Board of Health Official Name: _____

Board of Health Official Signature: _____

The above signature validates this permit for 10 consecutive days from the date shown for option (a) only. If the permittee chooses options (b) or (c), he/she must return to the Board of Health for a final signature after obtaining an emergency certification from the conservation commission

.

Please attach the emergency certification to this permit and return to the Board Health for final approval.

(See Back) Permittee must abide by all conditions placed on this action by the Framingham Conservation Commission.

This permit is valid for 10 consecutive days from the date of the final Board of Health signature.

Board of Health Official Name: _____

Board of Health Official Signature: _____ Date: _____

This permit does not allow permittee(s) or their authorized agent to trespass on private property.

This permit or a copy thereof shall be carried on the person of any individual exercising the authority thereof and shall be shown upon request if challenged by any local or state law enforcement officer empowered to enforce the provisions of M.G.L. c. 131.

Massachusetts Division of Fisheries and Wildlife Trapping Regulations

Permittee(s) may destroy problem furbearing mammals (named above) by means of a body-gripping trap or by means of a box or cage type trap including Hancock or Bailey traps for catching beaver. The pan of Hancock and Bailey traps must be submerged in water. Problem furbearing mammals that are captured alive shall be disposed of by destruction in a humane manner. Body gripping traps with a jaw spread not less than 4 inches and not greater than 7 inches or body gripping traps with a jaw spread not less than 6 inches and not exceeding 10 inches for the trapping of beaver only, may be used if such traps are completely submerged in water. The placement of traps in reference to the proximity of the beaver lodge or beaver dam is unrestricted, but the disturbance or destruction of the beaver lodge or beaver dam is strictly prohibited unless otherwise authorized.

Permittee(s) taking problem furbearing mammals, on the property of another, by means of a trap shall possess a valid Massachusetts trapping license and traps shall be registered according to M.C.L. c. 131, s. 80.

Said problem furbearing mammals (named above), their carcasses or parts thereof may be retained by the permittee, sold, bartered or exchanged for consideration during the open regulated harvest season for that species. Sealing of beaver pelts is required. Disposition of all carcasses obtained from the incidental capture of furbearing mammals not authorized by this permit must be surrendered to the District Wildlife Manager of the Division of Fisheries and Wildlife having jurisdiction in the town where the furbearing mammal was taken.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

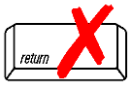
WPA Emergency Certification Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Emergency Information

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





Issuance From: Framingham Conservation Commission
Issuing Authority

1. Site Location:

2 Reason for Emergency:

Flooding from beaver dam is causing …

3. Applicant to perform work: Framingham Department of Public Works

4. Public agency to perform work or public agency ordering the work to be performed:

Town of Framingham

5. Date of Site Visit: Start Date: End Date*:

* no later than 30 days from start date or 60 days in the case of an Immediate Response Action approved by DEP to address an oil/hazardous material release.

6. Work to be allowed*:

Breach the beaver dam at site.
Trap beaver(s) in this wetland area.
Maintain Flexible Leveler in place.
Clean debris from chain link fence and additional fencing below water line.

* May not include work beyond that necessary to abate the emergency.

B. Signatures

Certified to be an Emergency by this Issuing Authority.

Signatures:

Chairman (or designee) Date

A copy of this form must be provided to the appropriate DEP Regional Office.

C. General Conditions

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Emergency Certification or subject to enforcement action.

2. This Emergency Certification does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of property rights.

3. This Emergency Certification does not relieve the applicant or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.

4. Any work conducted beyond that described above, and any work conducted beyond that necessary to abate the emergency, shall require the filing of a Notice of Intent.

5. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Emergency Certification at reasonable hours to evaluate compliance with this Certification, and may require the submittal of any data deemed necessary by the Conservation Commission or the Department for that evaluation.

6. This Emergency Certification shall apply to any contractor or any other person performing work authorized under this Certification.

7. No work may be authorized beyond 30 days from the date of this certification without extension by the Issuing Authority.

D. Special Conditions

E. Appeals

The Department may, on its own motion or at the request of any person, review: an emergency certification issued by a conservation commission and any work permitted thereunder; a denial by a conservation commission of a request for emergency certification; or the failure by a conservation commission to act within 24 hours of a request for emergency certification. Such review shall not operate to stay the work permitted by the emergency certification unless the Department specifically so orders. The Department's review shall be conducted within seven days of: issuance by a conservation commission of the emergency certification; denial by a conservation commission of the emergency certification; or failure by a conservation commission to act within 24 hours of a request for emergency certification. If certification was improperly granted, or the work allowed thereunder is excessive or not required to protect the health and safety of citizens of the Commonwealth, the Department may revoke the emergency certification, condition the work permitted thereunder, or take such other action as it deems appropriate.

LANDOWNER CONSENT FORM

Consent Form

I give permission for the Town of Framingham to access my property for the purpose of alleviating a threat to public health and safety posed by beaver or muskrat, as determined by the Board of Health.

_____ _____

Signature of Property Owner Date

_____

Address

_____ _____

Daytime Tel. # Evening Tel. #

APPLICATION FOR 30-DAY EXTENSION PERMIT

Pursuant to the provisions of M.G.L. c. 131, s. 80A and 321 CMR 2.08, I hereby apply for a 30 day extension permit to continue to alleviate an existing threat to human health and safety as determined by my local Board of Health.

Name: _____ Date: _____

Address: _____

Town: _____ Zip Code: _____

Daytime Tel. # _____ Evening Tel. # _____

Agent Name (if applicable): _____

Agent Tel. # _____

Complaint Location (if different than above): _____

_____

Type of Complaint: Please provide a detailed description of the threat to public health and safety.

_____

_____

_____

_____

_____

_____

_____

Under M.G.L. c. 131, s. 80A, an extension permit authorizes the applicant or his duly authorized agent to remedy the threat to human health and safety by one or more of the following options: (a) the use of conibear or box or cage-type traps for the taking of beaver or muskrat, subject to regulations; (b) the breaching of dams, dikes, bogs or berms; and/or (c) employing any non-lethal management of water-flow devices.

Applicant Signature: _____ Date: _____

Board of Health Official Signature: _____ Date: _____

Please attach a copy of the Board of Health site visit report (if applicable), a copy of the 10-day emergency permit and any consent forms. If options B and/or C are employed, attach a copy of the Emergency Certification from the Conservation Commission.

APPENDIX Q

REFERENCES

REFERENCES AND RESOURCES

A list of references used in the preparation of this document includes the following.

- EPA NPDES Phase II MS4 Permit, dated April 4, 2016, effective July 1, 2018.
- EPA NPDES Phase II MS4 Permit, effective May 1, 2003.
- Massachusetts General Laws c. 21, §§ 26-53 and its accompanying regulations 314 CMR 9.0 Water Quality Certification for Discharge of Dredged or Fill Material, Dredging, and Dredged Material Disposal in Waters within the Commonwealth; and 310 CMR 10.0 Wetlands Protection Act Regulations, enforced by MassDEP and the City's Conservation Commission
- Massachusetts General Laws c. 41, §§ 81K - 81GG, Subdivison Control Law (for lots under "Approval Not Required")
- Massachusetts General Laws c.131, § 80A, "An Act Relative to Foothold Traps and Certain Other Devices"
- MassDEP 321 CMR 2.08 and 10.00 Wetlands Protection Act
- MassDEP310 CMR 19.130(15) Solid Waste Management, Landfill Design And Operational Standards
- MassDEP 310 CMR 40.000 "The Massachusetts Contingency Plan."
- MassDEP 314 Code of Massachusetts Regulations 21.00 "Regulated Impervious Area General Stormwater Permit."
- MassDEP Policy #BAW-18-001 "Reuse and Disposal of Street Sweepings," dated May 14, 2018
- MassDEP "Management of Catch Basin Cleanings" guidelines
- Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges.
- MassDEP Stormwater Management Standards as described in the Massachusetts Stormwater Handbook
- Massachusetts Integrated List of Waters: listing of the condition of Massachusetts' waters pursuant to Sections 303(d) and 305(b) of the Clean Water Act
- Operation and Maintenance Manual for Flood Protection Works on Sudbury River at Framingham, Massachusetts (Saxonville) [referred to as Saxonville Levee O&M Manual]
- Town of Framingham Bylaws, Section V Article 18 "Wetlands Protection Bylaw", and accompanying regulations enforced by the Conservation Commission
- Town of Framingham Bylaws, Section V Article 26 "Illicit Discharges to Municipal Separate Storm Sewer System"
- City of Framingham Rules and Regulations Governing Subdivision of Land
- City of Framingham Stormwater Regulations
- City of Framingham Street Opening Permit Policy
- City of Framingham Zoning Ordinance
- City of Framingham Construction Standards
- U.S. Army Corps of Engineers Programmatic General Permit, regulated under Section 404 of the U.S. Clean Water Act
- U.S. Clean Water Act 33 U.S.C. 1251 (et seq.)
- U.S. Code of Federal Regulations 49 CFR 177 Transportation: Carriage by Public Highway