Stormwater Management Program (SWMP) Plan

Town of Lunenburg, Massachusetts

Prepared June 30, 2019
Revised June 30, 2022

Prepared For:

Town of Lunenburg
17 Main Street
Lunenburg, MA 01462

Prepared By:

Comprehensive Environmental Inc.
41 Main Street
Bolton, MA 01740

Stormwater Management Program (SWMP) Plan Revision Log

Revision Date	Section(s) Revised	Revisions Made	Revisions Made by
June 30, 2019	All	Original SWMP Plan prepared.	Design Consultants Inc.
June 30, 2021	All	SWMP Plan amended to document work completed during Permit Year 1 and Permit Year 2.	Comprehensive Environmental Inc., CEI
June 30, 2022	1.5, 2.4, 7.3.4, 7.3.5, and appendices	Updated program responsibilities, TMDL and impaired waterbodies/status, regulatory LID, GI, and impervious cover update, municipal BMP retrofit inventory	Comprehensive Environmental Inc.

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Stormwater Management Program (SWMP) 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 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.

Name: _____ Title: _____

Signature: _____ Date: _____

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1 Introduction

Lunenburg is one of many Massachusetts communities regulated under the Environmental Protection Agency's (USEPA) National Pollutant Discharge Elimination System (NPDES) Phase II rule (40 CFR 122). The rule requires regulated operators of municipal separate storm sewer systems (MS4) to develop a Stormwater Management Program (SWMP) and Best Management Practices (BMPs) to reduce the impacts of stormwater discharges. The requirements are outlined in the NPDES General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts, which was signed on April 4, 2016, with an effective date of July 1, 2018, and more recently updated on December 7, 2020 with an effective date of January 6, 2021.

This SWMP Plan describes and details the activities and measures that are being implemented to meet the terms and conditions of the permit.

1.1 Regulatory Background

The Stormwater Phase II Final Rule was promulgated in 1999 and was the next step after the 1987 Phase I Rule in the United States Environmental Protection Agency's effort to preserve, protect, and improve the Nation's water resources from polluted stormwater runoff. The Phase II program expands the Phase I program by requiring operators of Small Municipal Separate Storm Sewer Systems in urbanized areas, through the use of National Pollutant Discharge Elimination System permits, to implement programs and practices to control polluted stormwater runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of stormwater discharges that have the greatest likelihood of causing continued environmental degradation. Under the Phase II rule all MS4s with stormwater discharges from Census designated Urbanized Area are required to seek NPDES permit coverage for those stormwater discharges.

On May 1, 2003, EPA Region 1 issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 MS4 Permit) consistent with the Phase II rule. The 2003 MS4 Permit covered "traditional" (i.e., cities and towns) and "non-traditional" (i.e., certain Federal and state agencies and/or facilities) MS4 Operators located in the states of Massachusetts and New Hampshire. This permit expired on May 1, 2008 but remained in effect until operators were authorized under the USEPA's 2016 NPDES General Permit for Stormwater Discharges from MS4 in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit", "2016 Permit", "MS4 Permit, and/or "2016 MS4 Permit" which replaces the 2003 MS4 Permit.

The 2016 Massachusetts MS4 Permit was signed on April 4, 2016 with an original effective date of July 1, 2017, however was postponed by 1 year to a new effective date of July 1, 2018. The permit was cosigned by the Massachusetts Department of Environmental Protection (MassDEP) and thus is jointly regulated by EPA and MassDEP for Massachusetts permittees. After several years of litigation, the permit was updated in December 2020 with a revised effective date of January 6, 2021. Authorization to discharge was set to expire on

July 1, 2022, however, was administratively continued by EPA. The 2016 Permit remains in force and effect until a general permit is reissued at a future time.

The following sections outline how the Town of Lunenburg is meeting Phase II regulatory and schedule requirements.

1.2 MS4 Program

As required by the 2016 MS4 Permit, The Town of Lunenburg submitted a Notice of Intent (NOI) and required accompanying information, including endangered species, historic preservation, and an outfall map to EPA Region 1 by the September 28, 2018 deadline (**Appendix A**) requesting authorization to discharge under the new permit. Lunenburg received official authorization to discharge stormwater from its MS4 on June 4, 2019. Authorization to discharge expires on June 30, 2022.

This Stormwater Management Program Plan has been developed by the Town of Lunenburg to address the requirements of the 2016 MS4 Permit as a follow-up to the NOI. This SWMP Plan documents the Town of Lunenburg's program, including Best Management Practices (BMPs), plans, activities, and measures that have been implemented to date, those that are ongoing, and those proposed for the future to comply with the 2016 MA MS4 Permit. This is a "living" document and should be updated and/or modified as required during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term.

This permit in part requires that each permittee, or regulated community, address 6 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.

In addition to the 6 MCMs above, permittees must also address water quality impacts from waterbodies with approved Total Maximum Daily Loads (TMDLs) and certain impairments, generally known as water quality limited waterbodies.

1.3 Regulated Area

Requirements of the 2016 MS4 Permit are limited to a regulated area, defined as the Town's Urbanized Areas (UAs) which generally constitute the largest and most dense areas of settlement in a region. The Bureau of the Census determines UAs by applying a detailed set of published UA criteria to the latest decennial census data. Although the full UA definition is complex, the Bureau of the Census' general definition of a UA, based on population and population density, is provided below:

"An urbanized area (UA) is a densely settled core of census tracts and/or census blocks that have population of at least 50,000, 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. It is a calculation used by the Bureau of the Census to determine the geographic boundaries of the most heavily developed and dense urban areas."

The MS4 permit regulates UA areas based on both the 2000 and 2010 Census. Thus, areas that are identified as non-urbanized under the 2010 Census but urbanized under the 2000 Census are still regulated areas. In short, the regulated UA cannot shrink and can only expand. **Figure 1-1** shows the UA in the Town of Lunenburg. The UA is subject to change every 10 years based on the application of the Census definition, thus a larger area may be covered in the future.

1.4 How to Use this Plan

For the purposes of the 2016 MS4 Permit and ease of use, the Town's SWMP encompasses several separate written documents:

1. SWMP Plan (this document);
2. Discharge Detection and Elimination (IDDE) Plan (standalone document);
3. Facilities Operation and Maintenance (O&M) Plan (standalone document);
4. Stormwater Pollution Prevention Plan (SWPPP) (standalone document); and
5. Phosphorus Source Identification Report (standalone document).

This SWMP Plan is divided into several sections and includes the following components:

Section 2 **Town Characteristics** – Section 2 provides an overview of relevant characteristics, focusing on those aspects related to stormwater runoff and the water quality of surface waters.

Section 3 **MCM 1: Public Education and Outreach** – regulated operators of MS4s are required to implement a public education program. Section 3 discusses activities to comply with this measure.

Section 4 **MCM 2: Public Participation and Involvement** – regulated MS4s are required to obtain public participation throughout the stormwater management program. Section 4 discusses activities to comply with this measure.

Section 5 **MCM 3: Illicit Discharge, Detection, and Elimination** – regulated MS4s must develop and implement an illicit discharge detection and elimination program and develop a regulation to prohibit illicit discharges to the storm drain system. Section 5 discusses activities to comply with this measure.

Section 6 **MCM 4: Construction Site Stormwater Runoff Control** – regulated MS4s are required to implement and enforce a program to reduce pollutants in stormwater runoff from construction activities that disturb 1 or more acres. This requires the development of a local regulation requiring implementation of proper erosion and sediment controls. Permittees are also responsible for inspections and enforcement. Section 6 discusses activities to comply with this measure.

Section 7 **MCM 5: Stormwater Management in New Development and Redevelopment** – regulated MS4s are required to develop and enforce a regulation requiring implementation of post-construction runoff controls at sites where construction activities disturb 1 or more acres. The controls must be designed to treat stormwater runoff from post-development sites and must be maintained over the long-term. Section 7 discusses activities to comply with this measure.

Section 8 **MCM 6: Good Housekeeping and Pollution Prevention** – regulated MS4s must review their operations at specific facilities and those that occur throughout the Town (i.e., catch basin cleaning and street sweeping) and make improvements where needed to minimize pollution to stormwater runoff. Staff involved in these operations must also be trained on appropriate operations and maintenance techniques. Section 8 discusses activities to comply with this measure.

Section 9 **TMDL and Impaired Waters Controls** – regulated MS4s are required to evaluate and address stormwater contributions to impaired waters. Section 9 discusses activities to comply with this measure.

Section 10 **Annual Reporting** – Section 10 provides a summary of annual reporting requirements in order to meet the 2016 MS4 Permit.

Section 11 **Implementation of Best Management Practices** – Section 11 provides a summary of BMPs outlined in Sections 3 through 9 in a concise plan for easy reference.

1.5 Program Responsibilities

This plan is intended to be used by Town of Lunenburg staff whose job involves administering the MS4 permit and associated requirements. The Town's MS4 program is headed by the following personnel **(Table 1-1)**:

Table 1-1. MS4 Responsible Personnel

Name, Title	Role	Contact
Heather Lemieux, Town Manager	SWMP Team Coordinator	(978) 582-4130, hlemieux@lunenburgma.gov
Adam Burney, Director of Land Use Department	SWMP Team	(978) 582-4147, aburney@lunenburgma.gov
Bill Bernard, Director of Department of Public Works	SWMP Team	(978) 582-4160, wbernard@lunenburgma.gov
Stormwater Task Force	SWMP Team	(978) 582-4130, stormwater@lunenburgma.gov

The Town of Lunenburg Stormwater Management Program Team, under the direction of its Town Manager, is responsible for the overall implementation of the SWMP including project management, financial management, and contract management. Other Town departments assist in implementing portions of its MS4 program as identified in the NOI. The Land Use Department primarily is responsible for managing and implementing MCMs 1, 2, 4, and 5. The Department of Public Works is primarily responsible for managing and implementing MCMs 3 and 6. A separate entity, the Stormwater Task Force (SWTF), is responsible for general oversite of the SWMP Team, as well as providing input on program direction

2 Town Characteristics

This section provides some background information on the Town of Lunenburg, Massachusetts, useful in understanding the Town's characteristics and resources to develop a tailored Stormwater Management Plan. Town characteristics are described below.

2.1 Community Information

Lunenburg, MA is a suburban/urban community and municipality within Worcester County. It is generally bordered by Townsend, MA to the north, Fitchburg, MA to the west, Leominster, MA and Lancaster, MA to the south, and Shirley, MA to the east. The Lunenburg stormwater system consists of local municipal drainage pipes, open channels or natural channels. Waterways in Lunenburg include Mulpus Brook, Catacoonamug Brook, Pearl Hill Brook, and Easter Brook. Lunenburg is part of the Nashua River basin.

Select relevant community profile information is provided below:

- Total Area = 27.7 square miles *(source: Wikipedia)*
- Total Population = 10,086 *(source: 2010 US Census)*

2.2 Land Use

The land uses within the regulated area of the Town of Lunenburg are shown on **Figure 2-1** and provided below. Impervious area is shown on **Figure 2-2**.

- Agriculture 7.4%
- Commercial 1.5%
- Forest 64.7%
- Highway 0.2%
- Industrial 1.9%
- Open Land 3.4%
- Residential, High Density 1.1%
- Residential, Medium Density 2.3%
- Residential, Low Density 12.3%
- Water 5.2%

As per the above, Lunenburg has significant residential development (approximately 16%), however, the majority of the Town consists of forest, agriculture, open land, and water/wetland area (approximately 81%). Remaining land use (approximately 3%) consists highways and commercial/industrial development.

2.3 303(d) Impaired Waterbodies

The ultimate goal of this Stormwater Management Plan is to outline a program to effectively maintain the Town's stormwater infrastructure and to improve the water quality of receiving waters (waters which receive stormwater discharges from the MS4) in compliance with the 2016 MS4 Permit. 303(d) impaired waters are those surface waters identified by MassDEP as priority waters that do not meet water quality criteria. As part of the 2016 MS4 Permit, communities must implement BMPs to address waters with an approved Total Maximum Daily Load (TMDL) as of the issuance date of the permit (April 4, 2016) and to address water quality limited waters, including but not limited to waters listed in categories 5 or 4a on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section

303(d) and 305(b). **Table 2-1** lists the "impaired waters" partially or wholly located within the boundaries of Lunenburg's regulated area based on the 2016 Massachusetts Integrated List of Waters produced by MassDEP every 2 years[1]. These waterbodies are shown in **Figure 2-3**. Lunenburg reviews changes as new lists are published and record these changes and update this plan as required.

Table 2-1. Impaired Waters

Waterbody Name	Segment ID and Category		Impairment(s)	Approved TMDL[2]
Catacoonamug Brook	MA81-16	5	Dissolved Oxygen	
			Lack of a Coldwater Assemblage	
			Temperature	
Hickory Hills Lake	MA81031	4a	Mercury in Fish Tissue	33880
Lake Shirley	MA81122	5	(Brittle Naiad, Najas Minor*)	
			(Eurasian Water Milfoil, Myriophyllum spicatum*)	
			(Fanwort*)	
			(Non-Native Aquatic Plants*)	
			Dissolved Oxygen	
			Harmful Algal Blooms	
			Mercury in Fish Tissue	42399
			Turbidity	
Lake Whalom	MA81154	4c	(Eurasian Water Milfoil, Myriophyllum spicatum*)	
			(Curly-leaf Pondweed*)	
			(Non-Native Aquatic Plants*)	
Mulpus Brook	MA81-37	5	Lack of a Coldwater Assemblage	
			Temperature	
	MA81-36	5	Temperature	

Category 4a Waters – impaired waters with a completed TMDL.
Category 4c Waters – impaired waters where the impairment is not caused by a pollutant. No TMDL required.
Category 5 Waters – impaired waters that require a TMDL.
*TMDL not required (Non-pollutant)

Lunenburg is also subject to phosphorus and bacteria water quality limited waterbody requirements for Nashua River (MA81-05), due to its location within its watershed. Note that although Lunenburg has a waterbody listed as impaired for mercury, the 2016 MS4 Permit does not specify a wasteload allocation or other requirements for MS4 discharges. Lunenburg is meeting the remaining requirements for water quality limited waterbodies related to turbidity, phosphorus, and bacteria as outlined further in Section 9.

[1]Note that at the time of preparation of this report, the 2018/2020 303d List is the most up to date finalized version.
[2]"Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 Permit.

2.4 Measures to Protect Surface Drinking Water Supplies

All public drinking water is obtained from wells and there are no surface water supplies or tributaries within the Town. The town does not currently plan on using any surface waterbodies for public drinking water supplies in the near future and implementation of the SWMP helps protect water quality in all receiving waterbodies.

2.5 Endangered Species Act Determination

In order to be eligible to discharge stormwater under the 2016 MS4 Permit, the Town of Lunenburg must certify that its stormwater system is not impacting federally listed rare or endangered species habitat or other critical environmental locations. This was completed in the summer of 2019 as meeting "Criterion C" on the Notice of Intent with the results of the US Fish and Wildlife Service (USFWS) endangered species screening determination documented in **Appendix A**. These lists are subject to change; therefore, the most recent information should be obtained prior to initiating new stormwater projects. Lunenburg will coordinate with the appropriate federal offices when new stormwater projects are planned and the potential impact to these species will be evaluated. The USFWS will be contacted during the planning stages. The Northern Long-eared Bat *(Myotis septentrionalis)* was the only species identified as potentially being present within Lunenburg's regulated area. No critical habitats were identified.

2.6 National Historic Preservation Act Determination

Regulated MS4s must also evaluate whether its discharges have the potential to affect historic properties. The MS4 Permit typically authorizes discharges from existing facilities and requires control of the pollutants discharged from the facility, however, EPA does not anticipate effects on historic properties from the pollutants in the authorized discharges. Thus, to the extent EPA's issuance of the MS4 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. If there have been no relevant changes in operation of the MS4 since the 2003 MS4 General Permit, the discharge can still be considered to have no potential to have an effect on historic properties. This has been documented as "Criterion A" on the Notice of Intent (**Appendix A**) and thus no additional information is required for documentation.

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. In these cases, such as during future construction of structural stormwater BMPs or construction of the storm drain systems under the construction general permit (CGP), the Town will need to ensure that historic properties will not be impacted by their activities, or that they are in compliance with a written agreement with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other

tribal representative that outlines all measures the applicant will carry out to mitigate or prevent any adverse effects on historic properties. This will be completed as required during a later date(s).

3 MCM 1: Public Education and Outreach

3.1 Summary of Permit Requirements

3.1.1 Core Permit Requirements

Under MCM 1, permittees must develop an educational program, define educational goals, express specific messages, define the targeted audience for each message, and identify responsible parties for program implementation. At a minimum, the program must 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 must identify steps and/or activities that the public can take to reduce the pollutants in stormwater runoff and their impacts to the environment.

The Town must address 4 core target audiences, unless 1 of these audiences is not present in the MS4 community:

1. Residents;
2. Businesses, Institutions, and Commercial facilities;
3. Developers and Construction; and
4. Industrial facilities.

At least 2 educational messages must be distributed to audiences over the permit term spaced at least a year apart. See sections below for more information.

3.1.2 Impaired Waters Requirements

Public education and outreach programs must also address impaired waterbodies or those identified as priority waters. In Lunenburg, the waterbody impairments listed as having specific requirements under the 2016 MS4 Permit are turbidity, phosphorus, and bacteria-related. Priority waterbodies and impairments can be found in **Table 3-1**.

Table 3-1. Priority Waterbodies

Waterbody Name	Impairment
Lake Shirley	Turbidity
Nashua River	Phosphorus
Nashua River	E. coli

Note that there are no specific public education requirements to address turbidity. Therefore, relevant public information on phosphorus and bacteria topics as outlined by the 2016 MS4 Permit includes with each of the 4 applicable target audiences as outlined below.

3.2 Objectives and Goals

The Town of Lunenburg implements an education program that includes educational goals based on stormwater issues of significance within the MS4 area, increase knowledge, and change behavior of the public so that pollutants in stormwater are reduced.

3.3 Public Education Program

The following sections outline how Lunenburg is meeting the requirements of the 2016 MS4 Permit by completing targeted outreach to the 4 required audiences. Additionally, since the Town has waterbodies with water quality impairments associated with phosphorus and bacteria, the program includes messages to help minimize contributions of these pollutants, in accordance with the "Enhanced BMPs" requirements in Appendix H of the 2016 MS4 Permit.

3.3.1 Residential

Informational Topics
As required for all communities under the 2016 MS4 Permit, the following topics are addressed under the Residential public education and outreach program:

- Effects of lawn care (use of pesticides, herbicides, and fertilizers) 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; and
- Maintenance of septic systems.

As required for waterbodies with phosphorus impairments, the Town shall supplement its Residential program with the following:

- Spring (April-May): proper disposal of grass clippings and fertilizer usage, such as slow-release and phosphorus-free;
- Summer (June-July): proper management of pet waste; and
- Fall (August-October): proper disposal of leaf litter.

As required for waterbodies with bacteria and pathogen impairment, the Town shall supplement its Residential program with the following:

- Annual message encouraging the proper management of pet waste, including noting any existing bylaws where appropriate;
- Distribute educational materials to dog owners with license issuance or renewal;
- Describe detrimental impacts of improper pet waste management, requirements for waste collection and disposal, and penalties for non-compliance; and
- Provide information to owners of septic systems about proper maintenance.

Educational Message and Methods of Distribution
The following table shows the educational messages and methods of distribution for the above topics, along with responsible parties and measurable goals.

Table 3-2. BMP Description – Residential Outreach

BMP Description	Message	Method of Distribution	Responsible Parties	Measurable Goal
BMP 1-1: Residential Education Program	Webpage	Downloadable brochures, flyers, and fact sheets will be available on the SWTF website	SWTF	Inform and assist targeted audience to improve stormwater management for their facilities. Town webmaster will track # of people who view materials and # of people that download materials. Goal: 100 brochures/flyers/fact sheets will be downloaded by web page visitors annually.
	Survey	Provide a survey at public places/events and online	SWTF	Assess residents and businesses on knowledge of stormwater-related issues in the community.
	Press Release / Cable Access	Publish a press release in a local newspaper on applicable topic	Town Manager	Publish at least one newspaper article per year and post at least one public access channel message per year
	Brochures / Fact Sheets	Display fact sheets or brochures at Town Hall, Town Library, and other public places. Also post on SWTF website	SWTF	Inform and assist target audience to utilize simple household practices to reduce stormwater pollution. Track # of brochures and fact sheets that are taken from the displays as well as any responses received from targeted audiences. Goal: 100 brochures and fact sheets distributed annually by displays.
	ThinkBlue Outreach	ThinkBlue social media outreach	ThinkBlue statewide campaign	Inform and assist target audience on ways to reduce stormwater pollution.

The following table lists which of the topics are covered under each message.

Table 3-3. Residential Public Outreach Topics and Message

Topics and Educational Message	Fact Sheets / Brochures	Press Release	Stormwater Webpage
Core Program Topics			
Effects of outdoor activities such as lawn care (use of pesticides, herbicides, and fertilizers) on water quality	x	x	x
Benefits of appropriate on-site infiltration of stormwater	x	x	x
Effects of automotive work and car washing on water quality	x	x	x
Proper disposal of swimming pool water;	x		x
Proper management of pet waste	x	x	x
Maintenance of septic systems	x	x	x

Schedule
Due to the importance of educating Town residents, many of the above topics are made available continuously via brochures and the website.

3.3.2 Businesses, Institutions, and Commercial Facilities

Informational Topics
As required for all communities under the 2016 MS4 Permit, the following topics are addressed under the Business, Institutions, and Commercial public education and outreach program:

- Proper lawn maintenance (use of pesticides, herbicides and fertilizer);
- Benefits of appropriate on-site infiltration of stormwater;
- Building maintenance and storage of materials;
- Proper use and storage of salt or other de-icing and anti-icing materials;
- Proper management of waste materials and dumpsters;
- Proper management of parking lot surfaces;
- Proper car care activities; and
- Proper disposal of swimming pool water by entities such as motels, hotels, and health and country clubs.

<u>As required for waterbodies with phosphorus impairments, the Town shall supplement its Business, Institutions, and Commercial program with the following:</u>

- Spring (April-May): proper disposal of grass clippings and fertilizer usage, such as slow-release and phosphorus-free;
- Summer (June-July): proper management of pet waste; and
- Fall (August-October): proper disposal of leaf litter.

Educational Message and Methods of Distribution
The following table shows the educational messages and methods of distribution for the above topics, along with responsible parties and measurable goals.

Table 3-4. BMP Description – Businesses, Institutions, and Commercial Outreach

BMP Description	Message	Method of Distribution	Responsible Parties	Measurable Goal
BMP 1-2: Businesses, Institutions, and Commercial Facilities Education Program	Webpage	Downloadable brochures, flyers, and fact sheets will be available on the SWTF website	SWTF	Inform and assist targeted audience to improve stormwater management for their facilities. Town webmaster will track # of people who view materials. Goal: 100 brochures/flyers/fact sheets will be downloaded by web page visitors annually.
	Survey	Provide a survey at public places/events and online	SWTF	Assess residents and businesses on knowledge of stormwater-related issues in the community.
	Brochures / Fact Sheets	Display fact sheets or brochures at Town Hall, Town Library, and other public places. Also post on SWTF website	SWTF	Inform and assist target audience to properly manage leaf litter and lawn care to reduce stormwater pollution. Track # of brochures and fact sheets that are taken from the displays as well as any responses received from targeted audiences. Goal: 100 brochures and fact sheets distributed annually by displays.
	ThinkBlue Outreach	ThinkBlue social media outreach	ThinkBlue statewide campaign	Inform and assist target audience on ways to reduce stormwater pollution.

Schedule
Information pertaining to the Business, Institutions, and Commercial public education and outreach program are made available continuously on the website and via cable TV.

3.3.3 Developers and Construction

Informational Topics
As required for all communities under the 2016 MS4 Permit, the following topics are addressed under the Developers and Construction public education and outreach program:

- 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).

Educational Message and Methods of Distribution
The following table shows the educational messages and methods of distribution for the above topics, along with responsible parties and measurable goals.

Table 3-5. BMP Description – Developers and Construction Outreach

BMP Description	Message	Method of Distribution	Responsible Parties	Measurable Goal
BMP 1-3: Developers Education Program	Webpage	Downloadable brochures, flyers, and fact sheets will be available on the SWTF website	SWTF	Inform and assist targeted audience to improve stormwater management for their facilities. Town webmaster will track # of people who view materials. Goal: 100 brochures/flyers/fact sheets will be downloaded by web page visitors annually.
	Brochure / Fact Sheet	Publish fact sheets on SWTF website	SWTF	Inform and assist target audience on ways to reduce stormwater pollution. Goal: 100 brochures and fact sheets distributed annually by displays.
	ThinkBlue Outreach	ThinkBlue social media outreach	ThinkBlue statewide campaign	Inform and assist target audience on ways to reduce stormwater pollution.

Information pertaining to the Developers and Construction are made available continuously via brochures, on the website, and via social media.

3.3.4 Industrial

Informational Topics
As required for all communities under the 2016 MS4 Permit, the following topics are addressed under the Industrial public education and outreach program:

- Equipment inspection and maintenance;
- Proper storage of industrial materials and dumpster management;

- Proper management and disposal of wastes;
- Minimization of use and proper storage of salt or other de-icing/anti-icing materials;
- Benefits of on-site stormwater from areas with low exposure to industrial materials;
- Proper maintenance of parking lot surfaces; and
- Information about EPA's multisector general permit (MSGP).

Educational Message and Methods of Distribution
The following table shows the educational messages and methods of distribution for the above topics, along with responsible parties and measurable goals.

Table 3-6. BMP Description – Industrial Outreach

BMP Description	Message	Method of Distribution	Responsible Parties	Measurable Goal
BMP 1-4: Industrial Education Program	Webpage	Downloadable brochures, flyers, and fact sheets will be available on the SWTF website	SWTF	Inform and assist targeted audience to improve stormwater management for their facilities. Town webmaster will track # of people who view materials. Goal: 100 brochures/flyers/fact sheets will be downloaded by web page visitors annually.
	Brochure / Fact Sheet	Publish fact sheets on SWTF website	SWTF	Inform and assist target audience on ways to reduce stormwater pollution. Goal: 100 brochures and fact sheets distributed annually by displays.
	ThinkBlue Outreach	ThinkBlue social media outreach	ThinkBlue statewide campaign	Inform and assist target audience on ways to reduce stormwater pollution.

Schedule
Information pertaining to the Industrial public education and outreach program are made available on the website continuously on the website and via social media.

3.4 Measuring Public Education Program Effectiveness

During completion of the Town's annual report as detailed further under Section 10, Lunenburg reviews the effectiveness of each message and the Town's overall education program. Effectiveness is expected to vary by message, however is generally measured based on quantities of materials distributed and feedback from town employees based on observations in their area of work. Educational messages and/or distribution techniques are modified as needed, should program managers determine that they are ineffective.

4 MCM 2: Public Participation & Involvement

4.1 Summary of Permit Requirements

Under MCM 2, permittees must provide annual opportunities for public participation in the review and implementation of the Town's SWMP as part of a public education and involvement program. All public involvement activities must comply with state public notice requirements. The SWMP and annual reports must also be made available so that the public has opportunities to review and comment.

4.2 Objectives and Goals

Lunenburg implements a public participation and involvement program that provides opportunities for review and implementation of the Town's SWMP. This helps support public education and outreach items under MCM 1.

4.3 Public Participation and Involvement Opportunities

The following outlines how Lunenburg is meeting permit requirements to provide the public with opportunities to participate in reviewing and implementing the SWMP.

4.3.1 Make Documents Publicly Available for Comment

Lunenburg makes this written SWMP Plan, annual reports, and other regulatory mechanisms for SWMP implementation available for review and comment via the Town's website, along with the name, email address and/or phone number of a contact person from the Town government to request additional information or submit comments. This allows the public to comment on the program at least once per year. An updated SWMP Plan is posted to the website as additional tasks are completed. The following table shows the BMP, responsible parties and measurable goals.

Table 4-1. BMP Description – Public Review of Stormwater Management Plan

BMP Description	Responsible Parties	Measurable Goal
BMP 2-1: Public Review of Stormwater Management Program	Land Use Department	Stormwater Management Plan is publicly available.

4.3.2 Arrange Public Meeting for Stormwater Management Program Development

The Town may choose to arrange an annual public meeting to present the Stormwater Management Plan and provide the public and opportunity to participate in the review and implementation of the SWMP. The following table shows the BMP, responsible parties and measurable goals.

Table 4-2. BMP Description – Public Participation in Program Development

BMP Description	Responsible Parties	Measurable Goal
BMP 2-2: Public Participation in Stormwater Management Program	Board of Selectmen	Annual public input provided. (i.e., All Permit Years)

5 MCM 3: Illicit Discharge, Detection, and Elimination

5.1 Summary of Permit Requirements

Under MCM 3, permittees must implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. A summary of the required IDDE activities and timelines are provided below. See sections below for more information.

5.1.1 Legal Authority

The IDDE program shall include adequate legal authority in the form of a currently effective ordinance, bylaw, or other regulatory mechanism to prohibit, investigate, and eliminate illicit discharges. For permittees authorized by the MS4-2003 permit such as Lunenburg, the ordinance, bylaw, or other regulatory mechanism was required to be effective by May 1, 2008.

5.1.2 Sanitary Sewer Overflow

Regulated communities must identify all known locations where SSOs have discharged to the MS4 during the previous 5-years and update it annually. Upon detection of an SSO, the permittee must eliminate it as quickly as possible and take interim mitigation measures to minimize or eliminate the discharge of pollutants until remediation work is complete.

5.1.3 System Mapping

Regulated communities must complete a comprehensive map of their stormwater system in 2 phases. Phase 1 must be completed within 2 years and include infrastructure such as outfalls and preliminary catchment delineations, waterbodies, open channel conveyances, interconnections with other MS4s, and structural stormwater BMPs. Phase 2 must be completed within 10 years and include information such as outfalls with high accuracy GPS location and refined catchment delineations, catch basins, manholes, pipe connectivity, and sanitary or combined sewer systems as available/applicable.

5.1.4 Illicit Discharge, Detection, and Elimination Program

The 2016 MS4 Permit requires preparation of a comprehensive written IDDE Program or IDDE Plan that provides detailed procedures for assessment and priority ranking of outfalls and interconnections, dry and wet weather outfall sampling, catchment investigation procedures, system vulnerability factor (SVF) assessment, identification of an illicit discharge, illicit discharge removal, and ongoing screening requirements. The written IDDE Program must be prepared as a standalone IDDE Plan separate from this SWMP Plan.

5.1.5 Annual IDDE Training

The 2016 MS4 Permit requires annual IDDE training to be provided to all employees involved in the IDDE program. Training at a minimum includes information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program.

5.2 Objectives and Goals

The Town of Lunenburg implements an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. The ultimate goal is to remove sources of pollution and improve water quality in receiving waterbodies.

5.3 IDDE Program

The following sections outline how Lunenburg is meeting the requirements of the 2016 MS4 Permit to implement an IDDE program to locate, eliminate, and prohibit illicit discharges.

5.3.1 Establish Legal Authority

Requirements
Permittees must develop an ordinance, bylaw or regulatory mechanism 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.

Work to be Performed
Lunenburg has established legal authority as Town Code §204-2: *Discharges to Municipal Storm Sewer System* (https://ecode360.com/33613912), which addresses all of the above legal requirements in order to create an IDDE program to satisfy the 2016 MS4 Permit, and is provided under **Appendix B**. The following table shows the BMP, responsible parties and measurable goals.

Table 5-1. BMP Description – Establish IDDE Legal Authority

BMP Description	Responsible Parties	Measurable Goal
BMP 3-1: Enact and Enforce IDDE Bylaw	Planning Board	Enforce IDDE bylaw

5.3.2 Complete System Mapping

Requirements
The 2016 MS4 Permit requires the storm system map to be updated in 2 phases. Phase I mapping must be completed within 2 years of the effective date of the permit (July 1, 2020) and include the following information:

- Outfalls and receiving waters;
- Open channel conveyances (swales, ditches, etc.);
- Interconnections with other MS4s and other storm sewer systems;
- Municipally owned stormwater treatment structures;
- Waterbodies identified by name with a list of impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report; and
- Initial catchment delineations based on topography or contributing structures.

Phase II mapping must be completed within 10 years of the effective date of the permit (July 1, 2028) and include the following information:

- Outfall locations (latitude and longitude with a minimum accuracy of +/-30 feet);
- Pipe connectivity;
- Manholes;
- Catch basins;
- Refined catchment delineations based on updated mapping information;
- Municipal sanitary sewer system; and
- Municipal combined sewer system.

Work to be Performed
The Town of Lunenburg has mapped much of its stormwater system and current mapping status is provided in **Appendix C**. All information is incorporated into its GIS library and where applicable, GIS information can be exported into other formats. The Town of Lunenburg will continue to update its stormwater mapping by the required deadlines to include the above information. The following table shows the BMPs, responsible parties and measurable goals.

Table 5-2. BMP Description – Complete System Mapping

BMP Description	Responsible Parties	Measurable Goal
BMP 3-2: Phase I Storm Sewer System Map	Department of Public Works	Complete preliminary system map within 3 years of the effective date of permit
BMP 3-3: Phase II Storm Sewer System Map	Department of Public Works	Complete full system map 10 years after effective date of permit

5.3.3 Complete Sanitary Sewer Overflow Inventory

Requirements

The 2016 MS4 Permit requires municipalities to prohibit illicit discharges, including SSOs, to the separate storm sewer system. SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and/or vandalism.

Work to be Performed

The Town of Lunenburg completed an inventory of SSOs that have discharged to the MS4 within the 5 years prior to submitting the Year 1 Annual Report to EPA. According to the results of that inventory, there were no known SSOs to surface water or into the MS4 during those 5 years. The inventory is also included in the IDDE Plan, including the status of mitigation and corrective measures to address each identified SSO. The inventory is updated annually as part of the Town's annual report submittal to EPA in September of each year. The following table shows the BMP, responsible parties and measurable goals.

Table 5-3. BMP Description – Generate SSO Inventory

BMP Description	Responsible Parties	Measurable Goal
BMP 3-4: Complete SSO Inventory	Department of Public Works	Develop SSO inventory and complete within 1 year of the effective date of permit

In the event a SSO occurs, the town tracks and reports the following SSO information: the location; a clear statement of whether the discharge entered a surface water directly or entered the MS4; date(s) and time(s) of each known SSO occurrence; estimated volume(s) of the occurrence; description of the occurrence indicating known or suspected cause(s); mitigation and corrective measures completed with dates implemented; and mitigation and corrective measures planned with implementation schedules. The SSO inventory is updated as needed.

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. Follow up the verbal notification with a written report following MassDEP's Sanitary Sewer Overflow (SSO)/Bypass notification form within 5 calendar days of the time you become aware of the overflow, bypass, or backup.

The MassDEP contacts are:

- MassDEP Central Region, 8 New Bond Street, Worcester, MA 01606; (508) 792-7650
- 24-hour Emergency Line; 1 (888) 304-1133

The EPA contacts are:

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

5.3.4 Develop and Implement Written IDDE Program

Requirements

The Town of Lunenburg must develop an IDDE Program, the majority of which is contained in a written Illicit Discharge, Detection, and Elimination Plan, a standalone document separate from this SWMP Plan. The IDDE Plan must include a statement of responsibilities and detailed written procedures for the following:

- Assessment and priority ranking of outfalls and interconnections;
- Dry and wet weather outfall sampling;
- Catchment investigation procedures;
- System vulnerability factor (SVF) assessment;
- Identification of an illicit discharge;
- Illicit discharge removal; and
- Ongoing screening requirements.

Work to be Performed

Lunenburg developed a written IDDE Plan as a separate standalone document to address the illicit discharge requirements of the 2016 MS4 Permit. Lunenburg is working towards implementing a comprehensive IDDE Plan and program, according to the schedule set forth in the permit. The following table shows the BMPs, responsible parties and measurable goals.

Table 5-4. BMP Description – IDDE Program and Implementation

BMP Description	Responsible Parties	Measurable Goal
BMP 3-5: Written IDDE Program	Department of Public Works	Create written IDDE program prior to submitting the Year 2 annual report and update periodically
BMP 3-6: Outfall Inventory and Ranking	Department of Public Works	Classify and rank outfalls and interconnections within 3 years of the effective date of permit and update periodically
BMP 3-7: Implement IDDE Program	Department of Public Works	Implement catchment investigations and complete within 10 years of the effective date of the permit

5.3.5 Perform Dry and Wet Weather Outfall Screening

Requirements

Outfalls and contributing catchment areas must be categorized into Problem, High, Low, and Excluded outfalls and then ranked within each category. The 2016 MS4 Permit then requires all outfalls classified as High and Low to be inspected for the presence of dry conditions within 3 years of the permit effective date. While completing screening, permittees must also document various physical indicators of the outfall and sample flowing

outfalls. Additionally, outfalls with at least 1 SVF must also be sampled during wet weather. Depending on the results, additional screening and sampling may be required further up into the contributing catchment. Once dry and wet weather sampling is complete, additional ongoing screening shall be performed once every 5 years in accordance with the catchment prioritization and ranking. Both dry and wet weather outfall screening must be conducted in accordance with screening procedures outlined in the written IDDE Plan. All sampling results shall be reported in the permittee's annual report.

Work to be Performed

Lunenburg developed an outfall sampling program under the IDDE Plan which is being implemented according to the schedule outlined in the 2016 MS4 Permit. This includes dry and wet weather screening on Town outfalls, including those with SVFs where applicable. Known outfalls were evaluated during dry weather conditions during 2020 and 2021 and none of the sampling data collected from flowing outfalls met the Permit criteria as being highly likely to contain illicit discharges from sanitary sources. Results are documented in the standalone IDDE Plan. Ongoing screening will also be performed after the conclusion of the initial sampling rounds. The following table shows the BMPs, responsible parties and measurable goals.

Table 5-5. BMP Description – Perform Dry and Wet Weather Outfall Screening

BMP Description	Responsible Parties	Measurable Goal
BMP 3-8: Dry Weather Screening	Department of Public Works	Complete in accordance with outfall screening procedure within 3 years of the effective permit date
BMP 3-9: Wet Weather Screening	Department of Public Works	Complete in accordance with outfall screening procedure within 10 years of the effective permit date
BMP 3-10: Ongoing Screening	Department of Public Works	Conduct ongoing dry and wet weather outfall screening upon completion of the IDDE program

5.3.6 Perform Annual IDDE Training

The 2016 MS4 Permit requires annual IDDE training to be provided to all employees involved in the IDDE program. Lunenburg provides annual training that includes information on how to identify illicit discharges and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Frequency and type(s) of training are included in the annual report. The following table shows the BMP, responsible parties and measurable goals.

Table 5-6. BMP Description – Perform Annual IDDE Training

BMP Description	Responsible Parties	Measurable Goal
BMP 3-11: Employee Training	Department of Public Works	Annual training will be completed by June 30 each year.

5.4 Measuring IDDE Program Effectiveness

The success of the IDDE Program is evaluated according to the following parameters:

- Storm system mapping progress;
- Number of SSOs and illicit discharges identified and removed;
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedures;
- Updated SVF and catchment inventory and ranking;
- Dry weather and wet weather screening and sampling results;
- Estimated volume or quantity of sewage removed; and
- Number of employees successfully trained on IDDE.

The above is tracked throughout the year and reported as part of each annual report submitted to EPA each year by September 28.

6 MCM 4: Construction Site Stormwater Runoff Control

6.1 Summary of Permit Requirements

Under MCM 4, permittees are required to implement and enforce a program to reduce pollutants in stormwater runoff discharged to the MS4 from all construction activities that result in a land disturbance of greater than or equal to 1 acre within the regulated area. This program shall also regulate disturbances less than 1 acre if they are part of a larger common plan of development or sale that would disturb 1 or more acres. A summary of the required Construction Site Stormwater Runoff Control Program activities and timelines are provided below:

6.1.1 Legal Authority

The Construction Site Stormwater Runoff Control Program shall include adequate legal authority in the form of a currently effective ordinance, bylaw, or other regulatory mechanism to:

- Require the use of sediment and erosion control practices at construction sites; and
- Include controls for other wastes on construction sites.

For permittees authorized by the MS4-2003 permit such as Lunenburg, the ordinance, bylaw, or other regulatory mechanism was required to be effective by May 1, 2008.

6.1.2 Construction Site Stormwater Runoff Control Program

The 2016 MS4 Permit requires preparation of a written Construction Site Stormwater Runoff Control Program procedures that includes pre-construction site plan review and onsite construction inspections. Permittees must also establish requirements for developers to implement a Sediment and Erosion Control Program as part of its Construction Site Stormwater Runoff Control Program that includes BMPs to reduce pollutant sources from construction sites. This program should also include requirements for controlling other wastes during construction.

6.2 Objectives and Goals

The Town of Lunenburg implements an effective construction stormwater runoff control program to minimize or eliminate erosion and maintain sediment onsite so that it is not transported in stormwater and allowed to discharge to a water of the U.S through the permittee's MS4.

6.3 Construction Site Stormwater Runoff Control Program

The following sections outline how Lunenburg is meeting the requirements of the 2016 MS4 Permit to establish a Construction Site Stormwater Runoff Control Program.

6.3.1 Establish Legal Authority

Requirements
Permittees must develop an ordinance, bylaw or regulatory mechanism to:

- Require the use of sediment and erosion control practices at construction sites;
- Include controls for other wastes on construction sites.

Work to be Performed
The Town of Lunenburg updated its legal authority during the November 2020 town meeting to fully establish legal authority as Town Code §204-1 *Stormwater Management* (https://ecode360.com/33599550), which regulates construction projects greater than 1 acre and is provided under **Appendix B**. This comprehensive bylaw in part requires use of soil erosion and sediment controls to stormwater runoff at construction sites, and also includes controls for other wastes at construction sites. The following table shows the BMP, responsible parties and measurable goals.

Table 6-1. BMP Description – Establish Construction Site Legal Authority

BMP Description	Responsible Parties	Measurable Goal
BMP 4-1: Develop and Enforce Construction Bylaw	Planning Board, Land Use Department	Complete bylaw within 3 years of the effective date of the permit

6.3.2 Establish Written Procedures for Site Plan Review

Requirements
The 2016 MS4 Permit requires establishing written procedures for pre-construction plan review of the site design, planned operations, planned BMPs during the construction phase, and planned BMPs to manage runoff after development that includes the following:

- Potential water quality impacts;
- Consideration of information submitted by the public; and
- Evaluation of opportunities for use of LID and green infrastructure (GI).

Work to be Performed
The Town of Lunenburg updated its legal authority during the November 2020 town meeting to fully establish legal authority as Town Code §204-1 *Stormwater Management* (https://ecode360.com/33599550) and is provided under **Appendix B**. This comprehensive bylaw in part provides written procedures for reviewing plan submittals, including plans, calculations, and other items as required by the permit. The following table shows the BMP, responsible parties and measurable goals.

Table 6-2. BMP Description – Establish Site Plan Review Procedures

BMP Description	Responsible Parties	Measurable Goal
BMP 4-2: Develop Written Procedures for Site Plan Review	Planning Board, Land Use Department	Establish procedures for site plan review within 3 years of the effective date of the permit

6.3.3 Establish Procedures for Site Inspections and Enforcement

Requirements

The 2016 MS4 Permit requires the development of written procedures for site inspections and enforcement actions to take place both during construction of BMPs and after construction of BMPs is completed to ensure they are working as described in the approved plans. Procedures must define the following:

- Who is responsible for site inspections;
- Qualifications necessary to perform inspections;
- Who has authority to implement enforcement procedures;
- Ability to impose sanctions to ensure program compliance;
- The use of standardized inspection forms (if appropriate); and
- How to track the number inspections and enforcement actions for reporting in the Annual Report.

Work to be Performed

The Town of Lunenburg updated its legal authority during the November 2020 town meeting to fully establish legal authority as Town Code §204-1 *Stormwater Management* (https://ecode360.com/33599550) and is provided under **Appendix B**. This comprehensive bylaw in part provides written procedures for site inspections, enforcement actions, outlines qualified personnel, and provides a tracking methodology. The following table shows the BMP, responsible parties and measurable goals.

Table 6-3. BMP Description – Establish Site Inspections and Enforcement Procedures

BMP Description	Responsible Parties	Measurable Goal
BMP 4-3: Develop Written Procedures for Site Inspections and Enforcement	Planning Board, Land Use Department	Establish procedures for site inspections and enforcement within 3 years of the effective date of the permit

6.3.4 Establish a Sediment and Erosion Control Program and Construction Site Waste Control Program

Requirements

Permittees must establish 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. Examples of 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;
5. Protect all storm drain inlets and armor all newly constructed outlets;
6. Use perimeter controls at the site;
7. Stabilize construction site entrances and exits to prevent off-site tracking;
8. Inspect stormwater controls at consistent intervals.

Work to be Performed

The Town of Lunenburg updated its legal authority during the November 2020 town meeting to fully establish legal authority as Town Code §204-1 *Stormwater Management* (https://ecode360.com/33599550) and is provided under **Appendix B**. This comprehensive bylaw in part provides written procedures to prohibit illicit discharge of debris, truck wash-out, litter and sanitary waste control on constructions sites, The following table shows the BMPs, responsible parties and measurable goals.

Table 6-4. BMP Description – Develop an Erosion and Sediment Control Program

BMP Description	Responsible Parties	Measurable Goal
BMP 4-4: Establish a Sediment and Erosion Control Program	Planning Board, Land Use Department	Establish procedures for development of an erosion and sediment control program within 3 years of the effective date of the permit
BMP 4-5: Develop Procedures for Waste Control	Planning Board, Land Use Department	Establish requirements to control construction site wastes within 3 years of the effective date of the permit

7 MCM 5: Stormwater Management in New Development and Redevelopment

7.1 Summary of Permit Requirements

Under MCM 5, permittees shall develop, implement, and enforce a program to address post-construction stormwater runoff from new development and redevelopment sites that disturb 1 or more acres and discharge into an MS4 system. This program shall also regulate disturbances less than 1 acre if they are part of a larger common plan of development or sale that would disturb 1 or more acres. A summary of the required Stormwater Management in New Development and Redevelopment, also known as Post Construction Stormwater Management, activities and timelines are provided below:

7.1.1 Legal Authority

The Post Construction Stormwater Management Program shall include adequate legal authority in the form of a currently effective ordinance, bylaw, or other regulatory mechanism to:

- Require LID site planning and design strategies;
- Meet many of the requirements of the Massachusetts Stormwater Handbook and associated stormwater standards;
- Incorporate runoff volume storage and/or pollutant removal requirements; and
- Meet additional requirements for TMDL and water quality limited waterbodies.

Updates must be made within 3 years of the effective permit date.

7.1.2 As-Built Submittals

The permittee must require the submission of as-built drawings within 3 years after completion of construction projects and include structural and non-structural controls.

7.1.3 Operation and Maintenance

The program must include procedures to ensure adequate long-term operation and maintenance of BMPs are established after completion of a construction project, along with a dedicated funding source within 3 years of the effective permit date.

7.1.4 Regulatory Assessment

The permittee must complete an assessment of existing regulations that could affect creation of impervious cover to determine if changes are required to support LID. Additionally, the permittee must assess current regulations to ensure that certain green infrastructure is allowable where feasible. Any required changes must be completed within 4 years of the effective permit date.

7.1.5 Inventory of Potential Retrofit Sites

The permittee must complete an inventory within 4 years of the effective permit date to determine at least 5 permittee-owned properties that could be modified or retrofitted with stormwater BMP improvements.

7.2 Objectives and Goals

The Town of Lunenburg implements and enforces a program to reduce pollutants in stormwater runoff discharged to the MS4 from all construction activities that result in a land disturbance greater than or equal to 1 acre within the regulated area.

7.3 Post-Construction Stormwater Management Program

The following sections outline how Lunenburg is meeting the requirements of the 2016 MS4 Permit to establish a Post-Construction Stormwater Management Program.

7.3.1 Establish Legal Authority

Requirements
Under the 2016 MS4 Permit, permittees shall develop or modify an ordinance, bylaw, or other regulatory mechanism within 3 years of the effective date of the permit to contain provisions that are as least as stringent as the following:

1. Use LID site planning and design strategies unless in feasible;
2. Stormwater management system designs shall be consistent with, or more stringent than, the requirements of the 2008 Massachusetts Stormwater Handbook, as amended;
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 related to the total postconstruction impervious surface area on the site as calculated based on the average annual loading and not on the basis of any individual storm event.
    a. Average annual pollutant removal requirements 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 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 postconstruction load of TSS related to the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus related to the total post-construction impervious surface area on the site as calculated based on the average annual loading and not on the basis of any individual storm event.
    a) Average annual pollutant removal requirements 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, 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 are exempt from part a) above. 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 a) above.

Additionally, the bylaw must include requirements for stormwater structural BMPs proposed as part of new or redevelopment to be optimized as follows in order to meet TMDL and water quality limited waterbodies requirements:

- For phosphorus removal for development within the Nashua River watershed (Nashua River phosphorus impairment);
- For shutdown and containment to isolate the system in the event of an emergency spill or other unexpected event with areas draining to Lake Shirley.

See Section 9 for more information.

Work to be Performed
The Town of Lunenburg updated its legal authority during the November 2020 town meeting to fully establish legal authority as Town Code §204-1 *Stormwater Management* (https://ecode360.com/33599550), which regulates construction projects greater than 1 acre and is provided under **Appendix B**. This comprehensive bylaw in part requires the use of LID techniques as feasible, as well as establishing stormwater standards for TSS and total phosphorus removal for both new development and redevelopment. The following table shows the BMP, responsible parties and measurable goals.

Table 7-1. BMP Description – Establish Post-Construction Site Legal Authority

BMP Description	Responsible Parties	Measurable Goal
BMP 5-1: Develop and Enforce Post-Construction Bylaw	Planning Board, Land Use Department	Complete bylaw within 3 years of the effective date of the permit

7.3.2 Require Submittal of As-Built Plans and Long-Term Operation and Maintenance

The Town of Lunenburg updated its legal authority during the November 2020 town meeting to fully establish legal authority as Town Code §204-1 *Stormwater Management* (https://ecode360.com/33599550) and is provided under **Appendix B**. This comprehensive bylaw in part requires the submittal of as-built plans and comprehensive operation and maintenance plans prior to the completion of a project. The following table shows the BMPs, responsible parties and measurable goals.

Table 7-2. BMP Description – Submittal of As-Builts and Long Term O&M Plans

BMP Description	Responsible Parties	Measurable Goal
BMP 5-2: Require Stormwater As-Built Plan Submittal	Planning Board, Land Use Department	Require submittal of as-built plans for completed projects within 3 years of completion
BMP 5-3: Require Long Term Operation and Maintenance	Planning Board, Land Use Department	Require submittal of operation and maintenance plans and dedicated funding to ensure long term maintenance within 3 years of the effective date of the permit

7.3.3 Complete Regulatory Assessment

Requirements
The 2016 MS4 permit requires permittees to complete a report that assesses current street design, parking lot guidelines, and other local requirements that could affect creation of impervious cover to determine if changes to existing design standards are required to support LID. 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. Any required changes to reduce mandatory creation of impervious cover in support of LID should be made within 4 years of the effective permit date.

Additionally, the permittee must complete a report that assesses current regulations to determine the feasibility of allowing green roofs, infiltration practices, porous/pervious pavement, and water harvesting/storage devices where feasible. The assessment must indicate if the practices are allowed in the MS4 area and under what circumstances they are 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. Any required changes to allow for these BMPs must be completed within 4 years of the effective permit date.

Work to be Performed

The Town of Lunenburg completed a comprehensive review of its regulations to address the above requirements during Permit Year 4. A report (**Appendix D**) was developed that in part includes an assessment of requirements that affect creation of impervious cover, if design standards for streets and parking lots can be modified to better support LID options, and assesses the feasibility of making green infrastructure allowable when appropriate site conditions exist. Recommendations have been provided to the planning board, although no schedule has been developed to date. A detailed schedule is anticipated to be completed during Year 5 and beyond in cooperation with the Responsible Parties listed in the table below. The following table shows the BMPs, responsible parties and measurable goals.

Table 7-3. BMP Description – Complete LID and GI Regulatory Updates

BMP Description	Responsible Parties	Measurable Goal
BMP 5-4: Street design and parking lot guidelines	Planning Board, Land Use Department	Complete regulatory updates within 4 years of the effective date of the permit
BMP 5-5: Allow green infrastructure	Planning Board, Land Use Department	Complete regulatory updates within 4 years of the effective date of the permit

7.3.4 Complete Inventory of Potential BMP Retrofit Sites

Requirements

Permittees must complete an inventory of at least 5 existing permittee-owned properties that could be modified or retrofitted with structural stormwater BMP improvements to reduce the frequency, volume, and pollutant loads within 4 years of the effective permit date. The inventory provided in **Appendix E** should include municipal properties with significant impervious cover such as parking lots, buildings, and maintenance yards, along with infrastructure such as existing rights-of-way, outfalls and stormwater conveyances such as swales or detention practices. The permittee should address potential site constraints that could hinder BMP construction, such as subsurface conditions, depth to water table, and utility impacts, and should ideally allow opportunities for public education.

Beginning with the fifth annual report, should BMPs at 1 or more sites be constructed, the inventory should be updated so that it always contains at least 5 sites in the inventory for potential improvement. The permittee must report on all properties that have been modified or retrofitted to mitigate impervious area.

Work to be Performed

The Town of Lunenburg developed a comprehensive inventory and ranking (**Appendix E**) of all town-owned parcels within the regulated urbanized area that had impervious cover such as parking lots or buildings, or were located along/adjacent to roadways. This largely included all town-owned parcels present within the urbanized area with the exception of vacant conversation areas. The Town then conducted a desktop analysis of all parcels to assess them for potential BMP retrofit opportunities by reviewing relevant information such as available space, localized topography, soil types, opportunities to reroute existing drainage networks, etc. All properties were then evaluated in the field to further refine desktop assessments and were then ranked based on existing conditions and feasibility of retrofitting to improve water quality. The top five sites for potential BMP retrofit were then identified and pre-conceptual designs with costs were prepared for top sites. This inventory will be updated continuously starting in Year 5 as necessary. The following table shows the BMP, responsible parties and measurable goals.

Table 7-4. BMP Description – Complete Inventory of Properties for BMP Retrofit

BMP Description	Responsible Parties	Measurable Goal
BMP 5-6: Target properties to reduce impervious areas	Planning Board, Land Use Department	Complete inventory within 4 years of the effective date of the permit and update annually on retrofitted properties

8 MCM 6: Good Housekeeping and Pollution Prevention

8.1 Summary of Permit Requirements

Under MCM 6, permittees shall develop and implement an operations and maintenance program to reduce stormwater pollution from permittee activities. This includes optimizing existing activities related to parks and open space, buildings and facilities, vehicles and equipment, and stormwater infrastructure maintenance. A summary of the required Good Housekeeping and Pollution Prevention for Permittee Owned Operations activities and timelines is provided below.

8.1.1 Operations and Maintenance Programs

Permittees shall develop written operations and maintenance procedures for parks and open space, buildings and facilities, vehicles and equipment, winter road maintenance, stormwater infrastructure, and structural stormwater BMPs within 2 years of the effective permit date. This program shall also optimize catch basin cleaning and street sweeping, along with establishing proper storage techniques for cleaning residuals. All maintenance activities, inspections, and training shall be logged for annual reporting.

8.1.2 Stormwater Pollution Prevention Plans

Develop and implement Stormwater Pollution Prevention Plans (SWPPPs) for municipally-owned maintenance garages, public works yards, transfer stations within 2 years of the effective permit date.

8.2 Objectives and Goals

The Town of Lunenburg implements an effective good housekeeping, pollution prevention, and operation and maintenance program with a goal of preventing or reducing pollutant runoff, protecting water quality from municipal operations, and maintain its infrastructure in good working order.

8.3 Good Housekeeping and Pollution Prevention Program

The following sections outline how Lunenburg is meeting the requirements of the 2016 MS4 Permit to establish a Good Housekeeping and Pollution Prevention Program.

8.3.1 Complete Facilities O&M Procedures

Requirements

The permittee must complete an inventory of all parks and open space, buildings and facilities where pollutants are exposed to stormwater runoff, including those coming from vehicles and equipment, within 2 years of the permit effective date. The inventory must be reviewed annually and updated as necessary. Upon completion, the permittee must establish written procedures as part of an Operation and Maintenance Plan within 2 years of the permit effective date for the following items:

Parks and Open Space

- Proper use, storage, and disposal of pesticides, herbicides, and fertilizers;
- Lawn maintenance and landscaping activities to protect water quality, such as reducing mowing, lawn clippings handling, and use of alternative materials;
- Pet waste handling collection and disposal locations at all locations where pets are permitted, including signage;
- Control of waterfowl in areas where they congregate to reduce waterfowl droppings from entering the MS4s;
- Management of trash containers; and
- Addressing erosion or poor vegetative cover, particularly near a surface waterbody.

Buildings and Facilities

- Use, storage, and disposal of petroleum products and other potential pollutants.
- Materials handling training to applicable employees;
- Ensuring that Spill Prevention, Control, and Countermeasures (SPCC) Plans are in place if needed (aboveground petroleum storage greater than 1,320 gallons or underground petroleum storage greater than 42,000 gallons);
- Dumpsters and other waste management equipment; and
- Sweeping parking lots and keeping facility areas clean to reduce pollutants in runoff.

Vehicles and Equipment

- Storage of vehicles to prevent fluid leaks to stormwater;
- Fueling area evaluation, including feasibility of fueling under cover; and
- Preventing vehicle wash waters from entering surface waters or the MS4.

Work to be Performed

The Town prepared written procedures for the operations and maintenance of town-owned parks and open space, operations and maintenance of town-owned buildings and facilities (town offices, parking, etc.), and operations and maintenance (O&M) of town-owned vehicles and equipment. This comprehensive O&M Plan is maintained as a separate document separate from this SWMP Plan. As part of this document, the Town also developed a list of municipally-owned properties that includes open spaces, buildings and

facilities, and vehicles and equipment storage facilities. The following table shows the BMPs, responsible parties and measurable goals.

Table 8-1. BMP Description – Complete Written Facilities O&M Procedures

BMP Description	Responsible Parties	Measurable Goal
BMP 6-1: Inventory open spaces, buildings and facilities, and vehicles and equipment	Department of Public Works, Parks Commission, and Town Departments	Complete inventory of open spaces, buildings and facilities, and vehicles and equipment prior to submitting the Year 2 annual report
BMP 6-2: Establish Operation and Maintenance Procedures	Department of Public Works and Town Departments	Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment prior to submitting the Year 2 annual report

8.3.2 Complete Infrastructure O&M Procedures

Requirements

The permittee must establish written procedures as part of an Operation and Maintenance Plan within 2 years of the permit effective date to ensure that MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4 for the following items:

Street Sweeping (**Appendix F)**

- Sweeping all streets and permittee-owed parking lot, with the exception of rural uncurbed roads with no catch basins or high-speed limited access highways at least 1 per year in the spring following winter sanding events;
- More frequent sweeping of targeted areas based on inspections, land use, or known water quality impacts; and
- For rural uncurbed roadways with no catch basins or limited access highways, either an evaluation to meet the minimum frequencies above or development and implementation of an inspection, documentation, and targeted sweeping plan within 2 years of the effective date and submitted with the Year 1 annual report.

Catch Basin Cleaning (**Appendix G)**

- Prioritization of catch basins located near construction activities for more frequent inspection and maintenance;
- Establishing a schedule with a goal that at the time of maintenance, no catch basin is more than 50% full;
- For catch basins that are more than 50% full during 2 consecutive inspections or cleaning events, methods for investigating the contributing drainage area for sources of excessive sediment loads; and
- Establishing a plan for optimizing catch basin cleaning, inspections, and documentation.

Catch Basin and Street Sweeping Residuals Management

- Ensure proper storage of catch basins cleanings and street sweepings prior to disposal or reuse such that they will not be discharged to receiving waters based on available MassDEP policies.

Winter Operation and Maintenance

- Establish and implement procedures for winter road maintenance including the use and storage of salt and sand
- Minimizing use of sodium chloride and other salts and evaluation of opportunities to use alternative materials; and
- Ensuring that snow disposal activities do not result in disposal of snow into waters of the United States.

Work to be Performed

The Town recently updated its existing street sweeping, catch basin cleaning, and winter O&M procedures in order to meet permit requirements. Street sweeping will continue under the existing Street Sweeping Prioritization Plan provided in **Appendix F**. Catch basin prioritization will also continue according to the methodology and schedule outlined in the Catch Basin Optimization Plan provided in **Appendix G**. The following table shows the BMP, responsible parties and measurable goals.

Table 8-2. BMP Description – Complete Written Infrastructure O&M Procedures

BMP Description	Responsible Parties	Measurable Goal
BMP 6-3: Review Infrastructure O&M Procedures	Department of Public Works	Create written O&M Plan for stormwater infrastructure prior to submitting the Year 2 annual report
BMP 6-4: Catch Basin Cleaning	Department of Public Works	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually
BMP 6-5: Street Sweeping	Department of Public Works	Sweep all streets and parking lots at least annually and sweep all streets within the Long Island Sound, and French Basin Lakes watersheds twice per year.
BMP 6-6: Road salt optimization program	Department of Public Works	Implement salt use optimization during winter maintenance operations

8.3.3 Stormwater Pollution Prevention Plans

Requirements

The permittee must establish written Stormwater Pollution Prevention Plans for 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. SWPPPs must address a number of components, including the following:

- Pollution Prevention Team;
- Facility description, identification of potential pollutant sources, and identification of stormwater controls;
- Stormwater management practices, including measures to minimize or prevent exposure, good housekeeping and preventative maintenance, spill prevention and response, erosion and sediment control, management of runoff, salt storage, employee training, and control measure maintenance; and
- Procedures for site inspections and sampling.

Work to be Performed
The Town of Lunenburg has determined that it has one facility that meets the above requirements, the Lunenburg Closed Sanitary Landfill. A SWPPP has been prepared for this facility under as a separate standalone document which should be updated when there is a significant change in design, construction, operation, or maintenance of the facility that affects the discharge or potential discharge of pollutants. The SWPPP is available in hardcopy at the Lunenburg Department of Public Works to members of federal, state, or local agencies during normal working hours for review upon request. Copies of the SWPPP are accessible to all persons responsible for implementing and administering it. The following table shows the BMPs, responsible parties and measurable goals.

Table 8-3. BMP Description – Prepare SWPPPs for Regulated Facilities

BMP Description	Responsible Parties	Measurable Goal
BMP 6-7: Assess regulated facilities to determine SWPPP eligibility	Department of Public Works	Complete facilities assessment within 4 years of the effective date of permit.
BMP 6-8: Develop SWPPPs for applicable facilities	Department of Public Works	Complete and implement within 3 years of the effective date of the permit
BMP 6-9: Spill Prevention and Response Training	Department of Public Works	Train employees involved with spill prevention and response annually

8.3.4 Structural Stormwater BMP Inspections

Requirements
The permittee must establish and implement written inspection and maintenance procedures and frequencies for all stormwater treatment structures, such as infiltration and detention basins, proprietary stormwater treatment structures, gravel wetlands, etc. at least annually.

Work to be Performed
The Town of Lunenburg developed an inventory (**Appendix H**) of known structural stormwater BMPs by the end of Year 2 as required by MCM 3, mapping requirements. The Town then developed inspection and maintenance procedures for the various types of BMPs located within the regulated area. BMP inspection Standard Operating Procedures (SOPs)

and logs for BMP inspection and maintenance are provided in the standalone O&M Plan. Stormwater BMPs are inspected annually, with results documented in **Appendix H**. The following table shows the BMP, responsible parties and measurable goals.

Table 8-4. BMP Description – Inspect Structural BMPs Annually

BMP Description	Responsible Parties	Measurable Goal
BMP 6-10: Establish BMP O&M Procedures	Department of Public Works	Create written O&M Plan for stormwater BMPs within 2 years of the effective date of the permit
BMP 6-11: Inspect and maintain stormwater BMPs	Department of Public Works	Inspect and maintain treatment structures annually

9 TMDL and Impaired Waters Controls

9.1 Permit Requirements

The 2016 MS4 Permit requires regulated operators of MS4s to determine whether stormwater discharges from their MS4 contribute to any impaired waterbodies, including those subject to an approved TMDL and certain water quality limited waterbodies. Water quality limited waters are any waterbodies that do not meet applicable water quality standards, including waterbodies listed in categories "4a" and "5" on the Massachusetts Integrated List of Waters, also known as the "303(d) List". MassDEP is responsible for preparing TMDLs for many of these listed waters to identify the problem pollutant and establish water quality goals. TMDLs are prepared based on the priority assigned to the waterbody and are completed over the course of several years.

As outlined in Section 2.3, the Town of Lunenburg is subject to the following TMDL and impaired waters requirements:

Table 9-1. TMDL and Impaired Waters Requirements

Waterbody Name	Impairment	2016 Permit Requirements
Nashua River	Phosphorus	Appendix H, Part II
Nashua River	E. coli	Appendix H, Part III
Lake Shirley	Turbidity	Appendix H, Part V

The Town of Lunenburg must implement control measures for discharges to impaired waters without a TMDL as summarized in the sections below. The Town reviews the most recent approved list of impaired waters as it is released and outlines any additional requirements associated with the most recent list in this SWMP Plan. Progress towards meeting the TMDL and Impaired Waters requirements is documented in the standalone Phosphorus Source Identification Report.

9.2 Phosphorus Water Quality Limited Waterbody Requirements

The Town of Lunenburg is within the watershed of a waterbody that has a phosphorus impairment (Nashua River) and is required to implement the following requirements as outlined under Appendix H, Part II of the 2016 Permit.

9.2.1 Additional or Enhanced BMPs

The Town of Lunenburg must include the following additional or enhanced BMPs, in addition to the 6 MCMs outlined previously:

- **Public Education** – supplement its Residential and Business/Commercial/Institution programs with additional annual messages as follows:
    - Spring (April-May): Proper use and disposal of grass clippings and use of slow-release and phosphorus-free fertilizers;

    - Summer (June-July): Proper management of pet waste; and
    - Fall (August-October): Proper disposal of leaf litter.

- **Stormwater Management in New Development and Redevelopment** – supplement standard permit bylaw requirements to also mandate the use of stormwater BMPs optimized for phosphorus removal as part of new development and redevelopment projects. Additionally, retrofit opportunities must consider opportunities for constructing infiltration BMPs for properties within the Millers River watershed.

- **Good Housekeeping and Pollution Prevention** – establish requirements for reducing fertilizer usage and/or using slow release fertilizers on permittee owned properties, procedures for properly managing grass cuttings and leaf litter on permittee owned property, and prohibit blowing organic waste onto impervious surfaces. Additionally, street sweeping must be increased to at least twice per year, once in the spring and once in the fall.

9.2.2 Phosphorus Source Identification Report

The Town of Lunenburg must also prepare a Phosphorus Source Identification Report that generally does the following:

- Identifies, delineates, and prioritizes areas of town at the catchment-level that have the highest phosphorus loading potential based on land use and other factors;
- Accounts for the urbanized area that discharges to the Millers River watershed;
- Determines impervious area based on catchment delineations;
- Accounts for any screening results performed under MCM 3 when developing conclusions; and
- Identifies potential retrofit opportunities for installing structural BMPs during redevelopment.

This item must be completed by the end of Year 4.

9.2.3 Structural BMPs

Upon completion of the Phosphorus Source Identification Report, the Town must evaluate all properties identified under the report or using the procedures identified under Section 7.3.4 to complete a site-specific evaluation addressing the following:

- Identifies the next planned redevelopment activity or planned retrofit date;
- Determines an estimated cost of redevelopment or retrofit BMPs; and
- Determines the engineering and regulatory feasibility BMP installation.

Upon completion, the Town must provide a list of planned structural BMPs, along with a plan and schedule for implementation by the end of Year 5. At least1BMP must be designed and constructed as a demonstration project by the end of Year 6 that targets a catchment with a high phosphorus load potential. Remaining structural BMPs must be constructed

according to the provided plan and schedule. Phosphorus removals must be tracked and reported annually.

Work to be Performed
Requirements for meeting the phosphorous water quality limited waterbody requirements are being performed according to the schedule in the 2016 Permit. Progress is documented in the standalone Phosphorus Source Identification Report. The following table shows the BMP, responsible parties and measurable goals.

Table 9-2. Water Quality Limited Waterbody Requirements – Phosphorus

BMP Description	Responsible Parties	Measurable Goal
BMP 7-3: Water Quality Limited Waterbody Requirements – Phosphorus	Department of Public Works, Planning Board, Land Use Department	Adhere to requirements in Part II of Appendix H

9.3 Bacteria Water Quality Limited Waterbodies Requirements

The Town of Lunenburg is within the watershed of a waterbody that is impaired for bacteria (Nashua River) and is required to implement the following requirements as outlined under Appendix H, Part III of the 2016 Permit.

9.3.1 Additional or Enhanced BMPs

The Town of Lunenburg must include the following additional or enhanced BMPs, in addition to the 6 MCMs outlined previously:

- **Public Education** – supplement its Residential program with an annual message encouraging the proper management of pet waste and disseminate educational materials to dog owners at the time of issuance or renewal of a dog license. 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 Town also must provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria or pathogens.

- **Illicit Discharge, Detection, and Elimination** – designate catchments draining to bacteria or pathogen impaired segments as "Problem Catchments" or "High" priority.

Work to be Performed
Public education requirements have been incorporated into future public education outreach components as described in Section 3. IDDE requirements have been incorporated into Lunenburg's IDDE Plan. The following table shows the BMP, responsible parties and measurable goals.

Table 9-3. TMDL Requirements – E.coli

BMP Description	Responsible Parties	Measurable Goal
BMP 7-2: TMDL Requirements – E.coli	Department of Public Works, Planning Board, Land Use Department	Adhere to requirements in part A.III of Appendix F

9.4 Turbidity Water Quality Limited Waterbodies Requirements

The Town of Lunenburg is within the watershed of a waterbody that is impaired for turbidity (Lake Shirley) and is required to implement the following requirements as outlined under Appendix H, Part V of the 2016 Permit.

9.4.1 Additional or Enhanced BMPs

The Town of Lunenburg must include the following additional or enhanced BMPs, in addition to the 6 MCMs outlined previously:

- **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. Any stormwater management system designed to infiltrate stormwater on commercial or industrial sites must 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.

- **Good Housekeeping and Pollution Prevention –** increase street sweeping frequency of all municipal streets and parking lots to target areas with potential for high pollutant loads. This may include increased sweeping in commercial and high-density residential areas, or largely impervious drainage areas. Prioritize inspection and maintenance for catch basins to ensure that no sump is more than 50 percent full. Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings. Include street sweeping schedule developed to target high pollutant loads in each annual report.

Work to be Performed

Stormwater management requirements for new and redevelopment were addressed as part of the regulatory and other program updates to be completed during Year 3. The Town of Lunenburg has addressed street sweeping requirements under Section 8.3 and 9.2. The catch basin cleaning program is ongoing as outlined under Section 8.3. The following table shows the BMP, responsible parties and measurable goals.

Table 9-4. Water Quality Limited Waterbody Requirements – Turbidity

BMP Description	Responsible Parties	Measurable Goal
BMP 7-3: – Water Quality Limited Waterbody Requirements – Turbidity	Department of Public Works, Planning Board, Land Use Department	Adhere to requirements in Part V of Appendix H F

10 Annual Reporting

The permittee shall submit annual reports each year of the permit term. The reporting period is 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, 2018 to the permit effective date. The annual report is due 90 days from the close of each reporting period, or by September 28 of each year. The annual reports must contain the following relevant information which should be tracked throughout the year, and should be filed within **Appendix I**:

- A self-assessment review of compliance with the permit terms and conditions.
- An assessment of the appropriateness of the selected BMPs.
- The status of any plans or activities, including:
    - Identification of all discharges determined to be causing or contributing to an exceedance of water quality standards and description of response;
    - For discharges subject to TMDL or water quality limited waterbody requirements, identification of BMPs used to address the impairment and assessment of the BMPs effectiveness;
    - For discharges to water quality limited waters a description of each BMP and any deliverables required.
- An assessment of the progress towards achieving the measurable goals and objectives of each of the 6 minimum measures:
    - Evaluation of the public education program including a description of the targeted messages for each audience; method 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 IDDE activities including: status of mapping and results of the ranking and assessment; identification of problem catchments; status of all IDDE Plan components; number and identifier of catchments evaluated; number and identifier of outfalls screened; number of illicit discharges located and removed; gallons of flow removed; identification of tracking indicators and measures of progress; and employee training.
    - Evaluation of construction runoff management including number of project plans reviewed; number of inspections; and number of enforcement actions.
    - Evaluation of stormwater management for new and redevelopment including status of bylaw development; review and status of the street design and barriers to green infrastructure assessment; and inventory status.
    - Status of the O&M Programs.
    - Status of SWPPPs, including inspection results.
- All outfall screening and monitoring data during the reporting period and cumulative for the permit term; and a description of any additional monitoring data received by the permittee during the reporting period.
- Description of activities for the next reporting cycle.
- Description of any changes in identified BMPs or measurable goals.
- Description of activities undertaken by any entity contracted for achieving any measurable goal or implementing any control measure.

11 Program Documentation

The Town of Lunenburg's Best Management Practices Plan as outlined in the Town's NOI (**Appendix A**) is summarized in **Table 11-1**.

For consistency with the 6 MCMs and impaired water requirements, the BMPs are broken down into 7 categories:

1. Public Education and Outreach;
2. Public Participation and Involvement;
3. Illicit Discharge Detection and Elimination;
4. Construction Site Stormwater Runoff Control;
5. Stormwater Management in New Development and Redevelopment;
6. Good Housekeeping and Pollution Prevention; and
7. TMDL and Water Quality Limited Waterbodies Controls

The BMP tables also outline the measurable goals for each BMP to gauge permit compliance, the responsible party(ies) for implementing each BMP, and an implementation schedule to be used throughout the permit period. In addition to the implementation activities outlined in this plan, the Town performs the following activities throughout the duration of the permit:

1. **Program Evaluation** – conduct annual evaluations of the Stormwater Management Program for compliance with permit conditions. The evaluation must include a determination of the appropriateness of the selected BMPs in efforts towards achieving the measurable goals.

2. **Record Keeping** – maintain records that pertain to the Stormwater Management Program for a period of at least 5 years. Records need to be made available to the public and the Town may charge a reasonable fee for copying. Records need not be submitted to EPA or MassDEP unless specifically requested.

3. **Reporting** – submit an annual report to EPA and MassDEP, including the information as noted in Section 10.

Refer to the following link for a copy of the 2016 MA MS4 Permit:
https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6+	
BMP Description	**BMP ID**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Page and Section**	**7/1/18-6/30/19**	**7/1/19-6/30/20**	**7/1/20-6/30/21**	**7/1/21-6/30/22**	**7/1/22-6/30/23**	**7/1/23-6/30/24**	
1. Public Education and Outreach												
Businesses, Institutions, and Commercial Education Program	**1-1**	1. Web page posting of downloadable brochures, flyers and fact sheets posted on Town website may include materials available from the MADEP Stormwater Outreach Materials website (e.g., Stormwater Management for Small Businesses) and the Think Blue Massachusetts website.	Lunenburg Land Use Department	Goal: 100 brochures/flyers/fact sheets will be downloaded by web page visitors annually.	**9, §4**		*	*	*	*	*	
	1-2	2. Broadcast public service announcements and videos about stormwater management on the Lunenburg Cable Television channel, which are available from the Cable Television programs, the YouTube website, and the Think Blue Massachusetts website.	Lunenburg Land Use Department	Goal: 1000 people will view Public Service Announcements (PSAs) and videos annually.						*	*	
Developer and Construction Education Program	**1-3**	1. Email developers and home builders a brochure/fact sheet about construction stormwater management, which is available from the MADEP Stormwater Outreach Materials website and the Think Blue Massachusetts website.	Lunenburg Land Use Department	Email messages will include response form to measure the effectiveness of brochure/fact sheet. Track # and date of emails sent and responses received from targeted audience.	**10, §4**		*	*	*	*	*	
	1-4	2. Email developers and home builders the brochure "Builders Guide to Low Impact Development", which is available from the MADEP Stormwater Outreach Materials website and the National Association of Home Builders research center website.	Lunenburg Land Use Department	Email messages will include response form to measure the effectiveness of brochure/fact sheet. Track # and date of emails sent and responses received from targeted audience.						*	*	
Industrial Education Program	**1-5**	1. Email industrial facilities a brochure/fact sheet about Industrial Stormwater Best Management Practices, which is available from the MADEP Stormwater Outreach Materials website and the Think Blue Massachusetts website.	Lunenburg Land Use Department, Assessors Office	Email messages will include response form to measure the effectiveness of brochure/fact sheet. Track # and date of emails sent and responses received from targeted audience.	**11, §4**		*	*	*	*	*	
	1-6	2. Email industrial facilities a brochure/fact sheet about Industrial Fleet Management practices, which is available from the MADEP Stormwater Outreach Materials website and the Think Blue Massachusetts website	Lunenburg Land Use Department, Assessors Office	Email messages will include response form to measure the effectiveness of brochure/fact sheet. Track # and date of emails sent and responses received from targeted audience.					*	*	*	
Residential Education Program	**1-7**	1. Mail insert with Town bills – "Stormwater Pollution Prevention Guide for Homeowners", which is available from the MADEP Stormwater Outreach Materials website, the Think Blue Massachusetts website and other sources.	Lunenburg Land Use Department	Goal: 5,000 households will receive brochure in mail and Survey Monkey will measure effectiveness of messaging.	**12, §4**	*	*	*	*	*	*	
	1-8	2. Prepare 5 displays that offer brochures/fact sheets at Town Hall, Town Library and other public places. Materials about lawn maintenance, pet wastes, rain gardens, car care and additional topics are available from MADEP Stormwater Outreach website, the Think Blue Massachusetts website and other websites.	Lunenburg Land Use Department	Goal: 500 brochures and fact sheets will be distributed annually by displays. Survey Monkey will measure effectiveness of messaging.					*	*	*	

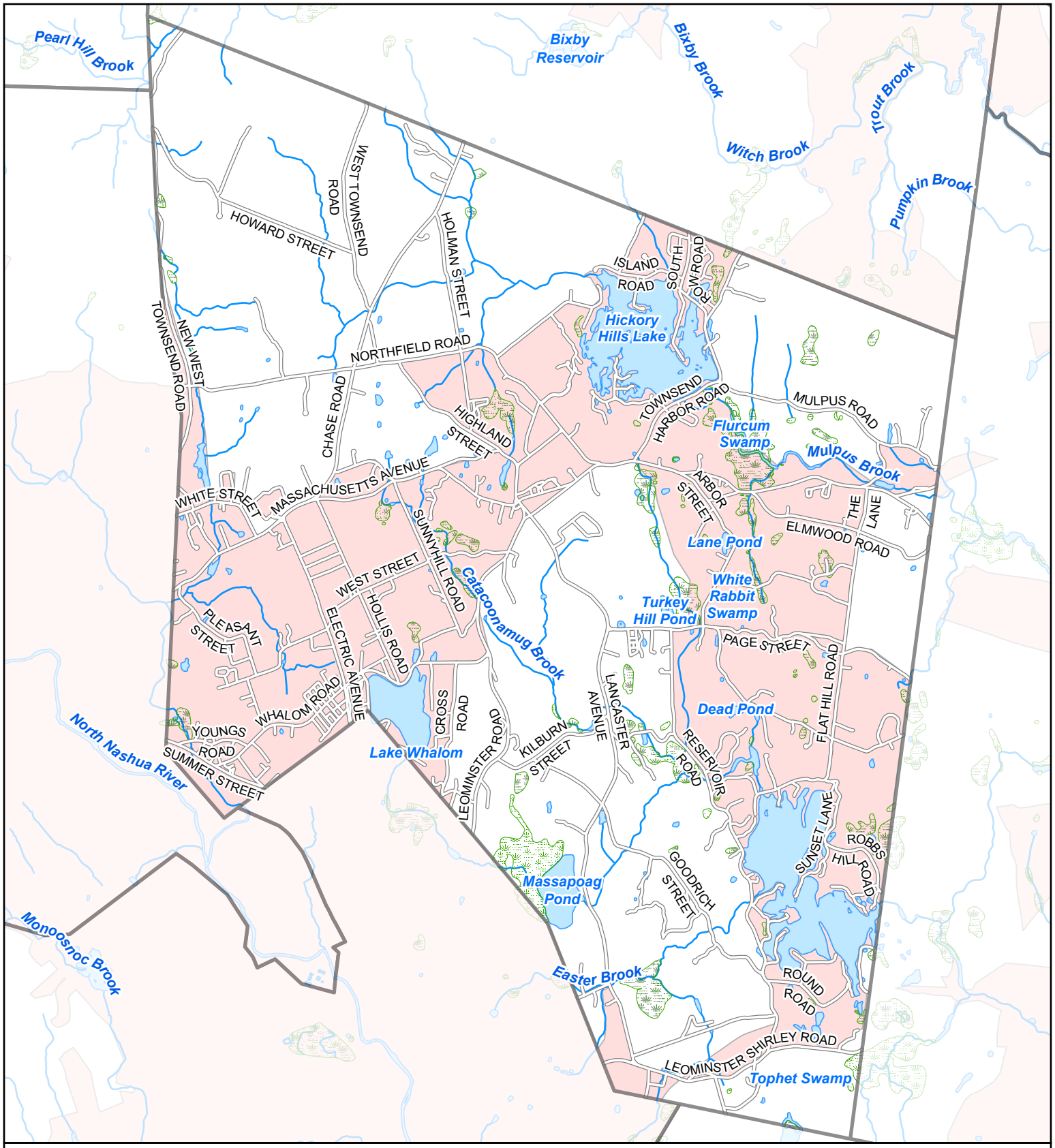
Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6+	
BMP Description	**BMP ID**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Page and Section**	**7/1/18-6/30/19**	**7/1/19-6/30/20**	**7/1/20-6/30/21**	**7/1/21-6/30/22**	**7/1/22-6/30/23**	**7/1/23-6/30/24**	
2. Public Participation & Involvement												
Public Review of Stormwater Management Program	**2-1**	1. Provide opportunity for public to review and comment on the SWMP and other regulatory mechanisms for SWMP implementation. The proposed Lunenburg SWMP will be posted on Lunenburg's SWTF website in June 2019 and available for public comment. Comments will be reviewed and incorporated as appropriate.	Lunenburg Land Use Department	Stormwater Management Plan is publicly available.	**13, §5**	*	*	*	*	*	*	
Public Participation in Stormwater Program Development	**2-2**	2. Public meeting will be arranged annually to present the Stormwater Management Plan and provide opportunity to participate in the review and implementation of the SWMP.	Board of Selectmen	Annual public input provided.	**13, §5**	*	*	*	*	*	*	
Community Stormwater Survey	**2-3**	1. Survey Monkey designed to assess public attitudes, interests and foster community participation in the Town's SWMP. The survey will posted on the Town website and Town Facebook page in 2019 and survey responses will be tracked.	Stormwater Task Force	Survey responses in FY2019 and FY2021 will be correlated to measure the effectiveness of messaging. Goal: 500 people will participate in these Town surveys.	**14, §5**	*	*	*	*	*	*	
3. Illicit Discharge Detection and Elimination												
IDDE Legal Authority	**3-1**	1. Establish a legal authority in order to create an IDDE program to satisfy the 2016 MS4 Permit.	Lunenburg Planning Board	Regulatory mechanism in place within 1 year of the permit effective date.	**15, §6**	*	*	*	*	*	*	
SSO Inventory	**3-2**	1. Annually complete an inventory of Sanitary Sewer Overflows that discharged to the MS4 during the previous five years, including information on location, discharge characteristics, and corrective actions.	Department of Public Works	Update inventory as needed.	**15, §6**	*	*	*	*	*	*	
Phase I Storm Sewer System Map **Phase II Storm Sewer System Map**	**3-3**	1. Delineate catchment areas based on topography for each MS4 outfall and map in GIS. Update outfalls, conveyances receiving waters, interconnections, MS4-owned BMPs & initial catchment delineations. 2. Update outfall spatial location, pipe connectivity, manholes, catch basins, refined catchment delineations as new information becomes available.	Department of Public Works Department of Public Works	Updated map 100% complete by 2020. Updated map 100% complete by 2028.	**16, §6**	* *	* *	 *	 *	 *	 *	
IDDE Program	**3-4**	1. IDDE Plan, which includes: initial outfall inventory & ranking; outfall screening procedure; catchment investigation procedure; illicit discharge removal procedure; follow up ranking of outfalls and interconnections procedure.	Department of Public Works	Conduct 100% of outfall screening on High and Low Priority Outfalls within 3 years of the permit's effective date. Complete catchment investigations for 100% of the Problem Outfalls within 7 years of the permit's effective date. Complete 100% of all catchment investigations within 10 years of the permit's effective date.	**16, §6**	*	*	*	*	*	*	
Employee Training	**3-5**	1. Annual IDDE training of DPW personnel as required by MS4 Permit 2.3.4.11	Department of Public Works	Annual training will be completed by June 30 each year.	**16, §6**	*	*	*	*	*	*	
Outfall Ranking for Water Quality Limited Waters With Phosphorus Impairment	**3-6**	1. Rank outfalls to receiving waters with phosphorus impairment as high priority for IDDE implementation. Per by MS4 Permit requirement 2.3.4.7.a.iii	Department of Public Works	Conduct 100% of outfall screening on High and Low Priority Outfalls by June 30, 2021.	**17, §6**	*	*	*				

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
BMP Description	BMP ID	Implementation	Responsible Dept./Person	Measurable Goal	Report Page and Section	Year / Schedule 1 7/1/18-6/30/19	2 7/1/19-6/30/20	3 7/1/20-6/30/21	4 7/1/21-6/30/22	5 7/1/22-6/30/23	6+ 7/1/23-6/30/24
4. Construction Site Stormwater Runoff Control												
Sediment and Erosion Control Bylaw	**4-1**	1. Sediment and erosion control bylaw has been approved and can be found in the Town Code §204-1 E (2) Stormwater Management; NPDES Phase II permits.	Lunenburg Planning Board	Continue to enforce bylaw.	**18, §7**	*					
Site Plan Review Procedures	**4-2**	1. Site plan review procedures have been approved and can be found in the Town Code §204-1 Stormwater Management; Town Code §250 Zoning .	Lunenburg Planning Board	Continue to enforce bylaw. Conduct site plan review of 100% of projects according to the existing Town procedures.	**18, §7**	*					
Site Inspection and Enforcements of Sediment and Erosion Control Measures Procedures	**4-3**	1. Site inspection and sediment and erosion control procedures have been approved and can be found in the Town Code §204-1 Stormwater Management; NPDES Phase II permits.	Lunenburg Land Use Department	Inspect 100% of construction sites according to existing Town procedures and take enforcement actions as needed.	**18-19, §7**	*					
Construction Site Waste Control	**4-4**	1. Procedures for controlling construction site waste have been approved and can be found in the Town Code §204-2 Discharges to Municipal Storm Sewer System.	Lunenburg Land Use Department	Inspect 100% of construction sites to ensure that waste is controlled as described within Town bylaw. Take enforcement actions as needed.	**19, §7**	*					
5. Stormwater Management in New Development and Redevelopment												
Post-Construction Stormwater Management Bylaw	**5-1**	1. Post-construction stormwater management bylaw has been approved and can be found in the Town Code §204-1 Stormwater Management; NPDES Phase II permits.	Lunenburg Planning Board	Continue enforcing existing bylaw.	**20, §8**	*					
Street Design and Parking Lot Guidelines Report	**5-2**	1. Prepare report assessing requirements that affect the creation of impervious cover. This assessment will determine if design standards for streets and parking lots can be modified to support low impact design options. When completed, the report will be part of the Stormwater Management Plan.	Lunenburg Land Use Department, Department of Public Works	The report will be completed by June 2022 and shall include recommendations to incorporate policies and standards into Town documents and procedures, which can lessen impervious cover created by parking areas and streets.	**20, §8**	*	*	*	*		
Green Infrastructure Report	**5-3**	1. Prepare report assessing existing local regulations to determine the feasibility of making green infrastructure - such as green roofs, infiltration practices and water harvesting devices - allowable when appropriate site conditions exist.	Lunenburg Land Use Department, Department of Public Works	The report will be completed by June 2022 and shall determine barriers to green infrastructure, as well as changes that can be made in Town regulations to make the practices allowable.	**21, §8**	*	*	*	*		
List of Municipal Retrofit Opportunities	**5-4**	1. Identify a minimum of five town properties that can be retrofitted to reduce pollutant loads of discharges into and from MS4 infrastructure (including street right-of-ways, conventional conveyances, outfalls and controls). Evaluate and rank retrofits for control of stormwater discharges to first or second order streams, public swimming beaches, water supply sources, water quality limited waters and other critical areas.	Lunenburg Land Use Department	The priority ranking for BMP retrofits will be completed by June 2022 and will be updated annually to include retrofits implemented.	**21, §8**	*	*				
Stormwater Bylaw Performance Standards	**5-5**	1. Modify town bylaw §204-1 E (2) performance standards per new MS4 Permit provisions for new development and redevelopment BMPs. Include §204-1 D (7) requirement for submission of as-built plans; and §204-1 F requirement for O&M Plans as part of this Stormwater Management Program. Also require BMPs to be optimized for phosphorus removal including stormwater infiltration practices where feasible.	Lunenburg Land Use Department	Revise the bylaw standards for runoff volume and pollutant removal by June 2020.	**21-22, §8**	*	*				

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6+	
BMP Description	**BMP ID**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Page and Section**	**7/1/18-6/30/19**	**7/1/19-6/30/20**	**7/1/20-6/30/21**	**7/1/21-6/30/22**	**7/1/22-6/30/23**	**7/1/23-6/30/24**	
6. Good Housekeeping and Pollution Prevention												
Parks and Open Spaces Operation and Maintenance Procedures	**6-1**	1. Prepare written procedures (electronic and hard copy) for the operations and maintenance of town-owned parks and open space for inclusion into the Town Stormwater Management Program.	Department of Public Works, Parks Commission, Town Departments	Create electronic document by June 2020 and implement the procedures for 100% of town-owned parks and open spaces.	**23, §9**	*	*					
Buildings and Facilities Operations and Maintenance Procedures	**6-2**	1. Prepare written procedures for the operations and maintenance of town-owned buildings and facilities (town offices, parking, etc.) for inclusion into the Town Stormwater Management Program.	Department of Public Works, Town Departments	Create electronic document by June 2020 and implement the procedures for 100% of town-owned buildings and facilities.	**23, §9**	*	*					
Vehicles and Equipment Operations and Maintenance Procedures	**6-3**	1. Prepare written procedures for the operations and maintenance (O&M) of town-owned vehicles and equipment for inclusion into the Town Stormwater Management Program	Department of Public Works, Town Departments	Create electronic document by June 2020 and implement the procedures for 100% of town-owned vehicles and equipment.	**24, §9**	*	*					
Infrastructure Operations and Maintenance Procedures	**6-4**	1. Prepare written program of procedures to maintain MS4 infrastructure in a timely manner for inclusion into the Town Stormwater Management Program.	Department of Public Works	Create electronic document by June 2020 and implement the procedures for 100% of town-owned MS4 infrastructure.	**24, §9**	*	*					
Catch Basin Cleaning Program	**6-5**	1. Prepare written program to optimize routine inspections, cleaning and maintenance of town-owned catch basins for inclusion into the Town Stormwater Management Program.	Department of Public Works	Create electronic document by June 2019 and implement the procedures for 100% of town-owned MS4 infrastructure.	**24, §9**	*						
Street Sweeping Program	**6-6**	1. Develop and implement sweeping procedures for town-owned streets and parking lots in accordance with Permit conditions, and maintain a town log of street and parking sweeping activities.	Department of Public Works	All town-owned parking lots and streets, except rural uncurbed roads, will be swept twice per year. Written procedure will be completed by June 2019.	**25, §9**	*						
Winter Road Maintenance Program	**6-7**	1. Prepare written program for winter road maintenance including procedures for the use and storage of sand and salt, reduction of salt application and evaluation of alternatives, and for Town snow disposal activities.	Department of Public Works	Written procedures will be completed by June 2019.	**25, §9**	*						
Stormwater Treatment Structures Inspection and Maintenance Procedures	**6-8**	1. Prepare and implement procedures for the annual inspection and maintenance of town-owned stormwater treatment structures including water quality swales, retention/detention basins, infiltration structures and proprietary devices.	Department of Public Works	Inspect and maintain 100% of town-owned stormwater treatment structures to ensure proper function. Written procedures will be completed by June 2019.	**25, §9**	*						
Stormwater Pollution Prevention Plan	**6-9**	1. Prepare a SWPPP for each Town operated public works yard and other waste handling facilities that are exposed to stormwater.	Department of Public Works	Develop and implement SWPPPs for 100% of Town operated facilities. Written SWPPPs will be completed by June 2020.	**26, §9**	*	*					
Phosphorus Source Identification Report	**6-10**	1. Prepare a Phosphorus Source Identification Report per requirements in Part II of Appendix H for the MS4 Permit. This report will include MS4 catchment delineations, outfall screening and monitoring results, impervious area for target catchments, and prioritize potential catchments with high phosphorus loading.	Department of Public Works	Identify retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment, including the removal of impervious area. The phosphorus source identification report shall be submitted to EPA as part of the Permit Year 4 annual report.	**26, §9**	*	*	*	*			
Phosphorus Source Structural BMP Listing	**6-11**	1. Evaluate town-owned properties identified by Phosphorus Source Identification Report for retrofit opportunities per requirements in Part II of Appendix H for the MS4 Permit.	Department of Public Works	At least one structural BMP will be identified as a demonstration project for a catchment with high phosphorus load potential. The listing and schedule of planned structural BMPs shall be submitted to EPA as part of Permit Year 5 annual report.	**26-27, §9**	*	*	*	*	*	*	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities

BMP Description	BMP ID	Implementation	Responsible Dept./Person	Measurable Goal	Report Page and Section	Year / Schedule 1 (7/1/18-6/30/19)	2 (7/1/19-6/30/20)	3 (7/1/20-6/30/21)	4 (7/1/21-6/30/22)	5 (7/1/22-6/30/23)	6+ (7/1/23-6/30/24)
7. TMDL and Impaired Waters Controls											
Discharges to Water Quality Limited Waterbodies - Phosphorus (Nashua River)		1. Enhanced BMPs - Public Education. Include proper fertilizer use and proper disposal of grass clippings with the Residential and Commercial public education programs.	Stormwater Task Force	Fact sheets to be posted on Town website with relevant information in the Spring and Fall.	**29-30, §11**	*	*	*	*	*	*
		2. Enhanced BMPs - Illicit Discharge, Detection, and Elimination. Designate catchment draining to phosphorus impaired waters as "Problem Catchments" or "High" priority catchments in IDDE ranking.		Complete initial ranking within 1 year of the effective date of the permit	**30, §11**	*					
		3. Enhanced BMPs - Consider BMPs to reduce phosphorus discharges when identifying MS4 properties for retrofits.		Retrofit inventory and priority ranking under shall include consideration of BMPs to reduce phosphorus discharges.	**30, §11**	*					
		4. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Increase street sweeping to twice per year (spring and fall) for catchment areas that discharge to the Nashua River.		Sweep all streets and parking lots within the Nashua River watersheds twice per year.	**30, §11**	*	*	*	*	*	*
		5. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Incorporate phosphorus reduction practices into Town good housekeeping practices such as fertilizer use and managing grass cuttings and leaf litter.		Establish and enforce procedures within 1 year of the permit effective date.	**30, §11**	*					
		6. Track any structural BMPs already existing or installed in the regulated area by the permittee or its agents, including type, total area treated, design storage volume and estimated phosphorus removal and report annually to EPA and MassDEP.		BMP tracking and updates shall occur yearly at a minimum.	**30-31, §11**	*	*	*	*	*	*
		7. Enhanced BMPs - Stormwater Management in New Development and Redevelopment. Include a requirement in the regulatory mechanism that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal.		Continue enforcing existing bylaw and implement phosphorus removal requirement within 2 years of the effective date of the permit.	**31, §11**	*	*				
		8. Enhanced BMPs - Consider BMPs to reduce phosphorus discharges, such as infiltration BMPs, when identifying MS4 properties for retrofits.		Evaluate stormwater BMPs for phosphorus removal during facility inventory within 2 years of the effective date of the permit	**31, §11**	*	*				
		9. Prepare a Phosphorus Source Identification Report to identify, delineate, and prioritize catchments with high phosphorus loading and identify potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment.		Complete Phosphorus Source Identification Report within 4 years of the effective date of the permit.	**31, §11**			*	*		
Discharges to Water Quality Limited Waterbodies - Bacteria (Nashua River)		1. Enhanced BMPs - Public Education. Include management of pet waste with the Residential and Commercial public education programs.	Stormwater Task Force	Fact sheets to be posted on Town website with relevant information in the Summer.	**29-30, §11**	*	*	*	*	*	*
		2. Enhanced BMPs - Illicit Discharge, Detection, and Elimination. Designate catchment draining to bacteria impaired waters as "Problem Catchments" or "High" priority catchments in IDDE ranking.		Complete initial ranking within 1 year of the effective date of the permit	**30, §11**	*					
Discharges to Water Quality Limited Waterbodies - Turbidity (Lake Shirley)		1. Enhanced BMPs - Illicit Discharge, Detection, and Elimination. Designate catchment draining to turbidity impaired waters as "Problem Catchments" or "High" priority catchments in IDDE ranking.	Stormwater Task Force	Complete initial ranking within 1 year of the effective date of the permit	**31, §11**	*					
		2. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Increase street sweeping for areas with higher pollutant loads.		Increase street sweeping if needed.	**31-32, §11**	*	*	*	*	*	*
		3. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Increase catch basin cleaning if inspections indicate that more frequent cleaning is necessary.		Increase catch basin cleaning if needed.		*	*	*	*	*	*
		4. Enhanced BMPs - Stormwater Management in New Development and Redevelopment. Mandate that designs of stormwater systems on commercial and industrial land uses allow for spill containment.		Adopt new design guidelines for commercial and industrial construction.	**32, §11**		*	*	*		



Legend

- Urbanized Area
- Roads
- Pond, Reservoir
- Wetland, Marsh
- Stream, Brook

N
W E
S

0 1

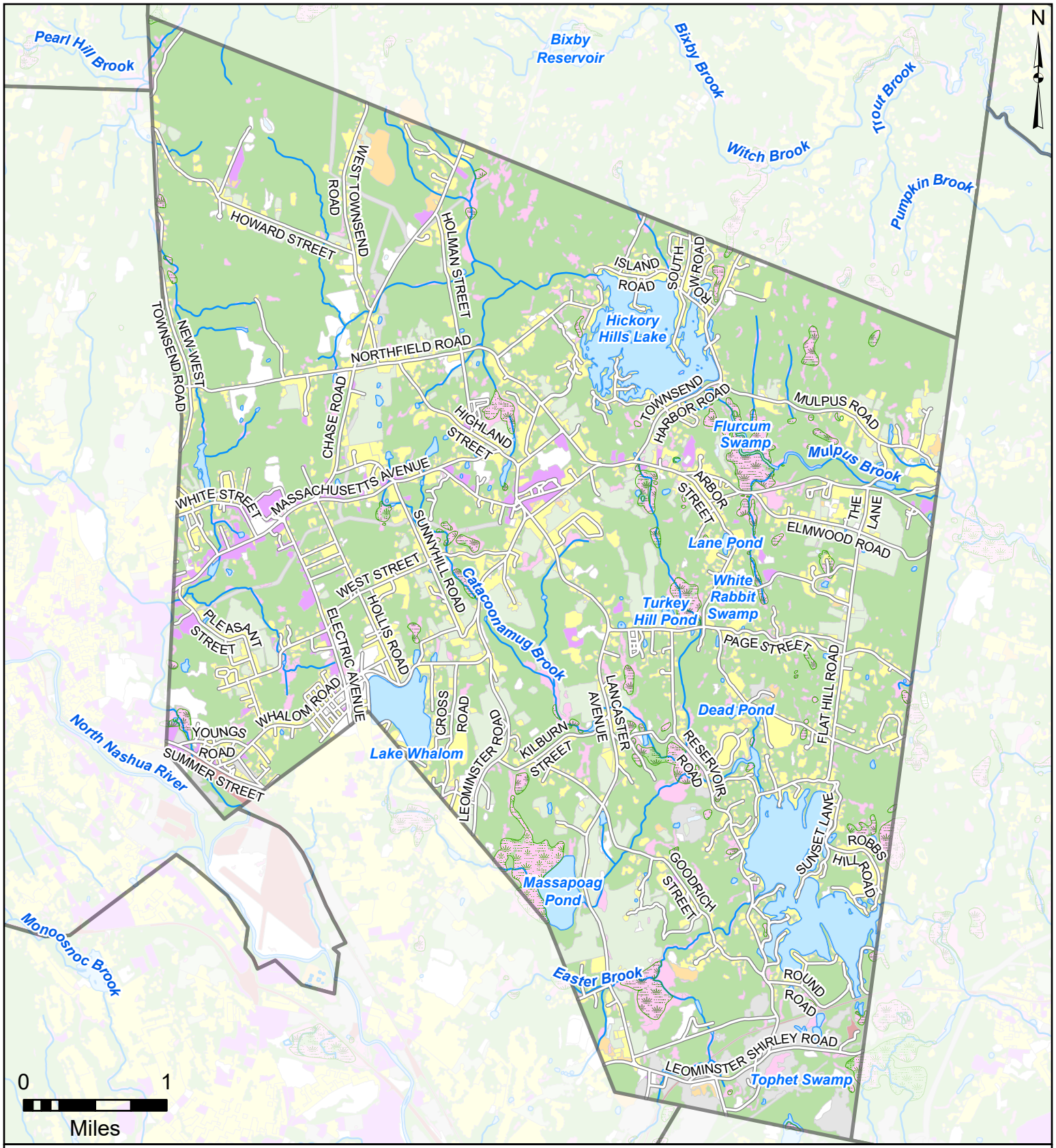
Miles

Figure 1-1
Urbanized Area
Lunenburg, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Lunenburg

2/9/2021



Legend

Land Use:
- Industrial
- Transportation
- Residential
- Commercial
- Agriculture
- Forest
- Water
- Wetland
- Disturbed Land
- Other Cleared Land

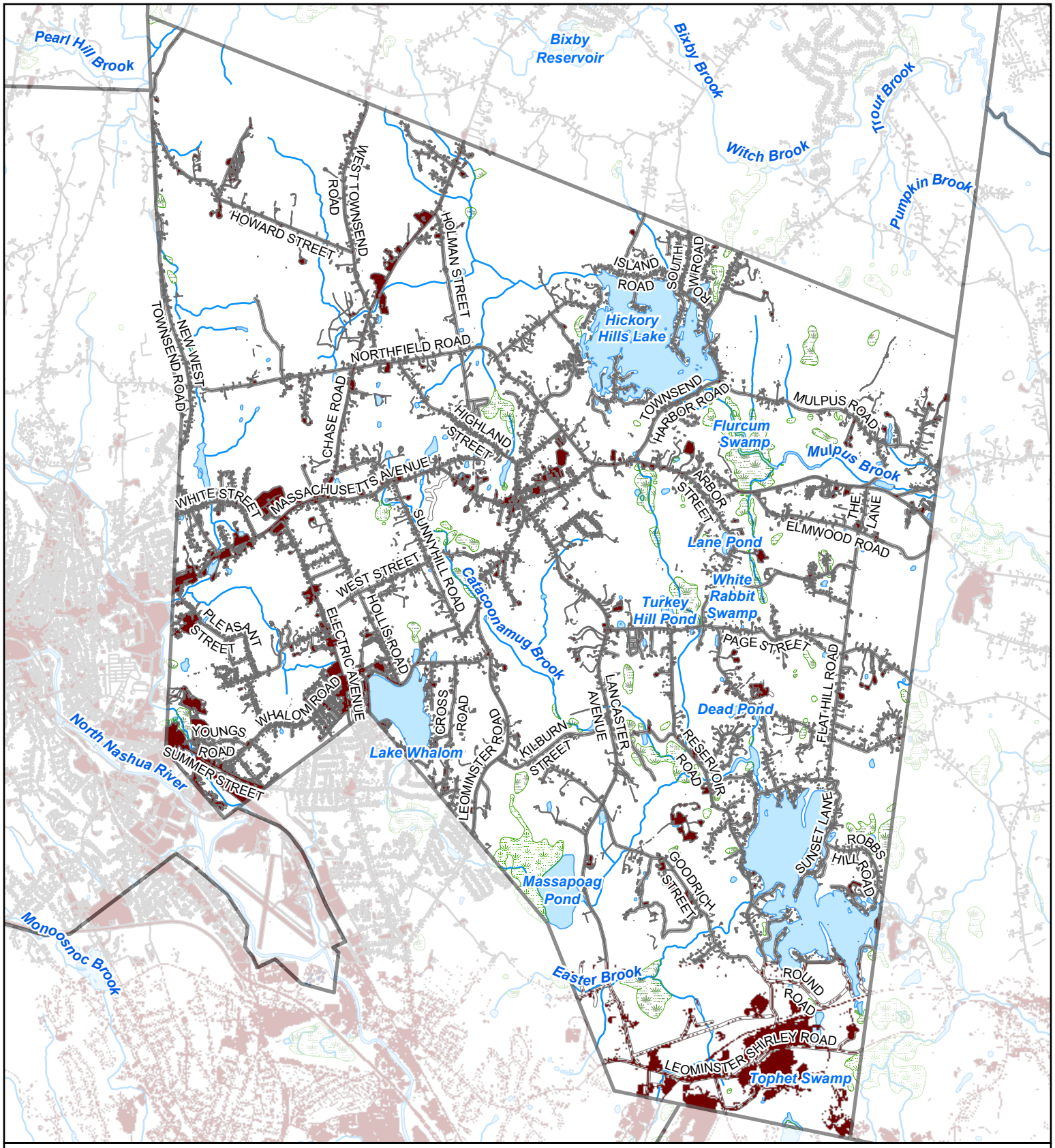
- Roads
- Pond, Reservoir
- Wetland, Marsh
- Stream, Brook

Figure 2-1
Land Use
Lunenburg, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Lunenburg

2/9/2021



Legend

- Impervious Surface
- Roads
- Pond, Reservoir
- Wetland, Marsh
- Stream, Brook

N
W E
S

0 1

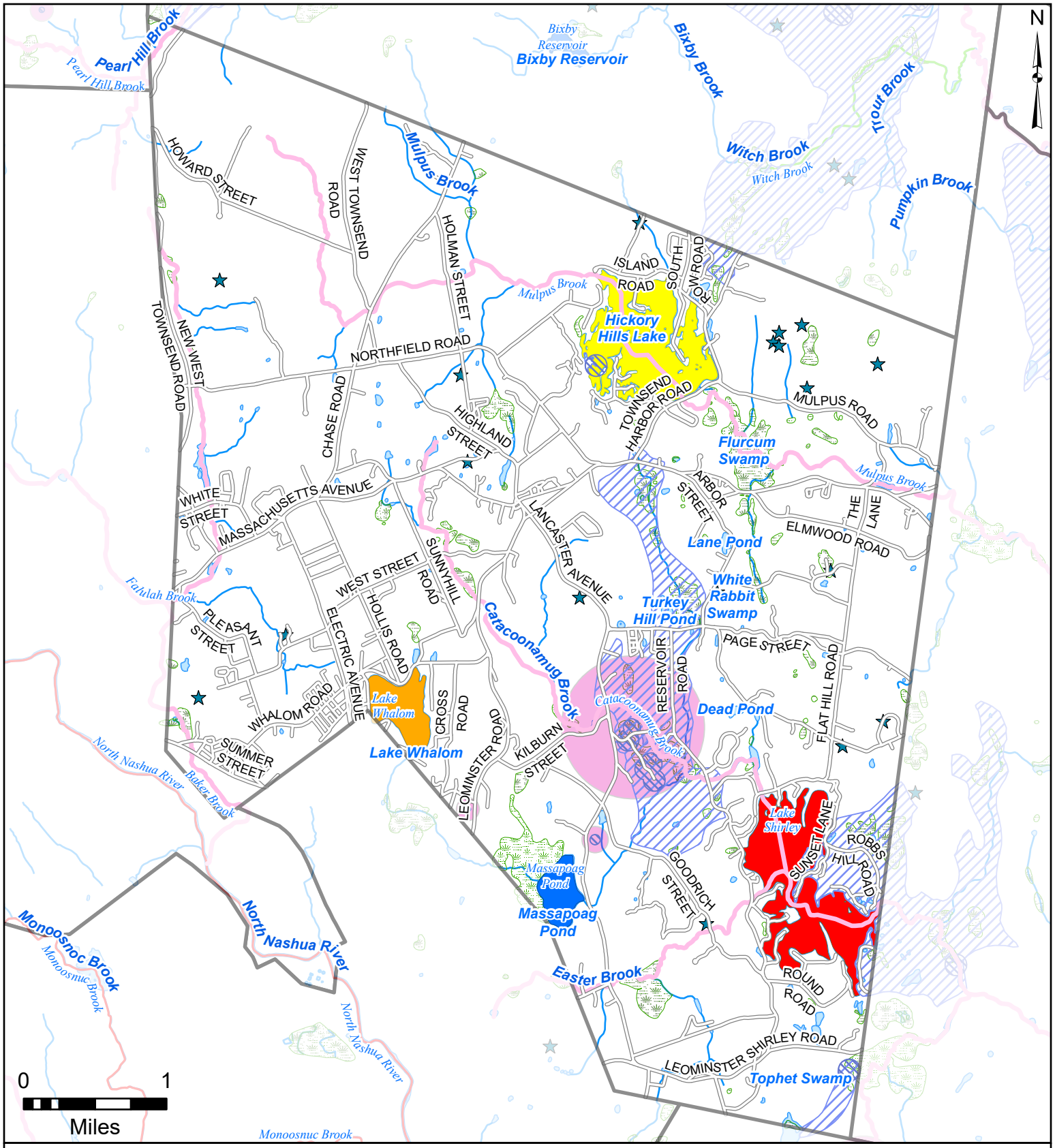
Miles

Figure 2-2
Impervious Area
Lunenburg, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Lunenburg

2/9/2021



Legend

- Roads
- Certified Vernal Pool
- MA DFW Coldwater Fisheries
- MassDEP Zone I
- MassDEP Zone II
- MassDEP IWPA

Category

- Category 2
- Category 3
- Category 4A
- Category 4C
- Category 5

- Category 3
- Category 4A
- Category 4C
- Category 5
- Pond, Reservoir
- Wetland, Marsh
- Stream, Brook
- Category 2

Figure 2-3
Resource Waters
Lunenburg, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Lunenburg

2/9/2021

Appendix A

Notice of Intent and Authorization to Discharge

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

RECEIVED
SEP 26 2018

Part I: General Conditions

General Information

Name of Municipality or Organization: Lunenburg

State: MA

EPA NPDES Permit Number (if applicable): MAR041206

Primary MS4 Program Manager Contact Information

Name: Lemieux, Heather

Title: Town Manager

Street Address Line 1: Town Hall

Street Address Line 2: P.O. Box 135

City: Lunenburg

State: MA

Zip Code: 01462

Email: hlemieux@lunenburgonline.com

Phone Number: (978) 582-4130

Fax Number:

Other Information

Stormwater Management Program (SWMP) Location (web address or physical location, if already completed): Lunenburg Land Use Department

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: https://www.axisgis.com/LunenburgMA/

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)*: Yes

Effective Date or Estimated Date of Adoption (MM/DD/YY): 12/05/07

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): 12/05/07

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): 12/05/07

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
Pearl Hill Brook and Wetlands	48	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Baker Brook	11	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Brook And Wetlands Tributary to Pearl Hill Brook	16	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Brook Crossing Northfield Road	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Mulpus Brook	32	☐	☐	☐	☐	☐	☐	☐	☐	☐	Cat 3 above Hickory Hills, Cat 5 Below Hickory Hills (lacck of cold water assemblage)
Tributary to Mulpus Brook	7	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Hickory Hills Lake (Dickenson Reservoir)	23	☐	☐	☐	☐	☐	☐	☐	☐	☐	Mercury in Fish Tissue (TMDL) Cat 4a
Wetlands Bordering Dickenson Reservoir	14	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Turkey Hill Pond Wetlands	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Lake Shirley	27	☐	☐	☒	☐	☐	☐	☒	☐	☐	Excess Algal Growth, Eurasian Water Milfoil, Myriophyllum spicatum*, non native aquatic plants,Excess Algal Growth, Mercury in Fish Tissue (TMDL) Cat 5
Lake Shirley Wetlands	13	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Easter Brook	12	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Whalom Lake and its Wetlands	23	☐	☐	☐	☐	☐	☐	☐	☐	☐	Eurasian Water Milfoil, Myriophyllum spicatum*, non native aquatic plants Cat 4c
Massapoag Pond	3	☐	☐	☐	☐	☐	☐	☐	☐	☐	Cat 3
Catacoonamug Brook	15	☐	☐	☐	☐	☐	☐	☐	☐	☐	Cat 2
Catacoomamug Brook Wetlands and Tribs	8	☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	

Click to lengthen table

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

Part III: Stormwater Management Program Summary

Identify the Best Management Practices (BMPs) that will be employed to address each of the six Minimum Control Measures (MCMs). For municipalities/organizations whose MS4 discharges into a receiving water with an approved Total Maximum Daily Load (TMDL) and an applicable waste load allocation (WLA), identify any additional BMPs employed to specifically support the achievement of the WLA in the TMDL section at the end of part III.

For each MCM, list each existing or proposed BMP by category and provide a brief description, responsible parties/departments, measurable goals, and the year the BMP will be employed (public education and outreach BMPs also requires a target audience). **Use the drop-down menus in each table or enter your own text to override the drop down menu.**

MCM 1: Public Education and Outreach

BMP Media/Category (enter your own text to override the drop down menu)	**BMP Description**	**Targeted Audience**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal**	**Beginning Year of BMP Implementation**
Brochures/Pamphlets	Mail flyer with bill.	Residents	Stormwater Task Force	Survey Monkey (2018 / 2021) to measure effectiviness of messaging.	2018
Web Page	Brochures	Businesses, Institutions and Commercial Facilities	Stormwater Task Force	"	2020
Brochures/Pamphlets	Email Fact Sheet	Developers (construction)	Land Use Department	"	2019
Brochures/Pamphlets	Email Fact Sheet	Industrial Facilities	Stormwater Task Force / Assesor	"	2018
Displays/Posters/Kiosks	Display at Library	Residents	Stormwater Task Force	"	2022
Local Public Service Announcements	Cable Access TV	Businesses, Institutions and Commercial Facilities	Stormwater Task Force	"	2023
Brochures/Pamphlets	Email Fact Sheet	Developers (construction)	Land Use Department	"	2022
Brochures/Pamphlets	Email Fact Sheet	Industrial Facilities	Stormwater Task Force Assesor	"	2021

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	Stormwater Task Force	Allow annual review of stormwater management plan and posting of stormwater management plan on website	2019
Public Participation	Stormwater Committee/Task Force - Maintain Stormwater Task Force	Board of Selectmen	Allow public to comment on stormwater management plan annually	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	DPW Operations	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	DPW Operations	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 Operations	Complete 10 years after effective date of permit	2018
Employee training	Train employees on IDDE implementation	DPW Operations	Train annually	2018
Conduct dry weather screening	Conduct in accordance with outfall screening procedure and permit conditions	DPW Operations	Complete 3 years after effective date of permit	2020
Conduct wet weather screening	Conduct in accordance with outfall screening procedure	DPW Operations	Complete 10 years after effective date of permit	2023
Ongoing screening	Conduct dry weather and wet weather screening (as necessary)	DPW Operations	Complete ongoing outfall screening upon completion of IDDE program	2023

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 Imple-mentation**
Site inspection and enforcement of Erosion and Sediment Control (ESC) measures	Complete written procedures of site inspections and enforcement procedures	Land Use Department	Complete within 1 year of the effective date of permit	2018
Site plan review	Complete written procedures of site plan review and begin implementation	Land Use Department	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	Land Use Department	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	Land Use Department	Complete within 1 year of the effective date of permit	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 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	Land Use Department and Conservation Commission	Require submission of as-built plans for completed projects	2018
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	Stormwater Task Force	Complete 4 years after effective date of permit and report annually on retrofitted properties	2021
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	Land Use Department / Stormwater Task Force	Complete 4 years after effective date of permit and implement recommendations of report	2020
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.	Land Use Department and DPW	Complete 4 years after effective date of permit and implement recommendations of report	2021

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	Land Use Department	Complete 2 years after effective date of permit	2019

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	DPW Operations / Town Departments	Complete and implement 2 years after effective date of permit	2018
Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Create inventory	Stormwater Task Force / Town Departments	Complete 2 years after effective date of permit and implement annually	2019
Infrastructure O&M	Establish and implement program for repair and rehabilitation of MS4 infrastructure	DPW Operations	Complete 2 years after effective date of permit	2018
Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPPs for maintenance garages, transfer stations, and other waste-handling facilities	DPW Operations	Complete and implement 2 years after effective date of permit	2018
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 maintenance of stormwater treatment structures	Establish and implement inspection and maintenance procedures and frequencies	DPW Operations	Inspect and maintain treatment structures at least annually	2019
Phosphorus Source Identification Report: Appendix H	Delineate catchments & opportunities for BMP retrofits	DPW Operations	Delineate catchments & opportunities for BMP retrofits	2021

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)
Phosphorus	MA81-05 Nashua River	Adhere to requirements in part II of Appendix H	Stormwater Task Force

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.

Click to add text

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

Part V: Certification

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

Name: Heather Lemieux

Title: Town Manager

Signature: Heather Lemieux

Date: 9/24/2018

[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

TOWN OF LUNENBURG
TOWN MANAGER

17 Main Street
P. O. Box 135
Lunenburg, MA 01462
Phone 978-582-4144
Fax 978-582-4175

April 2, 2019

Ms. Michelle Vuto
Stormwater & Construction Permits
U.S. EPA Region 1
5 Post Office Square-OEP06-4
Boston, MA 02109-3912

Re: Lunenburg MS4 NOI Submission
MAR041206

Dear Ms. Vuto:

In response to your March 29, 2019 email, the Town of Lunenburg offers the following clarifications to the Town's Notice of Intent:

- Any planned discharge activities will not adversely affect the endangered species present.
- Part V of Appendix H for turbidity for Lake Shirely will be followed.

We trust that these statements satisfy EPAs requirements. Please do not hesitate to contact us at any time.

Sincerely,

Heather Lemieux

Heather Lemieux
Town Manager

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

IPaC Record Locator: 746-17226871 June 27, 2019

Subject: Consistency letter for the 'Town of Lunenburg, MA' project indicating that any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Dear Michael Clark:

The U.S. Fish and Wildlife Service (Service) received on June 27, 2019 your effects determination for the 'Town of Lunenburg, MA' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. You indicated that no Federal agencies are involved in funding or authorizing this Action. This IPaC key assists users in determining whether a non-Federal action may cause "take"[1] of the northern long-eared bat that is prohibited under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Please report to our office any changes to the information about the Action that you entered into IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation.

If your Action proceeds as described and no additional information about the Action's effects on species protected under the ESA becomes available, no further coordination with the Service is required with respect to the northern long-eared bat.

---

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Town of Lunenburg, MA

2. Description

The following description was provided for the project 'Town of Lunenburg, MA':

> Determining requirements for the ESA criteria for the Town,s submittal of a NOI under the 2017 EPA NPDES MS4 Permit

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.587743595087744N71.72129091658479W

Determination Key Result

This non-Federal Action may affect the northern long-eared bat; however, any take of this species that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o).

Determination Key Description: Northern Long-eared Bat 4(d) Rule
This key was last updated in IPaC on **May 15, 2017**. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for non-Federal actions is to assist determinations as to whether proposed actions are excepted from take prohibitions under the northern long-eared bat 4(d) rule.

If a non-Federal action may cause prohibited take of northern long-eared bats or other ESA-listed animal species, we recommend that you coordinate with the Service.

Determination Key Result

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   No

2. Will your activity purposefully **Take** northern long-eared bats?

   No

3. Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

4. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

   Yes

5. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

6. Will the action involve Tree Removal?

   No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

0

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?
0

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

VIA EMAIL

June 4, 2019

Heather Lemieux
Town Manager

And;

Heather Lemieux
Town Manager
Town Hall
P.O. Box 135
Lunenburg, MA. 01462
hlemieux@lunenburgonline.com

Re: National Pollutant Discharge Elimination System Permit ID #: MAR041206, Town of Lunenburg

Dear Heather Lemieux:

The 2016 NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (MS4 General Permit) is a jointly issued EPA-MassDEP permit. Your Notice of Intent (NOI) for coverage under this MS4 General Permit has been reviewed by EPA and appears to be complete. You are hereby granted authorization by EPA and MassDEP to discharge stormwater from your MS4 in accordance with the applicable terms and conditions of the MS4 General Permit, including all relevant and applicable Appendices. This authorization to discharge expires at midnight on **June 30, 2022.**

For those permittees that certified Endangered Species Act eligibility under Criterion C in their NOI, this authorization letter also serves as EPA's concurrence with your determination that your discharges will have no effect on the listed species present in your action area, based on the information provided in your NOI.

As a reminder, your first annual report is due by **September 30, 2019** for the reporting period from May 1, 2018 through June 30, 2019.

Information about the permit and available resources can be found on our website: https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit. Should you have any questions regarding this permit please contact Newton Tedder at tedder.newton@epa.gov or (617) 918-1038.

Sincerely,

Thelma Murphy, Chief
Stormwater and Construction Permits Section
Office of Ecosystem Protection
United States Environmental Protection Agency, Region 1

and;

Lealdon Langley, Director
Wetlands and Wastewater Program
Bureau of Water Resources
Massachusetts Department of Environmental Protection

Appendix B

Stormwater Bylaw

Chapter 204

STORMWATER AND STORM SEWERS

§ 204-1. Stormwater management; NPDES Phase II permits. [Amended 11-17-2020 STM by Art. 20]

A. Purpose and intent.

(1) Regulation of discharges to the municipal separate storm sewer system (MS4) is necessary for the protection of the Town of Lunenburg's water bodies and groundwater, and to safeguard the public health, safety, welfare and the environment. Increased and contaminated stormwater runoff associated with developed land uses and the accompanying increase in impervious surface are major causes of impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands, and groundwater which result in the contamination of drinking water supplies; erosion of stream channels; alteration or destruction of aquatic and wildlife habitat; and flooding. This bylaw establishes minimum stormwater management standards for the final conditions that result from development and redevelopment projects to minimize adverse impacts off-site and downstream which would be borne by abutters, townspeople and the general public.

(2) This regulation requires local review and approval of a stormwater management plan for all development and redevelopment projects that disturb one acre or more. In addition to these regulations, the owner and/or developer is also obligated to meet the requirements of the Federal Environmental Protection Agency's (EPA) regulations for stormwater management.

B. The following definitions shall apply in the interpretation and implementation of this Bylaw. Additional definitions may be adopted by separate regulation:

ACRE — Forty-three thousand, five-hundred and sixty square feet (43,560 sq. ft.).

AGRICULTURAL USE — The normal maintenance or improvement of land in agricultural or aquacultural use, as defined by the Massachusetts Wetlands Protection Act, M.G.L. c. 131, § 40, and its implementing regulations.

ALTER — Any activity, which will measurably change the ability of a ground surface area to absorb water or will change existing surface drainage patterns. Alter may be similarly represented as "alteration of drainage characteristics," and "conducting land disturbance activities."

APPLICANT — Any person, individual, partnership, association, firm, company, corporation, trust, authority, agency, department, or political subdivision, of the Commonwealth of Massachusetts or the federal

government to the extent permitted by law requesting a Stormwater Management Permit for proposed land-disturbance activity.

BEST MANAGEMENT PRACTICE (BMP) — Structural, non-structural and managerial techniques that are recognized to be the most effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and nonpoint source pollution, and promote stormwater quality and protection of the environment. "Structural" BMPs are devices that are engineered and constructed to provide temporary storage and treatment of stormwater runoff. "Nonstructural" BMPs use natural measures to reduce pollution levels, do not require extensive construction efforts, and/or promote pollutant reduction by eliminating the pollutant source.

BETTER SITE DESIGN — Site design approaches and techniques that can reduce a site's impact on the watershed through the use of nonstructural stormwater management practices. Better site design includes conserving and protecting natural areas and greenspace, reducing impervious cover, and using natural features for stormwater management.

CERTIFICATE OF COMPLETION — Document issued by the Town of Lunenburg Planning Board, its employees, or authorized agents upon receipt of a final inspection report and acknowledgement that all conditions of the Stormwater Management Permit have been satisfactorily completed.

ENFORCEMENT ORDER — A written order issued by the Town of Lunenburg to enforce the provisions of this Article.

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 Town of Lunenburg, MA.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT — A permit issued by the EPA or jointly with the Commonwealth of Massachusetts that authorizes the discharge of stormwater to waters of the Unites States.

NEW DEVELOPMENT — Any construction, land alteration, or addition of impervious surfaces on previously undeveloped sites resulting in a total disturbance of land 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 Redevelopment.

NONPOINT SOURCE POLLUTION — Pollution from many diffuse sources caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and

human-made pollutants, finally depositing them into water resource areas.

OWNER — A person with a legal or equitable interest in property.

PERSON — Any individual, group of individuals, association, partnership, corporation, company, business organization, trust, estate, the Commonwealth or political subdivision thereof to the extent subject to Town Bylaws, administrative agency, public or quasi-public corporation or body, the Town of Lunenburg and any other legal entity, its legal representatives, agents, or assigns.

POST-DEVELOPMENT — The conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site or tract of land. Post-development refers to the phase of a new development or redevelopment project after completion, and does not refer to the construction phase of a project.

PRE-DEVELOPMENT — The conditions that exist at the time that plans for the land development of a tract of land are submitted to the Lunenburg Conservation Commission or Planning Board. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first plan submission shall establish predevelopment conditions.

RECHARGE — The replenishment of underground water reserves.

REDEVELOPMENT — Development, rehabilitation, expansion, demolition, or phased projects that disturb the ground surface or increase the impervious area on previously developed sites. Any construction, land alteration, or improvement of impervious surfaces resulting in total disturbance of land equal to or greater than 1 acre (or activities that are part of a larger common plan of redevelopment disturbing greater than 1 acre) that does not meet the definition of New Development.

STORMWATER AUTHORITY — The Town of Lunenburg Planning Board or its authorized agent(s). The Planning Board is responsible for coordinating the review, approval and permit process as defined in this Bylaw.

STORMWATER MANAGEMENT PERMIT (SMP) — A permit issued by the Planning Board after review of an application, plans, calculations, and other supporting documents, which is designed to protect the environment of the Town from the deleterious effects of uncontrolled and untreated stormwater runoff.

WATERS OF THE COMMONWEALTH — All waters within the jurisdiction of the Commonwealth of Massachusetts, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, groundwaters, and vernal pools.

WETLAND RESOURCE AREAS — Areas specified in the Massachusetts Wetlands Protection Act Regulations, 310 CMR 10.00, as amended,

and in the Town of Lunenburg Article XXI General Wetlands Protection Bylaw, as amended.

C. The objectives of this bylaw are:

(1) To require practices to control the flow of stormwater from new and redeveloped sites to the Town's storm drainage system in order to prevent flooding and erosion;

(2) To protect groundwater and surface water from degradation;

(3) To promote groundwater recharge;

(4) To prevent pollutants from entering the Town's municipal separate storm sewer system (MS4) and to minimize discharge of pollutants from the MS4;

(5) To ensure adequate long-term operation and maintenance of structural stormwater best management practices so that they work as designed;

(6) To comply with state and federal statutes and regulations relating to stormwater discharges;

(7) To establish Lunenburg's legal authority to ensure compliance with the provisions of this bylaw through inspection, monitoring, and enforcement.

(8) Establish regulations of land development activities that preserve the health of water resources.

(9) Require that the amount and quality of stormwater runoff from new development is equal to or better than pre-development conditions in order to reduce flooding, stream erosion, pollution, property damage and harm to aquatic life.

(10) Establish stormwater management standards and design criteria to control the quality and quantity of stormwater runoff.

(11) Encourage the use of low-impact development practices, such as reducing impervious cover and preserving greenspace and other natural areas.

D. Applicability. No person may undertake a construction activity following the effective date of this Bylaw, including clearing, grading and excavation that results in a land disturbance that will disturb equal to or greater than one acre of land or will disturb less than one acre of land but part of a larger common plan of development or sale that will ultimately disturb equal to or greater than one acre of land without a permit from the permit granting authority. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity or the original purpose of the site. Construction activities that are exempt are:

(1) Normal maintenance and improvement of land in agricultural use as defined by the Wetlands Protection Act regulation, 310 CMR 10.04;

(2) Maintenance of existing landscaping, gardens or lawn areas associated with a single-family dwelling;

(3) The construction of fencing that will not substantially alter existing terrain or drainage patterns;

(4) Construction of utilities other than drainage (gas, water, electric, telephone, etc.) which will not alter terrain or drainage patterns;

E. Permits and procedures.

(1) The permit granting authority (PGA) under this bylaw shall be the Lunenburg Planning Board. Such permit shall be granted if the PGA determines, in conjunction with the Conservation Commission, Department of Public Works, Board of Health and Building Commissioner, that the intent of this bylaw, as well as specific criteria, are met. The PGA shall not grant a special permit under this section unless the petitioner's application materials include, in the PGA's opinion, sufficiently detailed, definite, and credible information to support positive findings in relation to the standards given in this section. The PGA shall document the basis for any departures from the recommendations of the other Town boards or departments in its decision.

(2) The site owner or his agent shall file with the PGA 13 copies of a completed application package for a stormwater management permit (SMP). Permit issuance is required prior to any site-altering activity. While the applicant can be a representative, the permittee must be the owner of the site. The SMP application package shall include:

(a) A completed application form with original signatures of all owners;

(b) Thirteen copies of the stormwater management plan and project description as specified in Section F of this Bylaw;

(c) Thirteen copies of the erosion and sediment control plan as required by Section G of this Bylaw;

(d) Thirteen copies of the operation and maintenance plan as required by Section H of this Bylaw.

(e) Payment of the application and review fees.

(f) A Certified List of Abutters within 300 feet of the property boundaries, obtained from the Assessor's Office, along with 2 stamped envelopes for each unique abutter contained in the

list. Abutters located in other communities and within 300 feet of the property boundaries must also be included.

(g) A PDF file or files containing all application materials and plans emailed to the Planning Board Office.

(3) Entry. Filing and application for a permit grants the PGA, or its agent, permission to enter the site to verify the information in the application and to inspect for compliance with the resulting permit.

(4) Other boards. The PGA shall give one copy of the application package to the designated technical reviewers, which include the Conservation Commission, Department of Public Works, and Building Commissioner, for the purpose of reviewing the permit application. The PGA may also engage the services of a peer review engineer at its discretion.

(5) Fee structure. The PGA shall obtain with each submission an application fee established by the PGA. To assist the PGA in its review of plans during the Permit approval process, the PGA, at its discretion may hire an engineer or other qualified professional to act as a consultant to the Board. The cost of these consultant services shall be paid by the Applicant and the PGA will not sign any Permit decision until all consulting fees are paid in full. Applicants must pay the following fees before the permitting process may begin:

(a) Application Fee $100/Acre rounded up to the nearest acre (Maximum fee is $1,000).

(b) Application fee for an amendment $100.

(c) Fees for a professional peer review Assessed on a case by case basis.

(6) Actions. The PGA's action, rendered in writing, shall consist of either:

(a) Approval of the stormwater management permit application based upon determination that the proposed plan meets the standards in Subsection F(2) and will adequately protect the water resources of the community and is in compliance with the requirements set forth in this bylaw;

(b) Approval of the stormwater management permit application subject to any conditions, modifications or restrictions required by the SPGA which will ensure that the project meets the standards in Subsection F(2) and adequately protects water resources, as set forth in this bylaw;

(c) Disapproval of the stormwater management permit application based upon a determination that the proposed plan, as

submitted, does not meet the standards in Subsection F(2) or adequately protect water resources, as set forth in this bylaw.

(7) Project completion. At completion of the project, the permittee shall submit as-built record drawings of all structural stormwater controls and treatment best management practices required for the site. The as-built drawing shall show deviations from the approved plans, if any, and be certified by a registered professional engineer.

F. Contents of stormwater management plan.

(1) Application. The stormwater management plan shall contain sufficient information for the PGA to evaluate the environmental impact, effectiveness, and acceptability of the measures proposed by the applicant for reducing adverse impacts from stormwater. The plan shall be designed to meet the stormwater management standards as set forth in Subsection F(2) below and the current edition of the Department of Environmental Protection guidelines and policies. The plan shall be designed to also meet the policy standards of the PGA. The stormwater management plan shall fully describe the project in drawings, and narrative. It shall include, at a minimum:

(a) Names, addresses, and telephone numbers of the owner, applicant, and person(s) or firm(s) preparing the plan;

(b) Locus map;

(c) The existing zoning, and land use at the site;

(d) The proposed land use;

(e) The location(s) of existing and proposed easements;

(f) The location of existing and proposed utilities;

(g) The site's existing and proposed topography, with contours at one or two-foot intervals and additional spot grades as needed to depict detailed drainage patterns;

(h) The existing site hydrology (both groundwater recharge and surface runoff);

(i) A description and delineation of existing stormwater conveyances, impoundments, wetlands drinking water resource areas, sewage disposal systems, swimming beaches, or other critical environmental resource areas, on or adjacent to the site or into which stormwater flows;

(j) Description of subsurface conditions in areas to be used for stormwater retention, detention, or infiltration;

(k) A delineation of one-hundred-year floodplains, if applicable;

(l) Estimated high groundwater elevation in areas to be used for stormwater retention, detention, or infiltration, determined as outlined in 310 CMR 15.103;

(m) The existing and proposed vegetation and ground surfaces, with runoff coefficient for each;

(n) A drainage area map showing pre- and post-construction watershed boundaries, drainage area and stormwater flow paths;

(o) A description and drawings of all components of the proposed drainage system, including:

[1] Locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization;

[2] All measures for the detention, retention, or infiltration of water;

[3] All measures for the protection of water quality;

[4] The structural details for all components of the proposed drainage systems and stormwater management facilities;

[5] Notes on drawings specifying materials to be used, construction specifications, and typicals; and

[6] Analysis of existing and proposed hydrology with supporting calculations;

[7] Calculations supporting the estimate of stormwater treatment performance; and

[8] Calculations supporting the design of infiltration practices, including design infiltration rates, estimated dewatering times, and mounding analyses, where applicable.

(p) Proposed improvements, including location of buildings or other structures, impervious surfaces, and drainage facilities, if applicable;

(q) Timing, schedules, and sequence of development, including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization;

(r) A maintenance schedule for the period of construction;

(s) Stormwater runoff shall be calculated using latest Northeast Regional Climate Center (NRCC) extreme precipitation amounts for recurrence intervals (storm events) 2-, 10-, 25-, 50- and 100-year frequencies;

(t) An Erosion and Sediment Control Plan as detailed in Section G;

(u) An Operation and Maintenance Plan as detailed in Section H; and,

(v) Any other information requested by the PGA.

(2) Standards. Projects shall meet the standards of the Massachusetts Stormwater Management Policy, which are as follows:

(a) No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or water of the commonwealth;

(b) Low Impact Development (LID) site planning and design strategies must be implemented if practicable in order to reduce the discharge of stormwater from development sites;

(c) Stormwater management system design shall be consistent with the intent and guidance provided by the latest Massachusetts Stormwater Handbook and per industry standard methods. While design should be completed per Massachusetts Stormwater Handbook specifications to the fullest extent feasible, the PGA reserves the right to waive and/or modify minor disparities between the design and the Massachusetts Stormwater Handbook on a project-specific basis.

(d) 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.

[1] Average annual pollutant removal requirements in E.2.(d) are achieved through one of the following methods:

[a] 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

[b] Retaining the volume of runoff equivalent to, or greater than, 1.0 inch multiplied by the total post-construction impervious surface area on the new development site; or

[c] Meeting a combination of retention and treatment that achieves the above standards; or

[d] Utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the new development site.

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

[1] Average annual pollutant removal requirements in E.2.(e) are achieved through one of the following methods:

[a] 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

[b] Retaining the volume of runoff equivalent to, or greater than, 0.8 inches multiplied by the total post-construction impervious surface area on the redevelopment site; or

[c] Meeting a combination of retention and treatment that achieves the above standards; or

[d] Utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the redevelopment site.

(f) Redevelopment activities that are exclusively limited to maintenance and improvement of existing roadways, (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects) shall improve

existing conditions where feasible and are exempt from part Section F.2.(e). 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 Section F.2.(e).

(3) Project changes. The permittee, or its agent, shall notify the PGA in writing of any change or alteration of a land-disturbing activity authorized in a stormwater management permit before any change or alteration occurs. If the PGA determines that the change or alteration is significant, based on the design standards listed in Subsection F(2) and accepted construction practices, the PGA may require that an amended stormwater management permit application be filed and a public hearing held. If any change or deviation from the stormwater management permit occurs during a project, the PGA may require the installation of interim measures before approving the change.

G. Erosion and sediment control plans. An erosion and sediment control plan is required at the time of application for all projects. The erosion and sediment control plan shall contain sufficient information about the nature and purpose of the proposed development, pertinent conditions of the site and adjacent areas, proposed erosion and sedimentation controls, and proposed control for other wastes on construction sites such as demolition debris, litter, and sanitary wastes to ensure they are not discharged to the MS4, drainage system, or waters of the commonwealth. The applicant shall submit such material as is necessary to show that the proposed development will comply with the design requirements as follows:

(1) Minimize total area of disturbance.

(2) Sequence activities to minimize simultaneous areas of disturbance.

(3) Minimize soil erosion and control sedimentation during construction, provided that prevention of erosion is preferred over sedimentation control.

(4) Divert uncontaminated water around disturbed areas.

(5) Maximize infiltration and groundwater recharge.

(6) Install, inspect, and maintain all Erosion and Sediment Control measures in accordance with the manufacturer's specifications and good engineering practices.

(7) Prevent off-site transport of sediment and wastes.

(8) Protect all storm drain inlets and armor all newly constructed outlets.

(9) Protect and manage on and off-site material storage areas (overburden and stockpiles of dirt, borrow areas, or other areas

used solely by the permitted project are considered a part of the project).

(10) Comply with applicable federal, state and local laws and regulations including waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control.

(11) Institute interim and permanent stabilization measures, which shall be instituted on a disturbed area as soon as practicable but no more than fourteen (14) days after construction activity has temporarily or permanently ceased on that portion of the site.

(12) Properly manage on-site construction waste and materials.

(13) Stabilize construction site entrances and exits and prevent off-site vehicle tracking of sediments.

(14) Ensure that any stormwater BMP (for post-construction stormwater management) installed during construction will be protected from compaction, siltation, and erosion or will be restored or replaced such that the BMP will be capable of functioning as designed in accordance with these stormwater regulations.

H. Operation and maintenance plans. An operation and maintenance plan (O&M plan) is required at the time of application for all projects. The maintenance plan shall be designed to ensure compliance with the permit, this bylaw and that the Massachusetts Surface Water Quality Standards, 314 CMR 4.00 are met in all seasons and throughout the life of the system. The operation and maintenance plan shall remain on file with the PGA and shall be an ongoing requirement. The O&M plan shall include:

(1) The name(s) of the owner(s) for all components of the system.

(2) Maintenance agreements that specify:

(a) The names and addresses of the person(s) responsible for operation and maintenance.

(b) The person(s) responsible for financing maintenance and emergency repairs.

(3) Maintenance schedule for all drainage structures, including swales and ponds.

(4) List of easements, with the purpose and location of each.

(5) The signature(s) of the owner(s).

(6) Stormwater management easement(s).

(a) Stormwater management easements shall be provided by the property owner(s) as necessary for:

[1] Access for facility inspections and maintenance.

[2] Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the one-hundred-year storm event.

[3] Direct maintenance access by heavy equipment to structures requiring regular cleanout.

(b) The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.

(c) Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the PGA.

(d) Easements shall be recorded with the Worcester County Registry of Deeds prior to issuance of a certificate of completion by the PGA.

(7) Changes to operation and maintenance plans.

(a) The owner(s) of the stormwater management system must notify the PGA of changes in ownership or assignment of financial responsibility.

(b) The maintenance schedule in the maintenance agreement may be amended to achieve the purposes of this bylaw by mutual agreement of the PGA and the responsible parties. Amendments must be in writing and signed by all responsible parties. Responsible parties shall include the owner(s), persons with financial responsibility, and persons with operational responsibility.

(8) Stormwater infrastructure shall be privately owned, inspected and maintained per the operation and maintenance plan approved for the project. Inspection and maintenance logs shall be provided to the Planning Board on a yearly basis by final day in June for the Town to use in preparation of its annual report to the EPA as part of the NPDES permit requirements.

(9) The O&M Plan shall include procedures for using dedicated funds, establishing an escrow account, and/or developing a maintenance contract, if determined appropriate to ensure adequate long-term maintenance.

(10) Stormwater Management operation and maintenance duties shall be recorded with the deed for each lot in a subdivision. The applicant may elect to setup a home owner's association (HOA) or

other means to ensure all BMPs are inspected and maintained as required.

(11) Long-term operators responsible for O&M Plan implementation shall submit an annual report to the Planning Board documenting all inspection and maintenance completed on the stormwater system.

I. Surety. The PGA may require the permittee to post, before the start of land disturbance or construction activity, a surety bond, cash, or other acceptable security. The form of the bond shall be approved by Town Counsel, and be in an amount deemed sufficient by the PGA to ensure that the work will be completed in accordance with the permit. If the project is phased, the PGA may release part of the bond as each phase is completed in compliance with the permit, but the bond may not be fully released until the PGA has received the final inspection report as required by Section J and issued a certificate of completion.

J. Inspections.

(1) At the discretion of the PGA, periodic inspections of the stormwater management system construction may be conducted by the Town via the Planning Board, Conservation Commission, DPW or a professional engineer approved by the PGA. Written reports shall include:

(a) Inspection date and location.

(b) Evaluation of compliance with the stormwater permit.

(c) Any variations from approved specifications or any violations of the stormwater management plan.

(2) At a minimum, the PGA or its designee may inspect the project site at the following stages:

(a) Initial site inspection: prior to approval of any plan.

(b) Erosion control inspection: to ensure erosion control practices are in accord with the filed plan.

(c) Bury inspection: prior to backfilling of any underground drainage stormwater conveyance structures.

(d) Final inspection. After the stormwater management system has been constructed and before the surety has been released, the applicant must submit a record plan detailing the actual stormwater management system as installed. The PGA or its agent may inspect the system to confirm its "as-built" features. This inspector may also evaluate the effectiveness of the system in an actual storm. If the inspector finds the system to be adequate he shall so report to the PGA, which will issue a certificate of completion. As-built plans shall be full-size plans

that include all final grades, prepared by a professional engineer. All changes to project design should be clearly depicted on the as-built plans.

(e) If the system is found to be inadequate by virtue of physical evidence of operational failure, even though it was built as called for in the stormwater management plan, it shall be corrected by the permittee before the performance guarantee is released. If the permittee fails to act, the Town of Lunenburg may use the surety bond to complete the work. If the system does not comply with the plan, the permittee shall be notified in writing of the violation and the required corrective actions. A stop-work order shall be issued until any violations are corrected and all work previously completed has received approval by the PGA.

K. Waivers.

(1) The PGA may waive strict compliance with any requirement of this bylaw or the rules and regulations promulgated hereunder, where such action:

(a) Is allowed by federal, state and local statutes and/or regulations;

(b) Is in the public interest; and

(c) Is not inconsistent with the purpose and intent of this bylaw.

(2) Any applicant may submit a written request to be granted such a waiver. Such a request shall be accompanied by an explanation or documentation supporting the waiver request and demonstrating that strict application of the bylaws does not further the purposes or objectives of this bylaw.

(3) All waiver requests shall be discussed and voted on at the public hearing for the project.

(4) If, in the PGA's opinion, additional time or information is required for review of a waiver request, the PGA may continue the hearing to a date certain announced at the meeting. In the event the applicant objects to a continuance, or fails to provide requested information, the waiver request shall be denied.

L. Certificate of completion. The PGA will issue a letter certifying completion upon receipt and approval of the final inspection reports and/or upon otherwise determining that all work of the permit has been satisfactorily completed in conformance with this bylaw.

M. Building Permits. The Building Commissioner shall not issue a Building Permit without first confirming that and Stormwater Permit has been obtained or is otherwise not required for the project.

N. Enforcement.

(1) Enforcement agents. The Building Commissioner, in conjunction with the Planning Board, Conservation Commission and DPW Director, shall enforce this bylaw, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

O. Civil relief. If a person violates the provisions of this bylaw, regulations, a permit, notice, or order issued thereunder, the Planning Board, through the Building Commissioner, 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.

P. Orders.

(1) The Planning Board, in conjunction with the Conservation Commission and DPW Director, may issue a written order to the Building Commissioner to enforce the provisions of this bylaw 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.

(2) If the Building Commissioner, in conjunction with the Planning Board, Conservation Commission and DPW Director, 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 Town may, at its option, undertake such work, and expenses thereof shall be charged to the violator.

(3) Within 30 days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the cost incurred by the Town, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the Planning Board within 30 days of receipt of the notification of the cost incurred. If the amount due is not received by the expiration of the time in which to file a protest or within 30 days following a decision of the Planning Board affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against

the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in MGL c. 59, § 57 after the 31st day at which the costs first become due.

Q. Noncriminal disposition; right of entry.

(1) As an alternative to criminal prosecution or civil action, the Planning Board may elect, through the Building Commissioner, to utilize the noncriminal disposition procedure set forth in MGL c. 40, § 21D, and Chapter 1, Article 1, of the General Bylaws of the Town, in which case the Planning Board, its authorized agents and the Building Commissioner of the Town shall be the enforcing person. The penalty for the first violation shall be $25. The penalty for the second violation shall be $50. The penalty for the third violation shall be $100 and $200 for the fourth and each subsequent violation. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

(2) Entry to perform duties under this bylaw. To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Planning Board, its agents, and employees may enter upon privately owned property for the purpose of performing their duties under this bylaw and regulations and may make or cause to be made such examination surveys or sampling as the Planning Board deems reasonably necessary.

R. Appeals. The decisions or orders of the Planning Board, in conjunction with the Conservation Commission and DPW, shall be final. Further relief shall be to a court of competent jurisdiction.

S. Remedies not exclusive. The remedies listed in this bylaw are not exclusive of any other remedies available under any applicable federal, state or local law.

T. Severability. The invalidity of any section, provision, paragraph, sentence, or clause of these regulations shall not invalidate any section, provision, paragraph, sentence, or clause thereof, nor shall it invalidate any permit or determination that previously has been issued.

§ 204-2. Discharges to municipal storm sewer system and waters of commonwealth; NPDES Phase II permits.

A. Purpose.

(1) Increased and contaminated stormwater runoff is a major cause of impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater; contamination of drinking water supplies; alteration or destruction of aquatic and wildlife habitat; flooding.

(2) Regulation of illicit connections and discharges to the municipal storm sewer system is necessary for the protection of the Town's water bodies and groundwater, and to safeguard the public health, safety, welfare and the environment.

(3) The objectives of this bylaw are:

(a) To prevent pollutants from entering the Town's municipal separate storm sewer system (MS4);

(b) To prohibit illicit connections and unauthorized discharges to the MS4;

(c) To require the removal of all such illicit connections;

(d) To comply with state and federal statutes and regulations relating to stormwater discharges; and

(e) To establish the legal authority to ensure compliance with the provisions of this bylaw through inspection, monitoring, and enforcement.

B. Definitions. For the purposes of this bylaw, the following shall mean:

AUTHORIZED ENFORCEMENT AGENCY — The Planning Board (hereafter the "Board"), its employees or agents designated to administer/enforce this bylaw.

BEST MANAGEMENT PRACTICE (BMP) — An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of stormwater runoff.

CLEAN WATER ACT — The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) as hereafter amended.

DISCHARGE OF POLLUTANTS — The addition from any source of any pollutant or combination of pollutants into the municipal storm sewer system or into the waters of the United States or commonwealth from any source.

GROUNDWATER — Water beneath the surface of the ground.

ILLICIT CONNECTION — A surface or subsurface sewer or conveyance, which allows an illicit discharge into the municipal storm sewer system, including without limitation sewage, process wastewater, or wash water and any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved before the effective date of this bylaw.

ILLICIT DISCHARGE — Direct or indirect discharge to the municipal storm sewer system that is not composed entirely of stormwater, except as exempted in Subsection H. The term does not include a discharge in compliance with an NPDES stormwater discharge permit or a surface water discharge permit, or resulting from fire-fighting activities exempted pursuant to Subsection H of this bylaw.

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 rooftops.

MUNICIPAL SEPARATE STORM DRAIN SYSTEM (MS4) or MUNICIPAL STORM SEWER 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 Town of Lunenburg.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT — A permit issued by United States Environmental Protection Agency or jointly with the state that authorizes the discharge of pollutants to waters of the United States.

NON-STORMWATER DISCHARGE — Discharge to the municipal storm sewer system not composed entirely of stormwater.

PERSON — An individual, partnership, association, firm, company, trust, corporation, agency, authority, department or political subdivision of the commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

POLLUTANT — Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter, whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the commonwealth. Pollutants may include but are not limited to:

(1) Paints, varnishes, and solvents;

(2) Oil and other automotive fluids;

(3) Nonhazardous 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; sewage, fecal coliform and pathogens;

(7) Dissolved and particulate metals;

(8) Animal wastes;

(9) Rock, sand, salt, soils;

(10) Construction wastes and residues;

(11) Noxious or offensive matter of any kind.

PROCESS WASTEWATER — Water which during manufacturing or processing comes into direct contact with or results from the production or use of any material, intermediate product, finished product, or waste product.

RECHARGE — The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

STORMWATER — Stormwater runoff, snow melt runoff, and surface water runoff and drainage.

SURFACE WATER DISCHARGE PERMIT — A permit issued by the Department of Environmental Protection (DEP) pursuant to 314 CMR 3.00 that authorizes the discharge of pollutants to waters of the Commonwealth of Massachusetts.

TOXIC OR HAZARDOUS MATERIAL OR WASTE — Any material which, because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as toxic or hazardous under MGL c. 21C and c. 21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

WASTEWATER — Any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

WATERCOURSE — A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

WATERS OF THE COMMONWEALTH — All waters within the jurisdiction of the commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, and groundwater.

C. Applicability. This bylaw shall apply to flows entering the municipally owned storm sewerage system and waters of the commonwealth.

D. Authority. This bylaw is adopted pursuant to the regulations of the Federal Clean Water Act found at 40 CFR 122.34 and the Phase II ruling from the Environmental Protection Agency found in the December 8, 1999 Federal Register.

E. Responsibility for administration. The Planning Board, in conjunction with the Conservation Commission, Department of Public Works Director and Building Commissioner, shall administer, implement and enforce this bylaw. Any powers granted to or duties imposed upon the above may be delegated in writing by the above to employees or agents of the above.

F. Regulations. The Planning Board may promulgate rules and regulations to effectuate the purposes of this bylaw. Failure by the Planning Board to promulgate such rules and regulations shall not have the effect of suspending or invalidating this bylaw.

G. Prohibited activities.

(1) 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 waters of the commonwealth.

(2) Illicit connections. No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm sewer system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection.

(3) Obstruction of municipal storm sewer system. No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm sewer system without prior written approval from the Planning Board.

H. Exemptions:

(1) Discharge or flow resulting from fire-fighting activities.

(2) The following non-stormwater discharges or flows are exempt from the prohibition of non-stormwaters, provided that the source is not a significant contributor of a pollutant to the municipal storm sewer system:

(a) Water line flushing;

(b) Flow from potable water sources;

(c) Springs;

(d) Natural flow from riparian habitats and wetlands;

(e) Diverted stream flow;

(f) Rising groundwater;

(g) Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater;

(h) Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems), crawl space pumps, or air conditioning condensation;

(i) Discharge from landscape irrigation or lawn watering;

(j) Water from individual residential car washing;

(k) Discharge from dechlorinated swimming pool water (less than one ppm chlorine), provided the water is allowed to stand for one week prior to draining and the pool is drained in such a way as not to cause a nuisance;

(l) Discharge from street sweeping;

(m) Dye testing, provided verbal notification is given to the Planning Board prior to the time of the test;

(n) Non-stormwater discharge permitted under an NPDES permit or a surface water discharge permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency or the Department of Environmental Protection, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations;

(o) Discharge for which advanced written approval is received from the Planning Board as necessary to protect public health, safety, welfare or the environment.

(3) Discharge or flow that results from exigent conditions and occurs during a state of emergency declared by any agency of the federal or state government, or by the Town of Lunenburg Town Manager, the Planning Board or the Board of Health.

I. Emergency suspension of storm sewerage system access. The Planning Board may suspend municipal storm sewer 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. In the event any person fails to comply with an emergency suspension order, the authorized enforcement agency may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

J. 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 waters of the commonwealth, the person shall take all necessary steps to ensure

containment and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and police departments and the Planning Board and the Lunenburg Board of Health. In the event of a release of nonhazardous material, the reporting person shall notify the Planning Board no later than the next business day. The reporting person shall provide to the Planning Board 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.

K. Enforcement.

(1) The Building Commissioner, in conjunction with the Planning Board, Conservation Commission and DPW Director, shall enforce this bylaw, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

(2) Civil relief. If a person violates the provisions of this bylaw, regulations, permit, notice, or order issued thereunder, the Planning Board, through the Building Commissioner, 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.

(3) Orders.

(a) The Planning Board, in conjunction with the Conservation Commission and DPW Director, may issue a written order to the Building Commissioner to enforce the provisions of this bylaw or the regulations thereunder, which may include:

[1] Elimination of illicit connections or discharges to the MS4;

[2] Performance of monitoring, analyses, and reporting;

[3] That unlawful discharges, practices, or operations shall cease and desist; and

[4] Remediation of contamination in connection therewith.

(b) If the Building Commissioner, in conjunction with Planning Board, Conservation Commission and DPW Director, 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 Town may, at its option, undertake such work, and expenses thereof shall be charged to the violator.

(4) Costs. Within 30 days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the Town, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the Planning Board within 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 30 days following a decision of the Planning Board affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in MGL c. 59, § 57 after the 31st day at which the costs first become due.

(5) Noncriminal disposition. As an alternative to criminal prosecution or civil action, the Planning Board may elect, through the Building Commissioner, to utilize the noncriminal disposition procedure set forth in MGL c. 40, § 21D, in which case the Building Commissioner of the Town shall be the enforcing person. The penalty for the first violation shall be $25. The penalty for the second violation shall be $50. The penalty for the third violation shall be $100. The penalty for the fourth violation and subsequent violations shall be $200. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

(6) Entry to perform duties. Under this bylaw, to the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Planning Board, its agents, and employees may enter upon privately owned property for the purpose of performing their duties under this bylaw and regulations and may make or cause to be made such examinations, surveys or sampling as the Planning Board deems reasonably necessary.

(7) Appeals. The decisions or orders of the Planning Board, Conservation Commission and DPW shall be final. Further relief shall be to a court of competent jurisdiction.

(8) Remedies not exclusive. The remedies listed in this bylaw are not exclusive of any other remedies available under any applicable federal, state or local law.

L. Severability. The provisions of this bylaw are hereby declared to be severable. If any provision, paragraph, sentence, or clause of this bylaw 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 bylaw.

M. Transitional provisions. Residential property owners shall have 180 days from the effective date of the bylaw to comply with its provisions or petition the Planning Board for an extension, provided good cause is shown for the failure to comply with the bylaw during the specified period. All other property owners shall have 180 days from the effective date of the bylaw to comply with its provisions or petition the Planning Board for an extension, provided good cause is shown for the failure to comply with the bylaw during the specified period.

Appendix C

Stormwater System Mapping

Mapping Status

Requirement Summary	Status
Phase I – Must be Complete by July 1, 2020	
1. Outfalls and receiving waters	Complete
2. Open channel conveyances	Ongoing
3. Interconnections with other MS4s	Ongoing
4. Municipally owned structural BMPs	Complete
5. Waterbody names and impairments	Complete
6. Initial catchment delineations by topography	Complete
Phase II – Must be Complete by July 1, 2028	
1. Outfalls with spatial accuracy +/-30 feet	Complete
2. Pipe connectivity	In Progress
3. Manholes	In Progress
4. Catch basins	In Progress
5. Refined catchment delineations	Not started
6. Municipal sanitary system	Complete
7. Municipal combined sewer system	Not Applicable

Stormwater Infrastructure Map

Lunenburg, MA

Comprehensive Environmental Incorporated

N
W E
S

0 0.25 0.5 0.75 1
Miles

Data source: MassGIS, Town of Lunenburg

Legend

- Outfalls
- Catch Basin
- Leaching Catch Basin
- Drainage Manhole
- Dry Well
- Inlet
- Culvert
- Detention Basin
- Infiltration Basin
- Swale
- Interconnections
- DOT Outfall
- DOT Manhole
- DOT Catch Basin
- Drainage Pipe
- Sewer Pipes
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Non-Urban Area

10/29/2021

Appendix D

Regulatory Assessments

LID, GI, AND IA REGULATORY ASSESSMENT

To: Adam Burney, Land Use Director, Town of Lunenburg

From: Nick Cristofori, P.E., Comprehensive Environmental Inc.

Date: May 11, 2022

Subject: Review of Lunenburg's Regulations for LID, GI, and Impervious Cover Creation

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, regulated communities such as Lunenburg are required to complete an assessment of existing town regulations as they pertain to Low Impact Development (LID), green infrastructures (GI), and the creation of impervious area (IA) under permit sections 2.3.6.b and 2.3.6.c. In summary, communities must complete the following:

- Develop a report assessing current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover to determine if changes to design standards for streets and parking lots can be made to support low impact development options.
- 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, planter gardens, pervious pavements, and other designs to manage stormwater using landscaping and structured soils; and water harvesting devices such as rain barrels and cisterns.

This memorandum serves as a report assessing any barriers to implementing LID and green infrastructure, opportunities for reducing mandatory creation of impervious area, and recommended regulatory changes to be made.

As part of preparation of this memo, CEI reviewed the following regulations:

- Chapter 140, Excavations and Earth Removal (undated)
- Chapter 204, Stormwater and Storm Sewers (November 17, 2020)
- Chapter 205, Streets and Sidewalks (undated)
- Chapter 239, Wetlands Protection (1998)
- Chapter 250, Zoning (May 3, 2014)
- Chapter 315, Land Use Permitting Procedures (undated)
- Chapter 325, Subdivision Regulations (March 2002)
- Chapter 335, Wetlands Regulations (March 5, 2014)

Recommendations
The following items are provided as recommendations and next steps:

- Table 1 (attached) provides a detailed assessment and recommended regulatory changes that should be considered when updating relevant sections of the town's regulatory mechanisms.
- Regulatory review and permitting processes such as Site Plan Review, Subdivision, Wetlands, and/or any other similar processes should be updated to specifically reference the stormwater regulatory mechanisms adopted to meet MS4 regulations for projects that disturb one or more acres. This should include the construction and post-construction stormwater requirements, including requirements for treating stormwater from new development and redevelopment, so that project proponents are aware of the additional requirements under MS4 regulations.
- Changes should be made as part of the next major regulatory update undertaken by the town for each relevant section, or more suitable timeframe as determined by the Planning Board and/or other regulatory board/department.
- This memorandum should be provided to the Planning Board and local transportation board, if applicable, as recommended by the permit.

If you have any further questions or would like additional information, please feel free to contact me at 800.725.2550 x303 or ncristofori@ceiengineers.com. Thank you.

Nick Cristofori, P.E.
Principal, Project Manager

Attachments:

- Table 1: Recommendations for Updating Existing Regulations Pertaining to LID, Green Infrastructure and Impervious Cover Creation

Table 1: Recommendations for Updating Existing Regulations Pertaining to LID, Green Infrastructure and Impervious Cover Creation

Topic	Reference	Existing Requirement	Recommendations
General design for environmental sensitivity	Subdivision Ch. 325-4.6: Protection of natural features	Provides for general protection of natural features that "will add attractiveness and value to the community".	Consider expanding these sections to include precautions to reduce pollution from stormwater runoff.
	Zoning Ch. 250-1.1: Purpose (pg. 205)	"… conservation of natural resources and the prevention of blight and pollution of the environment".	
	Site Plan Approval Ch. 250-8.4: Site plan approval	"The use of low-impact development, infiltration of stormwater and reduction of impervious surface are strongly encouraged."	
Stormwater Management			
Surface runoff	Zoning Ch. 250-4.11: Tri-Town Smart Growth District (pg. 275)	"Surface run-off shall be minimized and the protection of the site and adjacent properties from erosion as a result thereof shall be assured."	Consider adding this requirement to other districts (this is the only one).
	Subdivision Ch. 325-5.13: Areas disturbed by construction (pg. 542)	"Runoff shall be controlled and conveyed into storm sewers or other outlets so it will not erode the land or cause off-site damage." "Sediment basins, temporary and permanent, shall be constructed where necessary to detain runoff and to trap sediment during construction."	Consider expanding/ providing alternative options that encourage infiltration such as rain gardens and swales.
Cluster development	Zoning Ch. 250-5.6: Cluster development (pg. 331)	No current regulations to explicitly require low impact design strategy for site plan and supporting stormwater management features.	Consider allowing flexible development such as cluster/open space development as a "by right" form of development (no special permit required) and developing guidance that requires cluster development sites to be designed as LID with guidance regarding what is meant by LID:

Topic	Reference	Existing Requirement	Recommendations
			• Site design strategy for minimizing pavement, retaining natural drainage paths and features, and treating runoff as close to its source as feasible; • Directing runoff from roofs and impervious areas to "disconnect" runoff from the formal drainage system; • Maximizing the use of infiltration practices to reduce runoff volume that must otherwise be conveyed and treated; • Use of surface-based stormwater management systems that incorporate vegetation to enhance stormwater treatment.
Low Impact Development	--	No provisions regarding the use of Low Impact Development or green infrastructure to be addressed during development.	Consider expanding language as follows: "LID site planning and design strategies must be implemented unless infeasible to reduce the discharge of stormwater from development sites. LID techniques with the goals of protecting water quality, maintaining predevelopment site hydrology, preserving existing vegetation, reducing the development footprint, minimizing or disconnecting impervious area, and use of enhanced stormwater BMPs shall be incorporated into landscaped areas. These techniques may include disconnection of rooftop and non-rooftop runoff, use of green roofs, vegetated

Topic	Reference	Existing Requirement	Recommendations
			bioretention systems, tree box filters, infiltration edges, dividers, or islands planters, and raingardens. Capture and reuse of stormwater is strongly encouraged. The applicant must document in writing why LID strategies are not appropriate when not used to manage stormwater."
Rain Water Harvesting	--	No provisions regarding the use of stormwater for non-potable uses such as lawn watering are currently in place.	Expand LID language as discussed under "LID and green infrastructure design" to include vegetated green roofs as an acceptable technique that may be used in the town.
Green Roofs	--	No provisions regarding green roofs currently exist	Expand LID language as discussed under "LID and green infrastructure design" to encourage reuse of stormwater as part of site design.
Open Space/ Landscaping			
Landscaping requirements	Zoning Ch. 250-5.4: Mixed residential development (pg. 326) Ch. 250-5.5: Planned residential area (pg. 330)	Open space and landscaping: "All areas not covered by pavement, curbing, buildings and/or structures, …, shall be landscaped with grass, shrubbery, trees, flowers or ground covers indigenous to the area. Along the length of each exterior wall of each principal building, there shall be a landscaped area with bushes, shrubs or flowers indigenous to the area."	Provide language explicitly allowing stormwater practices in landscaped areas such as "Low impact stormwater management techniques, such as bioretention areas, filter strips, vegetated swales, constructed wetlands, and rain gardens may be located within the required landscaped areas."
Open space uses	Zoning Ch. 250-4.7: Village Center District (pg. 254)	"Features that may be used to create open space areas acceptable to the Planning Board of Appeals may include, without limitation, fixed benches, fixed tables,	Provide language explicitly allowing stormwater practices in open space areas such as "Low impact stormwater management techniques, such as bioretention areas, filter strips, vegetated

Topic	Reference	Existing Requirement	Recommendations
	Ch. 250-4.17: Village Center District (pg. 315)	fountains, pathways, bikeways, bicycle racks, period lighting, shade trees, perennial gardens, picnic areas, and/or trash receptacles."	swales, constructed wetlands, and rain gardens may be located within the required open space areas."
	Zoning Ch. 250-5.6: Cluster developments (pg. 332)	"Land designated as open space shall be limited to the following uses: (a) Agriculture, farming, and/or the keeping of horses and grazing of animals as permitted by this bylaw. (b) Passive or active recreation."	
Site work			
Cleanup	Subdivision Ch. 325-5.16: Cleanup (pg. 543)	"Any area disturbed by the construction and all rights-of-way shall be cleaned up so as to leave the area shown on the plan in a neat and orderly appearance free from debris, tree stumps, loose rocks, mounds of dirt or other objectionable material. Seeding of these areas may be required by the Planning Board."	Metropolitan Area Planning Council (MAPC) recommends: Require contractors to reestablish permeability of soils that have been compacted by construction vehicles. For example, contractor can rototill lawn areas prior to seeding to re-establish void space (hence permeability and infiltration) of the soils.
Street Design			
Materials	Subdivision Ch. 325-5.2: Streets and roadways (pg. 534)	"The wearing surfaces of roadways shall be on Class I bituminous concrete pavement, Type I-1, unless otherwise approved or required by the Planning Board."	MAPC recommends: Permit use of permeable paving for road shoulders/ parking lanes in residential neighborhoods, with use of conventional paving for travel lanes only.
Dimensions	Subdivision Ch. 325-5.2: Streets and roadways (pg. 534)	Minimum pavement widths: Major street = 30 feet Secondary street = 24 feet Intermediate street = 24 feet Minor street = 22 feet	MAPC recommends: Permit a minimum pavement width of 18-22 feet on low-traffic local streets in residential neighborhoods. Allow narrower pavement widths along the sections of roadway where there are no houses,

Topic	Reference	Existing Requirement	Recommendations
			buildings, or intersections, and where on-street parking is not anticipated. Residential roadway pavement width should be set based on the number of homes served, anticipated vehicle usage, and on-street parking requirements. For non-residential mixed-use roadways, pavement widths should be set based on traffic volume, types of vehicles, parking and pedestrian requirements.
Cul-de-sacs / Dead ends	Subdivision Ch. 325-4.2: Streets (pg. 523)	Minimum paved roadway diameter of turnarounds = 100 feet with an outside diameter roadway dedication of 130 feet.	MAPC recommends: Minimize required radii for cul-de-sacs. A radius of 35 feet is optimal, depending on emergency vehicles. Allow or require the creation of landscaped island (and bioretention cells) within cul-de-sacs. Consider allowing alternative pavement types such as pervious pavement.
	Subdivision Ch. 325-4.2: Streets (pg. 523)	"Dead-end streets shall be provided at the closed end with a turnaround."	MAPC recommends: Permit use of one-way loop streets to eliminate turnarounds. Permit "hammerhead" turnarounds instead of cul-de-sacs.
Curbs	Subdivision Ch. 325-5.6: Curbs, berms and guard rails (pg. 539)	"Bituminous concrete berms and curbs of six inches in height and one foot in width shall be provided along each side of the roadway… In the event that the Planning Board waives curbs and berms, paved	MAPC recommends: Do not require the use of conventional curbs for the full length of all streets in residential neighborhoods. / Consider allowing the use of "open drainage" along residential streets.

Topic	Reference	Existing Requirement	Recommendations
		gutters shall be provided along each edge of the roadway where the grade exceeds 3%".	If the protection of the roadway edge is a concern, consider allowing alternative designs such as curbs with openings or flush curbs, that enable the use of bioretention, treatment swales, and open drainage instead of requiring pipe drainage systems. / Where curbs are deemed necessary to protect the roadway edge, allow the use of perforated curbs (that allow runoff to flow into swales) or "invisible curbs" (flush with the road surface).
Sidewalks			
General requirements	Zoning Ch. 250-4.5: Commercial District (pg. 243) Ch. 250-4.7: Village Center District (pg. 252) Ch. 250-4.12: Summer Street Revitalization Overlay District (pg. 283) Ch. 250-4.17: Village Center District (pg. 313)	"Sidewalks shall be provided from the street line, when applicable, and from the parking areas to building(s)."	Consider adding more flexibility in providing sidewalks only when there is a need for them. MAPC recommends: Provide flexibility with sidewalk layout (e.g., alternative pedestrian circulation layout that uses common areas, rather than street right of ways). Permit sidewalk placement on one side of the street only in low-density residential neighborhoods.
	Subdivision Ch. 325-4.9: Sidewalks, grass plots, trees, curbs and berms (pg. 526)	"Sidewalks shall be provided on one side of each street for the full length of major streets. Sidewalks shall be provided in the vicinity of pedestrian generators on major and secondary streets as required by the Planning Board".	
Materials	Subdivision Ch. 325-5.4: Sidewalks (pg. 538)	"Bituminous concrete sidewalks laid in two courses … If the applicant prefers to install cement concrete sidewalks, they shall be constructed in conformity …"	Permit/encourage the use of permeable paving/ other pervious material for sidewalks.

Topic	Reference	Existing Requirement	Recommendations
	Subdivision Ch. 325-4.13: Bikeways, walkways, and trails (pg. 530)	No requirement for material of bikeways, walkways, and trails; provides minimum *pavement* width.	
Dimensions	Subdivision Ch. 325-4.9: Sidewalks, grass plots, trees, curbs and berms (pg. 526)	Minimum sidewalk widths = 4 feet.	Consider establishing maximum width.
Sidewalk design/ landscaping requirements	Subdivision Ch. 325-5.4: Sidewalks (pg. 538)	"Sidewalks shall be constructed within the subdivision, separated from the pavement area by a seeded grass plot."	Consider allowing for sidewalks to direct runoff to landscaped areas such as tree box filters or rain gardens
Driveways			
Materials	Zoning Ch. 250-6.1: Off-street parking and loading areas (pg. 340)	"All required parking spaces and loading bays, maneuvering aisles, and driveways shall have a durable, dustless, all-weather surface suitable for year-round use, such as asphalt or concrete, and shall dispose of surface water by grading and drainage in such a manner that no surface water shall drain onto any public way or onto any lot in other ownership."	Permit use of pervious material for single family driveways (porous pavers, paving stones, pervious asphalt or concrete), and/or use of 'two-track' design for residential driveways.
Dimensions	Zoning Ch. 250-6.4 (Article VI General Provisions Affecting All Districts): Driveways and entrances (pg. 338)	Driveway widths: One-way = minimum of 10 feet Two-way = minimum of 20 feet Maximum of 30 feet	MAPC recommends: Require driveway width no more than 9 feet (18 feet for two-way).
	Subdivision Ch. 325-4.3 (Article IV Design Standards):	"Driveways in subdivisions containing one- and/or two-family dwellings only shall be at least 10 feet wide".	

Topic	Reference	Existing Requirement	Recommendations
	Driveways and curb cuts (pg. 524)	"Driveways in nonresidential uses shall be at least 16 feet wide".	
Common driveways	Zoning Ch. 250-6.4 (Article VI General Provisions Affecting All Districts): Driveways and entrances (pg. 341)	"Not more than two primary dwellings may maintain one common entrance and/or driveway."	MAPC recommends: Permit the use of common driveways to serve up to four houses, including OSRD lots that do not meet standard dimensional requirements.
	Subdivision Ch. 325-4.14: Common driveways (pg. 530)	"Common driveways serving two residences are permitted by Town bylaw."	
Parking Lots			
Landscaping requirements	Zoning Ch. 250-6.4 (Article VI General Provisions Affecting All Districts): Driveways and entrances (pg. 341)	Provides requirements for trees in outdoor parking lots; for lots with 10+ spaces, requires landscaped open space not less than five feet in width either between rows or spaces or in strips parallel to the spaces, 3 trees required in each such strip.	Establish landscaping requirements for parking areas that include vegetated islands with bioretention functions. Allow bioretention areas, filter strips, swales, and constructed wetlands to count towards the fulfillment of site landscaping/ open space requirements.
Off street parking	Zoning Ch. 250-4.1: Permitted and prohibited uses (pg. 226)	Residential uses: Accessory Dwelling - "There is at least 1 off street parking space for each bedroom or efficiency apartment in the converted portion of the structure, which space shall be provided in conjunction with other parking facilities."	Establish parking maximums. Allow reduced parking for homes and businesses near major transit stops. MAPC recommends: Do not require more than 3 off street parking spaces per 1000 square feet of gross floor area in professional office buildings.
	Zoning Ch. 250-6.1 (Article VI General Provisions Affecting All Districts): Off-street parking and loading areas (pg. 333)	Establishes number of off-street parking spaces required	

Topic	Reference	Existing Requirement	Recommendations
			Do not require more than 4.5 off street parking spaces per 1000 square feet of gross floor area of shopping centers. Do not require more than 2 off street parking spaces per single family home.
Required number of parking spaces	Zoning Ch. 250-4.7: Village Center District (pg. 248) Ch. 250-4.17: Village Center District (pg. 309)	Parking requirements table.	Establish parking maximums. Allow reduced parking for homes and businesses near major transit stops.
	Zoning Ch. 250-4.11: Tri-Town Smart Growth District (pg. 274)	Parking requirements table.	
Parking space dimensions	Zoning Ch. 250-6.4: Driveways and entrances (pg. 338)	Table 1: Parking space dimensions for standard and compact cars (Standard width = 9 ft, standard depth = 19 ft).	MAPC recommends: Permit stall width of 9 feet or less for a standard parking space. Permit stall length of 18 feet of less for a standard parking space.
Materials	Zoning Ch. 250-6.1: Off-street parking and loading areas (pg. 340)	"All required parking spaces and loading bays, maneuvering aisles, and driveways shall have a durable, dustless, all-weather surface suitable for year-round use, such as asphalt or concrete, and shall dispose of surface water by grading and drainage in such a manner that no surface water shall drain onto any public way or onto any lot in other ownership."	Permit use of permeable paving for parking stalls and spillover parking areas. Add language such as, "Pervious materials such as porous pavers, paving stones, reinforced grass, and pervious pavement may be allowed for parking stalls or overflow parking areas."

Topic	Reference	Existing Requirement	Recommendations
	Zoning Ch. 250-4.5: Commercial District (pg. 243)	Interior Streets, Drives, Walkways and Access: "Surfaces shall be pervious when possible and practical, excluding the required parking areas."	Consider including required parking areas to be pervious when possible and practical.
Lot Layout			
Impervious lot coverage	Zoning Ch. 250-4.1: Permitted and prohibited uses (pg. 220) Ch. 250-4.3: Recreation District (pg. 238) Ch. 250-4.6: Office Park/ Industrial District (pg. 246) Ch. 250-4.9: Water Supply Protection District (pg. 258-261) Ch. 250-4.17: Village Center District (pg. 311)	Current provisions provide maximum lot coverage by Zoning district.	MAPC recommends: Establish limits on impervious lot coverage (e.g., 15%) for rural, low-density areas. (15% "not appropriate for town centers, transit-oriented districts, and moderate density neighborhoods, where compact development should be encouraged.")
	Zoning Ch. 250-6.6 (Article VI General Provisions Affecting All Districts): Performance standards (pg. 358)	"No more than 50% of a required front yard shall be covered by impervious surfaces".	Consider lowering.
Drive-through queues	Zoning Ch. 250-4.4: Limited Business/ Residential District (pg. 239) Ch. 250-4.5: Commercial District (pg. 242) Ch. 250-4.6: Office Park/ Industrial District (pg. 245)	Drive Through Service: "The minimum space available for vehicles to queue on-site shall not be less than 10 cars."	Consider lowering or making drive-throughs permeable pavement.

Topic	Reference	Existing Requirement	Recommendations
Landscaping requirements	Zoning Ch. 250- 4.5 –5.4	Various landscaping requirements by Zoning district (along street frontage, the sides of buildings; buffer strips; 4-foot area separating all paved areas from lot line setbacks).	Provide language explicitly allowing stormwater practices in required landscaped areas such as "Low impact stormwater management techniques, such as bioretention areas, filter strips, vegetated swales, constructed wetlands, and rain gardens may be located within the required landscaped areas."
Frontage requirements	Zoning Ch. 250	Various minimum frontages by Zoning district.	MAPC recommends: Permit reduction in frontage (and corresponding road length/paved area) where appropriate, such as in open space residential developments, at the outside sideline of curved streets, and around cul-de-sacs. Establish frontage maximums *only max is max building frontage in Village Center District.

Appendix E

Inventory and Ranking of Town-Owned Property

Site Name	Address	Map ID	Map Tile Number	Contact	Street Sweeping	Catch Basin Inspection & Cleaning	Outfall Inspection & Maintenance	Stormwater & Water Line Maintenance	Asphalt Cleaning & Repair	BMP Inspection & Maintenance	Oil/Water Separator	Floor Drains	Snow Stockpiling/Removal	Winter Road Maintenance	Landscape Design & Management	Lawn & Grounds Maintenance	Pet Waste & Litter	Storage & Use of Pesticides & Herbicides	Storage & Use of Fertilizers	Waterfowl Management	Building Washing & Repair	Solid Waste Management	Material Loading/ Unloading	Material Storage	Painting	Winter Road Maintenance	Vehicle & Equipment Storage & Maintenance	Vehicle & Equipment Washing	Vehicle & Equipment Fueling	Parts Cleaning	Spill Response	Spill Reporting	Emergency Contact Info	Erosion & Sedimentation Control	Construction Site Inspection
MUNICIPAL BUILDINGS																																			
Water Tower	9 Chase Road	WD2	D3																																
Department of Public Works Facilities	520 Chase Road	D1			x	x	x	x	x	x				x			x				x	x	x	x	x	x	x	x	x	x	x	x	x	x
Unknown Building	123 Hollis Road	T4	E3, E4																																
Pump Station	500 Leominster-Shirley Road	D2	K11, K12																																
Lunenburg Water District	50 Lesure Avenue	WD1	G3																																
Lunenburg Town Hall	17 Main Street	T1	D6																		x				x										
Lunenburg Police and Fire Department	655 Massachusetts Avenue	PD1	D4, D5			x	x	x					x								x	x			x		x								
Old School Building	30 School Street	T3	E6									x									x				x										
Lunenburg Historical Society	10 School Street	T2	D6, E6																																
Water Tower	314 Sunny Hill Road	WD3	F5																																
Unknown Building	23 West Street	T5	E6																																
SCHOOLS AND COMMUNITY BUILDINGS																																			
Lunenburg Public Library	1023 Massachusetts Avenue	L1	D7																																
Lunenburg Middle High School	1079 Massachusetts Avenue	S1	D7		x	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x	x	x	x				x		x	x	x	x	x
Turkey Hill Elementary School	129 Northfield Road	S2	D7		x	x	x	x	x			x	x	x	x	x	x	x	x		x	x	x	x	x		x	x	x	x	x	x	x	x	x
Lunenburg Primary School	1401 Massachusetts Avenue	S3	D9		x	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x	x	x	x				x		x	x	x	x	x
Ritter Memorial Library	960 Massachusetts Avenue	L2	D6																																
Eagle House Senior Center	25 Memorial Drive	S5	D6																																
Boys and Girls Club of Lunenburg	15 Memorial Drive	S7	D6																																
Passios Elementary School	1025 Massachusetts Avenue	S4	D7		x	x	x	x	x	x		x	x	x	x	x	x				x	x	x	x	x		x	x	x	x	x	x	x	x	x
Brooks House	1033 Massachusetts Avenue	S6	D7		x				x				x	x	x	x	x				x	x	x	x	x				x		x	x	x	x	x
HOUSING																																			
Pearl Brook Apartments	131 White Street	H1	D2, E2																																
OPEN SPACES																																			
Parks																																			
Marshall Park and Pond	100 Chestnut Street	P1	D6																																
Lunenburg Historic District Park	35 Lancaster Avenue	P2	D6, E6																																
Brian McNally Park	10 Lesure Avenue	P3	G3																																
Veterans Memorial Park	999 Massachusetts Avenue	P4	D6, D7																																
Cowdrey Nature Center	1625 Massachusetts Avenue	P5	C9-10, D9-12																																
Laurel Bank Conservation Area	120 Pleasant Street	P6	F1-2, G1																																
Clarks Hill Conservation Area	301 Lancaster Avenue	P7	E7																																
Ben Normand Park	702 Reservoir Road	P8	I10																																
Wallis Park	10 Wallis Park	P9	G3																																
Cemeteries																																			
North Cemetery	50 Holman Street	C1	C6																																
South Cemetery	60 Page Street	C2																																	
Beaches																																			
Lunenburg Town Beach	265 Prospect Street	B1	G4																																
OTHER																																			
Lakefront Parking	75 Lakefront Avenue	PL1	G4																																

Municipal Properties

Town of Lunenburg, MA

Comprehensive Environmental Incorporated

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Miles

Data source: MassGIS, CEI, Town of Lunenburg

7/31/2020

Legend

- Outfall, Outlet, or Swale Outlet
- Culvert
- Catch Basin
- Leaching Catch Basin
- Drainage Manhole
- Detention or Infiltration Basin
- Inlet
- Dry Well
- Detention Basin
- Infiltration Basin
- Swale
- Drainage Pipes
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Urbanized Area

Municipal Properties:

- Cemeteries
- Low-Income Housing
- Municipal Buildings
- Open Spaces
- Parking
- Schools and Community Buildings
- Town Beach

MUNICIPAL PROPERTY BMP RETROFITS

To: Heather Lemieux, Town Manager, Town of Lunenburg

From: Nick Cristofori, P.E., Comprehensive Environmental Inc.

Date: June 30, 2022

Subject: Municipal Property BMP Retrofits

Permit Requirements and Project Background

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, as amended (Permit), the Town of Lunenburg is required to complete an inventory and priority ranking of Town-owned properties (minimum of five properties) and existing stormwater infrastructure that could be retrofitted with stormwater Best Management Practices (BMPs) designed to reduce the frequency, volume and pollutant loads of stormwater discharges to its MS4 through the mitigation of impervious area. At a minimum, Lunenburg must consider municipal property with significant impervious area that could be mitigated, existing street right-of-ways, and open space and undeveloped land available to mitigate stormwater runoff from nearby areas (e.g. from a trunk line in the street).

The potential for retrofitting particular properties must consider, on a screening level and subject to availability, factors such as maintenance access; subsurface geology; depth to water table; site slope and elevation; and proximity to aquifers and subsurface infrastructure including sanitary sewers and septic systems. Sites must be priority ranked based on factors such as schedules for planned capital improvements to storm and sanitary sewer infrastructure and paving projects as available; current storm sewer level of service (if known); control of discharges to impaired or critical receiving waters; the complexity and cost of implementation; and opportunities for public use and education.

Additionally, the Town has waterbodies listed under the final Massachusetts Year 2018/2020 List of Impaired Waters (2018/2020 303d List[1]) as being subject to Total Maximum Daily Loads (TMDLs) and impaired waters requirements. Specifically, the Town is subject to phosphorus impaired waters requirements for discharges to the Nashua River. For this waterbody, the town must evaluate Town-owned properties within the watershed for opportunities to construct or retrofit BMPs. The evaluation must address the engineering and regulatory feasibility of the retrofit, estimated costs for BMP implementation, and the schedule for any planned infrastructure, resurfacing or redevelopment activity. Lunenburg must then design and construct a stormwater BMP as a public demonstration project targeting a catchment with high phosphorus load by the end of June 2024 (Permit Year 6).

Beginning with the fifth year MS4 annual report and in each subsequent annual report, Lunenburg must report on those permittee-owned properties and infrastructure inventoried that have been

[1] As of the date of this memorandum, the finalized 2016 303d List is the most recent List of Impaired Waters available.

retrofitted with BMPs to mitigate impervious area and associated water quality impacts. A minimum of five sites must be maintained in the retrofit inventory.

This memorandum outlines activities completed by Comprehensive Environmental Inc. (CEI) to assist the Town of Lunenburg with meeting the above Permit requirements, with a focus on potential retrofit opportunities on developed municipal parcels. Analysis of open space and undeveloped land available to mitigate stormwater runoff from nearby areas should be evaluated under a future effort.

Municipal Parcel Retrofits

Desktop and Field Analysis

The Town identified 30 Town-owned facilities located within the MS4 regulated area with impervious cover such as parking lots and rooftops as required by the permit which were advanced for additional desktop and field analysis. CEI first developed a series of parcel maps for each facility to be used for recording existing conditions and field notes. Parcel maps typically showed an aerial view of each facility, along with property lines, topography data, available drainage information, and other relevant information. Noah Parent and Nicole Haggerty of CEI conducted field assessments of all 30 facilities in fall 2021. The goal was to evaluate opportunities to reduce pollutant loads discharging to the MS4 or surface water bodies from the site through reduction or treatment of stormwater runoff from impervious surfaces.

One parcel associated with the Lunenburg Middle High School was identified as a good candidate for retrofit opportunities. Discussion with onsite facilities personnel indicated that existing onsite BMPs treat some stormwater runoff generated, however, locations and designs are unknown. CEI attempted to obtain as-built plans for the site and drainage infrastructure, however, were unsuccessful. This site should be further evaluated to determine additional BMP retrofit opportunities due to the extensive impervious cover onsite.

A map of all 30 facilities is provided as **Figure 1** at the end of this memorandum. A summary of the existing conditions for each site is included as **Table 1**, with proposed retrofit conditions provided as **Table 2** the end of this memorandum.

Proposed BMP Selection

Proposed conceptual BMPs have been selected based largely on available space, soil types within the area, and proximity to wetland areas. For planning, pollutant removal, and cost estimating purposes, locations with larger areas available for implementation were assigned BMPs with larger footprints such as infiltration basins, extended detention basins, or constructed wetlands, whereas smaller areas were assigned to rain gardens, trenches, or swales. Implementation areas with soils classified primarily as HSG C or D were assigned non-infiltrating BMP types such as extended detention basins. Areas located in close proximity to wetlands are assumed to have relatively high groundwater, and thus were assigned BMP types such as constructed wetlands.

For the purposes of this initial screening effort, BMP selection focused on surface BMPs that could be installed in existing available spaces with little disturbance to existing paved surfaces, as a typical surface BMP is less expensive on a pounds of pollutant removed than a subsurface system installed below a parking lot or ball field. More expensive underground infiltration BMPs (e.g., subsurface infiltration) will be considered for proposed redevelopment projects where demolition, reconstruction and/or repaving are proposed to minimize the costs of installation. The use of subsurface infiltration BMPs would significantly increase treatment costs, as they can cost up to 4-10 times more than surface BMPs. Other BMPs that disturb pavement, including leaching catch basins and porous pavement, can likely be implemented at a wide variety of site, however, were not comprehensively assessed as part of this project will also be evaluated during redevelopment projects. Actual BMP types and sizes are expected to be refined as part of future designs.

BMP Unit Costs

Costs for BMP design and construction were estimated based on a memorandum from EPA titled "Methodology for developing cost estimates for Opti-Tool" (**Attachment A**). This memorandum built on multiple previous studies dating as far back as 2010 to estimate total implementation costs for multiple types of stormwater BMPs on a dollars per cubic foot of constructed volume in 2016 dollars, which also assumed that 35% of the construction cost would go towards engineering design and other contingencies. For the purposes of this memorandum, 2016 dollars were then converted to 2022 dollars by adding 18% to the total cost in order to account for inflation over the preceding six years.

Additionally, the Opti-Tool memorandum notes that cost adjustment factors may be incorporated to more accurately account for BMP site constraints associated with installation in a urban environments as follows:

- Undeveloped areas: 1.0;
- Partially developed areas: 1.5;
- Developed areas: 2.0; and
- Highly urban setting: 3.0.

Based on current development conditions, a cost adjustment factor of 1.5 was applied to all potential BMPs. Actual engineering costs depend on many factors, and engineering for larger projects generally consist of a lower total percent of the construction cost, with the inverse being true for smaller projects (e.g., a $250,000 construction project may have a $50,000 engineering cost or 20% of construction, whereas a $50,000 construction project may have a $25,000 engineering cost or 50% of construction). Costs outlined in this memorandum are for guidance and comparison purposes only, and future design phases will further refine costs associated with all BMPs. A summary of costing data is provided in **Table 3** at the end of this memorandum.

Pollutant Removal and Cost Summary

Based on calculations from the BATT calculator, implementation of all the stormwater BMPs outlined in Table 2 will remove a total of 2.0 pounds of phosphorus per year for a total engineering and construction cost of approximately $635,100 at an average cost of $320,800 per pound of

phosphorus removed. Pre-conceptual designs for the top five sites have been prepared and are included as **Attachment B**. Implementation of all recommended BMPs will remove a total of 2.3 pounds of phosphorus for a total cost of approximately $729,000.

Roadway Improvement Projects

Roadway improvement projects such as pavement resurfacing, reclamation, and/or roadway widening serve as an opportunity for the Town to coordinate drainage improvements with roadway improvements. It also provides an opportunity to incorporate water quality BMPs, however, such opportunities are often restricted to areas located within, or immediately adjacent to, the roadway. Example roadway intersection improvements for Town to consideration are provided in **Attachment C**. Implementation of such BMPs requires evaluation on a case-by-case basis in consideration of the size of the ROW, soil type, surrounding drainage infrastructure and location of other utilities.

Recommendations and Next Steps

It is recommended that the Town move forward with design and construction of a public demonstration project targeting a catchment with high phosphorus load within the Nashua River watershed by the end of June 2024. **Table 4** below outlines the top recommended locations, all of which are located within the watershed. These locations were identified to be of high priority as they have good opportunities for retrofit, discharge to waterbodies with a nitrogen TMDL or impairment, and have good public education opportunities. Pre-conceptual designs for the sites have been prepared and are included as **Attachment B**.

Additionally, is recommended that the Town review as-built plans for the High School to determine additional locations and opportunities for BMP retrofits at this location due to the large amounts of impervious area. It is further recommended that the Town repair and stabilize the eroded areas downstream of the High School outfall, located just southeast of the football field and track, to reduce the amount of sediment entering natural waterbodies.

The Town should also consider investigating, and implementing where feasible, water quality treatment BMPs as part of drainage improvements during roadway improvement projects. The cost and amount of phosphorus removed from these systems will vary based on the size of the BMP and contributing drainage area.

Table 4 – Top Priority BMP Locations

Location		Proposed BMP(s)			TP Reduction	
Facility Name	**Address**	**Type**	**Estimated Size**	**Construction & Engineering**	**Lbs / Year**	**Dollars / Pound**
Lunenburg Public Library	1023 Mass. Avenue	Water Quality Swale	270' x 15' x 2' Deep	$271,900	0.6	$438,600
		Detention Basin	110' x 50' x 3' Deep			
Historical District Town Common	35 Lancaster Avenue	Infiltration Basin	70' x 30' x 4' Deep	$123.200	1.0	$124,500
		Catch Basin	4 Units			
Boys and Girls Club of Lunenburg	15 Memorial Drive	Rain Garden	20' x 15' x 2' Deep	$198,800	0.1	$2,840,000
Lunenburg Historical Society	10 School Streets.	Water Quality Swale	80' x 4' x 1' Deep	$21,000	0.3	$70,700
		Infiltration Basin	35' x 15' x 3' Deep			
Lunenburg Middle High School[2]	1079 Mass. Avenue	TBD	TBD	TBD	TBD	TBD

If you have any further questions or would like additional information, please feel free to contact me at 800.725.2550 x303 or ncristofori@ceiengineers.com. Thank you.

Nick Cristofori, P.E.
Project Manager

Attachments:

- Table 1: Summary of Existing Conditions
- Table 2: Proposed Improvements
- Table 3: BMP Costing Information
- Figure 1: Municipal Properties Visited
- Attachment A: Memorandum report on Methodology for developing cost estimates for Opti-Tool; February 20, 2016
- Attachment B: Pre-Conceptual Designs for Top Locations
  Attachment C: Example Roadway and Intersection BMP Improvements

[2] Onsite facilities personnel indicated that existing BMPs treat some stormwater runoff, however, locations and designs are unknown. This site should be further evaluated to determine additional BMP retrofit opportunities.

Table 1: Summary of Existing Conditions

Description	Address	CEI Map ID	Total Parcel Area (acres)	Impervious Area (acres)	Existing Conditions Description	Watershed	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
Lunenburg Public Library	1023 Mass Ave	L1	1.49	0.30	The Lunenburg Public Library is a large multi-storey building with a large parking area. A single catch basin exists in the parking lot, directing water to an existing BMP. A rough drainage swale exists north of the building, flowing west to east. Water enters a low lying grassed area with overflow structure near the main Middle-High School entrance.	Mulpus Brook-Nashua River	No	Yes (Detention Basin)	Paxton-Urban land complex	C	0.15
									Woodbridge fine sandy loam	C/D	1.63
Historical District Town Common	35 Lancaster Ave	P2	0.50	0.01	Small grassed common between Lancaster Avenue, Whiting Street and Leominster Road. A small garden area exists on the northern portion of the common and a small gazebo exists in the center. Multiple large trees exist throughout the common.	Mulpus Brook-Nashua River	No	No	Paxton fine sandy loam	C	0.51
Boys and Girls Club of Lunenburg	15 Memorial Dr	S7	0.34	0.50	A Boys and Girls Club building with two medium sized parking areas. Basketball court present west of the building. Two catch basins present in southern parking area.	Mulpus Brook-Nashua River	No	No	Paxton fine sandy loam	C	0.26
									Woodbridge fine sandy loam	C/D	0.58
Lunenburg Historical Society	10 School St	T2	0.44	0.11	The Lunenburg Historical Society building with oversized parking area (located on Map ID T2), off of school street. A small grassed island exists in between the parking area and School Street.	Mulpus Brook-Nashua River	No	No	Paxton fine sandy loam	C	0.55
Lunenburg Middle High School	1079 Mass Ave	S1, S2, S6	35.22	16.67	Recommend installing rain gardens throughout grass areas to treat runoff prior to entering drainage system. Recommend repairing areas of erosion downstream of school outfall.	Mulpus Brook-Nashua River	No	No	Chatfield-Hollis-Rock outcrop complex	B	0.95
									Paxton fine sandy loam	C	1.85
									Paxton-Urban land complex	C	15.03
									Woodbridge fine sandy loam	C/D	29.44
									Ridgebury fine sandy loam	D	4.63
Low-Income Housing Complex	131 White St	H1	4.48	1.48	Housing development community with multiple units and paved parking areas. Multiple catch basins exist throughout.	Sand Brook-North Nashua River	No	No	Hinckley loamy sand	A	4.23
									Ridgebury fine sandy loam, extremely stony	D	1.73
Brian McNally Park	10 Lesure Ave	P3	2.26	0.10	Park with baseball field, small paved/gravel parking area, picnic area and medium sized wooded area.	Sand Brook-North Nashua River		No	Paxton-Urban land complex	C	0.70
									Woodbridge fine sandy loam	C/D	1.57
									Ridgebury fine sandy loam	D	0.10
Lunenburg Police Department	655 Mass Ave	PD1	2.69	2.01	Police station with multiple existing BMPs.	N/A	N/A	Yes (Detention Basins)	Udorthents, smoothed	N/A	1.17
									Chatfield-Hollis-Rock outcrop complex	B	2.35
									Woodbridge fine sandy loam, very stony	C/D	0.96
									Whitman fine sandy loam, extremely stony	D	0.23
Lunenburg Primary School	1401 Mass Ave	S3	12.04	4.29	Primary School with multiple existing BMPS.	N/A	N/A	Yes (Dentention Basins)	Paxton fine sandy loam	C	1.38
									Woodbridge fine sandy loam, very stony	C/D	1.32
									Woodbridge fine sandy loam	C/D	13.52
									Ridgebury fine sandy loam	D	0.11
Town Beach	265 Prospect St	B1	0.03	0.16	Thin beach area between Prospect Street and Lake Whalom. Multiple catch basins observed on Prospect Street.	N/A	N/A	No	Paxton fine sandy loam	C	0.18
									Woodbridge fine sandy loam	C/D	0.01
North Cemeterie	50 Holman St	C1	20.69	1.66	Town cemetery.	N/A	N/A	No	Hinckley loamy sand	A	0.60
									Windsor loamy sand	A	9.86
									Scarboro mucky fine sandy loam	A/D	1.90
									Chatfield-Hollis-Rock outcrop complex	B	9.55
									Swansea muck	B/D	0.45
Cemetery	60 Page St	C2	4.55	1.48	Town cemetery.	N/A	N/A	No	Quonset loamy sand	A	6.03
Highway Department	520 Chase Rd	D1	3.09	3.57	Large maintenance building, parking area and areas for equipment and material storage. Wooded area abuts Chase Road. Mulpus Brook flows south to north through the western portion of the parcel.	N/A	N/A	No	Urban land	N/A	3.05
									Hinckley loamy sand	A	0.35
									Scarboro mucky fine sandy loam	A/D	1.31
									Woodbridge fine sandy loam, very stony	C/D	1.78
									Woodbridge fine sandy loam	C/D	0.03
									Ridgebury fine sandy loam	D	0.13
Pump Station	500 Leominster-Shirley Rd	D2	17.49	0.00	Large wooded parcel with wetland area. Pump station and associated gravel area exist near Leominster Shirley Road.	N/A	N/A	No	Pits, gravel	N/A	4.92
									Scarboro mucky fine sandy loam	A/D	5.46
									Freetown muck	B/D	7.12
Ritter Memorial Library	960 Mass Ave	L2	0.47	0.61	Library and business building between School Street, Mass Avenue and Lancaster Avenue. Parking areas east and west of building with connecting paved road south of the building. Grassed area north of the building.	N/A	N/A	No	Paxton fine sandy loam	C	1.09
									Water	N/A	3.11

Description	Address	CEI Map ID	Total Parcel Area (acres)	Impervious Area (acres)	Existing Conditions Description	Watershed	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
Marshall Park and Pond	100 Chestnut St	P1	25.16	2.64	Large park with two baseball fields, a softball field, parking areas, wooded areas and pond.	N/A	N/A	No	Scarboro mucky fine sandy loam	A/D	0.40
									Chatfield-Hollis-Rock outcrop complex	B	17.97
									Paxton fine sandy loam	C	1.04
									Woodbridge fine sandy loam	C/D	0.54
									Ridgebury fine sandy loam	D	3.28
									Whitman fine sandy loam, extremely stony	D	1.45
Veterans Memmorial Park	999 Mass Ave	P4	0.29	0.01	Thin parcel between Memorial Drive and Mass Avenue. Multiple veteran memorials.	N/A	N/A	No	Woodbridge fine sandy loam	C/D	0.30
Cowdrey Conservation Area	1625 Mass Ave	P5	312.72	0.37	Very Large conservation area with large amounts of wetlands. Mulpus Brook flows through parcel.	N/A	N/A	No	Pits, gravel	N/A	8.84
									Water	N/A	4.91
									Deerfield loamy fine sand	A	30.96
									Quonset loamy sand	A	111.38
									Chatfield-Hollis-Rock outcrop complex	B	2.94
									Freetown muck	B/D	79.34
									Paxton fine sandy loam	C	38.86
									Woodbridge fine sandy loam	C/D	14.47
									Whitman fine sandy loam	D	21.39
Laurel Bank Conservation Area	120 Pleasant St	P6	66.92	0.91	Conservation land made up of mostly wooded areas, wetlands and ponds. Elevation varies throughout.	N/A	N/A	No	Udorthents, smoothed	N/A	0.25
									Water	N/A	1.51
									Hinckley loamy sand	A	51.78
									Freetown muck	B/D	2.05
									Swansea muck	B/D	1.80
									Paxton fine sandy loam, extremely stony	C	4.74
									Paxton fine sandy loam	C	0.09
									Woodbridge fine sandy loam	C/D	5.61
Clarks Hill	301 Lancaster Ave	P7	17.43	0.00	Large wooded parcel with very steep slope off of Lancaster Avenue.	N/A	N/A	No	Paxton fine sandy loam	C	3.22
									Woodbridge fine sandy loam	C/D	14.21
Ben Normand Park	702 Reservoir Rd	P8	4.05	0.07	Roadside park with a softball and baseball field. Very little impervious area exists. Adjacent Reservoir Road is fairly flat with no drainage structures.	N/A	N/A	No	Quonset loamy sand	A	2.70
									Scarboro mucky fine sandy loam	A/D	1.42
Wallis Park	10 Wallis Park	P9	1.45	0.67	Park with two basketball courts, playground and large wooded area. Parcel is relatively flat with little to no room for a BMP.	N/A	N/A	No	Paxton-Urban land complex	C	2.12
Lake Access Area	75 Lakefront Ave	PL1	0.11	0.58	A long thin strip of land between Lake Front Avenue and Lake Whalom. Area is mostly paved with rock wall abutting lake. Small grassed islands exist throughout.	N/A	N/A	No	Water	N/A	0.04
									Paxton-Urban land complex	C	0.65
Eagle House Senior Center	25 Memorial Dr	S5	1.21	0.59	Senior center building and associated parking area. Multiple catch basins exist on and around the parcel. A game area and playground for the neighboring school exists on the parcel.	N/A	N/A	No	Woodbridge fine sandy loam	C/D	1.79
Town Hall	17 Main St	T1	0.03	0.11	Town Hall building takes up the vast majority of space on the parcel. Very limited pervious area.	N/A	N/A	No	Paxton fine sandy loam	C	0.15
Old School Building	30 School St	T3	1.61	0.82	Old Primary School building and associated parking areas located at the end of School Street.	N/A	N/A	No	Paxton fine sandy loam	C	2.44
Lunenburg Community Pollinator Habitat	123 Hollis Rd	T4	34.11	0.07	Nature and wildlife area with single family residence. Mostly wooded with a noticeable decrease in elevation from west to east.	N/A	N/A	No	Chatfield-Hollis-Rock outcrop complex	B	17.33
									Woodbridge fine sandy loam, very stony	C/D	13.05
									Ridgebury fine sandy loam, extremely stony	D	3.80
Lunenburg Water Department	50 Leasure Ave	WD1	0.62	0.24	Small Water Department building and paved parking area. Pavement in poor condition. Multiple drainage structures on Water Street.	N/A	N/A	No	Paxton-Urban land complex	C	0.09
									Ridgebury fine sandy loam	D	0.78
Water Tower	9 Chase Rd	WD2	0.73	0.26	Water tower on wooded parcel, surrounded by wooded areas. Could not locate access road to investigate further.	N/A	N/A	No	Chatfield-Hollis-Rock outcrop complex	B	0.99
Water Tower	314 Sunny Hill Rd	WD3	0.55	0.16	Water tower off of Sunnyhill Road. Paved access road and small parking area. Multiple catch basins observed east of the water tower.	N/A	N/A	No	Paxton fine sandy loam	C	0.71

1. All soils data obtained from GIS sources.

Table 2: Proposed Improvements

Description	Address	CEI Map ID	Recommendations and Conclusions	Area For Treatment		Pollutant Loading[1]			Proposed BMP(s)		Pollutant Reduction Estimates[2]			BMP Implementation Costs[3]				Dollars per Pound of Removal		
				Total (acres)	Impervious (acres)	Impervious Area TP Load (lbs/yr)	Impervious Area TN Load (lbs/yr)	Impervious Area TSS Load (lbs/yr)	Proposed BMP(s)	Estimated Size	TP Reduction (lbs/yr)	TN Reduction (lbs/yr)	TSS Reduction (lbs/yr)	Unit Construction Cost per SF, CF or LF	Estimated Construction Cost	Estimated Engineering Cost	Total BMP Cost (Design & Construction)	TP Reduction ($$/lb)	TN Reduction ($$/lb)	TSS Reduction ($$/lb)
Lunenburg Public Library	1023 Mass Ave	L1	Recommend the enhancement of the drainage swale north of the library, creating a more defined and armored swale. Asphalt curbing with curb cuts should be added along the south side of the Elementary School driveway. Riprap swales will transport water from the roadway to the main swale. Grassed basin should be dug out to allow for additional storage.	1.68	1.16	1.55	11.80	1716.95	Water Quality Swale	270' x 15' x 2' Deep	0.6	3.6	1,717	$8.18	$66,300	$23,300	$288,400	$465,200	$80,800	$170
									Detention Basin	110' x 50' x 3' Deep				$8.92	$147,200	$51,600				
Historical District Town Common	35 Lancaster Ave	P2	Recommend the installation of a rain garden or infiltration basin on the south western corner of the common. Catch basin(s) installed along the eastern edge of Leominster Road will transport runoff to the rain garden. An overflow structure will allow water to flow into an existing catch basin on Leominster Road during high flow events.	1.17	0.75	1.01	7.63	1110.10	Infiltration Basin	70' x 30' x 4' Deep	1.0	7.6	1,110	$8.18	$68,800	$24,100	$123,200	$124,500	$16,200	$120
									Catch Basin	4 Units				$5,600	$22,400	$7,900				
Boys and Girls Club of Lunenburg	15 Memorial Dr	S7	Recommend the replacement of the catch basin located in the northeastern corner of the southern parking area with a manhole. Install curb cut and riprap swale to small rain garden in the grassed area west of the building. Rain garden overflow structure will connect to new manhole and follow existing drainage to the street.	0.09	0.08	0.11	0.81	118.41	Rain Garden	20' x 15' x 2' Deep	0.1	0.3	118	$20.27	$12,200	$4,300	$198,800	$2,840,000	$584,800	$1,700
Lunenburg Historical Society	10 School St	T2	Recommend the pave and regrade of the parking area to promote positive drainage to the proposed infiltration basin, north of the building. The installation of a catch basin will allow water to enter the basin. A swale northwest of the building will transport any runoff from the paved driveway and building to the BMP.	0.27	0.24	0.32	2.44	355.23	Water Quality Swale	80' x 4' x 1' Deep	0.3	2.3	332	$16.38	$5,300	$1,900	$24,700	$82,400	$10,900	$100
									Infiltration Basin	35' x 15' x 3' Deep				$8.18	$12,900	$4,600				
Lunenburg Middle High School	1079 Mass Ave	S1, S2, S6	Recommend the installation of rain gardens throughout grassed areas where feasible in order to treat runoff prior to entering drainage system. Recommend repairing erosion downstream of school outfall.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Low-Income Housing Complex	131 White Street	H1	Recommend the addition of a swale along the western edge of the western most parking area to capture and treat sheet flow.	0.21	0.21	0.28	2.14	310.83	Water Quality Swale	100' x 10' x 1' Deep	0.1	0.4	262	$16.38	$16,400	$5,800	$22,200	$317,200	$63,500	$100.00
Brian McNally Park	10 Lesure Ave	P3	Recommend a repave of existing parking lot, possible use porous pavement for additional infiltration.	0.27	0.25	0.34	2.54	370.03	Porous Pavement	7600 SF	0.2	1.9	340	$6.98	$53,100	$18,600	$71,700	$341,500	$37,200	$300.00
Lunenburg Police Department	655 Mass Ave	PD1	Recommend keeping up with BMP maintenance.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lunenburg Primary School	1401 Mass Ave	S3	Recommend keeping up with BMP maintenance.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Town Beach	265 Prospect St	B1	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North Cemeterie	50 Holman St	C1	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cemetery	60 Page St	C2	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Highway Department	520 Chase Rd	D1	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pump Station	500 Leominster-Shirley Rd	D2	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ritter Memorial Library	960 Mass Ave	L2	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Marshall Park and Pond	100 Chestnut St	P1	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Veterans Memmorial Park	999 Mass Ave	P4	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cowdrey Conservation Area	1625 Mass Ave	P5	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Laurel Bank Conservation Area	120 Pleasant St	P6	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Clarks Hill	301 Lancaster Ave	P7	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ben Normand Park	702 Reservoir Rd	P8	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wallis Park	10 Wallis Park	P9	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lake Access Area	75 Lakefront Ave	PL1	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Eagle House Senior Center	25 Memorial Dr	S5	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Town Hall	17 Main St	T1	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Old School Building	30 School St	T3	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lunenburg Community Pollinator Habitat	123 Hollis Rd	T4	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lunenburg Water Department	50 Leasure Ave	WD1	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Tower	9 Chase Rd	WD2	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water Tower	314 Sunny Hill Rd	WD3	No Recommendations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
										Total	**2.3**	**16.1**	**3,880**	-	**$539,600**	**$189,400**	**$729,000**	**$238,800**	**$11,800**	**$200**

1. Pollutant loading calculated for impervious areas only using the land use loading rates provided in the BATT calculator for "Highway". Rates are as follows, in pounds per acre per year: 1.34 pounds of Total Phosphorus; 10.17 pounds of Total Nitrogen; 1,480.13 pounds of Total Suspended Solids
2. Pollutant reduction estimates calculated through EPA's BATT calculator
3. Information on BMP costing is attached as Attachment A.

Table 3 - BMP Costing Information

Stormwater BMP Type	Unit	OptiTool BMP Estimates, 2016[1,2]	OptiTool BMP Estimates, 2022[3]	Adjusted BMP Estimate, 2022[4]	Adjusted Construction Estimate[4]	Adjusted Engineering/ Contingency Estimate[5]
Biorentention / Rain Garden	per CF	$15.46	$18.24	$27.36	$20.27	$7.09
Constructed Wetlands	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Dry Detention Basin	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Gravel Wetland	per CF	$8.78	$10.36	$15.54	$11.51	$4.03
Infiltration Basin	per CF	$6.24	$7.36	$11.04	$8.18	$2.86
Infiltration Trench	per CF	$12.49	$14.74	$22.11	$16.38	$5.73
Porous Pavement	per CF	$5.32	$6.28	$9.42	$6.98	$2.44
Sand Filter	per CF	$17.94	$21.17	$31.75	$23.52	$8.23
Wet Detention Basin	per CF	$6.80	$8.02	$12.04	$8.92	$3.12
Subsurface Infiltration/Detention System (aka Infiltration Chamber)	per CF	$67.85	$80.06	$160.13	$118.61	$41.51

1. Memorandum on Methodology for developing cost estimates for Opti-Tool is provided as Attachment A.

2. Total includes cost of construction, engineering, and contingencies.

3. 2022 Estimate assumes a 18% markup from 2016 Estimate due to inflation.

4. Adjustment factor of 1.5 is applied to account for construction in developed areas.

5. Engineering/Contingency Estimate is 35% of the Construction Estimate.

ASHBY

TOWNSEND

FITCHBURG

LEOMINSTER

SHIRLEY

LANCASTER

HOWARD STREET
WEST TOWNSEND ROAD
NEW WEST TOWNSEND ROAD
STAGECOACH ROAD
CHASE ROAD
ASPLUND DRIVE
HOLMAN STREET
NORTHFIELD ROAD
HIGHLAND STREET
GILCHREST STREET
VALLEY ROAD
ISLAND ROAD
WOODLAND ROAD
SOUTH ROW ROAD
COVE ROAD
PENINSULA DRIVE
TOWNSEND HARBOR ROAD
HEMLOCK DRIVE
MULPUS ROAD
CROSS STREET
BEAL STREET
CHESTNUT STREET
RILEY ROAD
MASSACHUSETTS AVENUE
WHITE STREET
RICHARDS WAY
ROLLING ACRES ROAD
ELMWOOD ROAD
THE LANE
ARBOR STREET
COURT AND CIRCLE
SUNNYHILL ROAD
FAIRVIEW ROAD
WEST STREET
ELECTRIC AVENUE
HOLLIS ROAD
ELM STREET
PAGE STREET
WATT STREET
PLEASANT STREET
BROWN AVENUE
PRATT STREET
CAROUSEL LANE
PROSPECT STREET
LEOMINSTER ROAD
RESERVOIR ROAD
LAUREL LANE
CROSS ROAD
WHALOM ROAD
YOUNGS ROAD
SUMMER STREET
ASH STREET
KILBURN STREET
LANCASTER AVENUE
BURRAGE STREET
FLAT HILL ROAD
LONGWOOD DRIVE
HOUGHTONS MILL ROAD
SUNSET LANE
ROBBS HILL ROAD
OAK RIDGE ROAD
GOODRICH STREET
FLYNN ROAD
FIRE ROAD 12
RUTH STREET
FIRE ROAD 16
ROUND ROAD
FIRE ROAD 15
LEOMINSTER SHIRLEY ROAD

D1
C1
P1
S1,S2,S6
S3
P5
PD1
WD2
H1
S7
T4
T2
T1
L1
P4
S5
T3
L2
P2
P7
WD3
C2
P6
P9
PL1
P3
B1
WD1
P8
D2

Figure 1
Municipal Properties Visited

Lunenburg, MA

Comprehensive Environmental Incorporated

N

0 0.5 1
Miles

Data source: MassGIS, CEI, Town of Lunenburg

6/30/2022

Legend

- Outfall
- Open Drainage Outfall
- Culvert
- DNE
- Catch Basin
- Drop Inlet
- Leaching Catch Basin
- Inlet
- Swale Inlet
- Manhole
- Dry Well
- Interconnections
- Detention Basin
- Infiltration Basin
- Swale
- Drainage_Pipes
- Non-Urban Area
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook

MunicipaProperties:

- Cemeteries
- Low-Income Housing
- Municipal Buildings
- Open Spaces
- Parking
- Schools and Community Buildings
- Town Beach

MUNICIPAL PROPERTY BMP RETROFITS

Attachment A:
BMP costing table and memorandum report on
Methodology for developing cost estimates for Opti-Tool;
February 20, 2016

MEMORANDUM

DATE: February 20, 2016

TO: Opti-Tool TAC

FROM: Karen Mateleska, EPA Region- I

SUBJECT: **Methodology for developing cost estimates for Opti-Tool**

Introduction

EPA – Region I offered to provide TetraTech with BMP cost information for the New England Stormwater Management Optimization Tool (Opti-Tool). The goal was to include the latest available information that would accurately reflect capital costs for select BMPs installed in the New England region. This document describes the approach used to determine these values.

The unit cost estimates originally developed as part of a 2010 study were used as the basis/starting-point for the cost estimates for the Opti-Tool. This study, entitled *Stormwater Management Plan for Spruce Pond Brook Subwatershed,* was produced by the Charles River Watershed Association (CRWA). The full report can be viewed at: http://www.crwa.org/hs-fs/hub/311892/file-636820515-pdf/Our_Work_/Blue_Cities_Initiative/Scientific_and_Technical/CRWA_Franklin_Plan.pdf. This subwatershed in the Town of Franklin (in eastern Massachusetts) was selected, in part, because it represented one of the many communities in the watershed that would be required to reduce nutrient (phosphorus) loads in stormwater runoff as part of EPA's Phase II MS4 General Stormwater Permit and a TMDL for Nutrients in the Upper/Middle Charles River. The cost estimates developed in the study can predominantly be attributed to CRWA and both Rich Claytor and Nigel Pickering of Horsley Witten Group (CRWA *et al.* 2010). The development of these costs was based on a literature review of BMP cost information and Claytor's extensive experience working in this field with Massachusetts communities. These values were originally reported in Appendix B of the aforementioned CRWA document. Those cost estimates have also been used in additional stormwater studies supported by EPA – Region I, including the *Sustainable Stormwater Funding Evaluation for the Upper Charles River Communities of Bellingham, Franklin, and Milford, MA (*2011). (That report can be viewed at: http://www.epa.gov/region1/npdes/charlesriver/pdfs/20110930-SWUtilityReport.pdf)

Before simply relying on the CRWA cost estimates, additional research was conducted of publicly available (online) resources to determine if more recent BMP cost information for the New England region was available. These resources included:

- EPA's LID webpage: http://water.epa.gov/polwaste/green/
- EPA's 2013 Article: *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs: http://water.epa.gov/polwaste/green/upload/lid-gi-programs_report_8-6-13_combined.pdf*

- New England Environmental Finance Center: http://efc.muskie.usm.maine.edu/
- UNC Environmental Finance Center's *Catalog of Finance Publications on Green Infrastructure Approaches to Stormwater Management* (This spreadsheet provides a catalog of 46 publications related on green infrastructure for stormwater management that have finance relevance; Several of the sources from the catalog were reviewed for this document) : http://www.efc.sog.unc.edu/reslib/item/catalog-green-infrastructure-and-stormwater-finance-publications
- Houle, *et al. Comparison of Maintenance Cost, Labor Demands, and System Performance for LID and Conventional Stormwater Management*: http://www.unh.edu/unhsc/sites/unh.edu.unhsc/files/Houle_JEE_July-2013.pdf
- University of New Hampshire Stormwater Center's *Forging the Link: Linking the Economic Benefits of LID and Community Decisions: http://www.unh.edu/unhsc/forging-link-topics*
- Center for Neighborhood Technology's *Green Values Stormwater Tool Box: http://greenvalues.cnt.org/* which included the Green Values Calculator: http://greenvalues.cnt.org/national/calculator.php
- Water Environment Research Foundation (WERF): User's Guide to the BMP and LID Whole Life Cost Models, Version 2.0: www.werf.org/bmpcost
- Low Impact Development Center: http://www.lowimpactdevelopment.org/
- ECONorthwest's *The Economics of Low-Impact Development: A Literature Review:* http://www.econw.com/our-work/publications/the-economics-of-low-impact-development-a-literature-review/
- Drexel University's Low Impact Development Rapid Assessment (LIDRA Model) http://www.lidratool.org/home/publications.aspx

A review of these resources did highlight the multitude of variables that can impact the cost of installing LID BMPs and the variety of cost analysis methods that can be used when assessing the cost effectiveness of various LID storm water controls. For example, many of the resources emphasized that costs tend to be site specific. Costs often differ significantly among different geographical locations, depending upon labor and material expenses and the constraints of a particular site. Unfortunately, most of the aforementioned resources highlighted projects outside of the New England region (with the exception of the articles by Houle of the UNHSC and New England Environmental Finance Center.)

EPA's recent (2013) report entitled *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs* listed the 7 different types of economic analyses that were represented by the 13 case studies highlighted in the report. These ranged from the simplest form of economic analysis (i.e., the capital cost assessment) to more robust forms, including the life cycle cost assessment. Whole life-cycle costs would provide a more accurate estimate of the cost of installing, operating, maintaining, and replacing a project (i.e., BMP) throughout its expected lifetime. However this type of analysis requires solid estimates for capital, land purchase, O&M, and other related costs.

Ideally, the goal was to include a more advanced economic analysis (i.e. – life cycle costs) in the Opti-Tool while still maintaining some level of simplicity for the end user. However, such a robust economic analysis does not currently appear possible because the literary search for more recent BMP cost estimates, reflective of New England states, was largely unsuccessful. However, the search was not

entirely fruitless. Jamie Houle of the UNHSC did provide extremely valuable information on capital and maintenance costs for various BMPs that have been tested at the UNHSC. Cost estimates for a particular BMP available from *both* the CRWA study and UNHSC were discussed among Mark Voorhees of EPA, Jamie Houle of UNHSC, and Karen Mateleska of EPA, and a best professional judgment decision was made.

The recommendation at this time is to use a combination of the CRWA cost estimates **and** UNHSC costs estimates as the basis for the Opti-Tool BMP cost estimates, and to use a modified capital cost assessment (which includes a fixed percentage for Design and Contingency Costs) as well as a separate field for maintenance hours (from the UNHSC). The details supporting this approach are described below.

Overview of Scope and Approach

According to a draft memo, dated 6/20/14 from Tetra Tech to EPA Region I, the current SUSTAIN BMP Cost function has seven major individual components, using a formula that would likely be useful in a more detailed design mode. For purposes of simplicity, EPA Region I is proposing the following cost function formula for the tool's "planning" mode:

General Cost Function Formula = Storage Volume of BMP* (ft^3) X Cost Estimate for BMP ($/$ft^3$)
X Adjustment Factor

* Storage Volume of BMP is more accurately defined as (Design) Physical Storage Capacity of BMP; See Section A below for more details

Initially, the intention was to include the preliminary Operations and Maintenance (O&M) costs in the general formula (page 3) by simply multiplying the formula results by our Preliminary O & M costs. However, such an approach would only include **one year's worth** of operations and maintenance, which could have been misleading because it would not have reflected the true life cycle cost of the BMP (i.e., assume life cycle of 20 years). However, simply including the 20 year life cycle cost (O&M cost *20) in the above formula would have greatly increased the cost value and perhaps have created misconceptions about BMP use and affordability.

Therefore, the subcommittee decided to include the anticipated operation and maintenance **hours** required for each BMP per year instead. This parameter was included as a completely separate field in the Opti-Tool. The rationale was that Opti-Tool users need to understand that operation and maintenance impact the overall cost-effectiveness of BMPs and should be considered when selecting a BMP. Including O&M hours (instead of costs) as a separate field, would still highlight this important consideration for stormwater managers.

A. Storage Volume and Proposed Cost Estimate Values

As highlighted above, the general cost function formula used in the Opti-Tool consists of 3 factors: the BMP storage volume, the proposed BMP storage volume cost estimate, and the adjustment factor. The first two factors will be covered together in this memo because they are so closely linked. Table 1 below summarizes the proposed BMP cost estimates for the Opti-Tool.

Table 1: Proposed BMP Cost Estimates for Opti-Tool

BMP (From Opti-Tool)	Cost ($/ft^3) [1]	Cost ($/ft^3) – 2016 dollars[6]
Bioretention (Includes rain garden)	13.37 [2,4]	15.46
Dry Pond or detention basin	5.88 [2,4]	6.80
Enhanced Bioretention (aka-Bio-filtration Practice)	13.5 [2,3]	15.61
Infiltration Basin (or other Surface Infiltration Practice)	5.4 [2,3]	6.24
Infiltration Trench	10.8 [2,3]	12.49
Porous Pavement - Porous Asphalt Pavement	4.60 [2,4]	5.32
Porous Pavement - Pervious Concrete	15.63 [2,4]	18.07
Sand Filter	15.51 [2,4]	17.94
Gravel Wetland System (aka-subsurface gravel wetland)	7.59 [2,4]	8.78
Wet Pond or wet detention basin	5.88 [2,4]	6.80
Subsurface Infiltration/Detention System (aka-Infiltration Chamber)	54.54[5]	67.85

[1] Footnote: Includes 35% add on for design engineering and contingencies

[2] Costs in 2010 dollars

[3] From CRWA Cost Estimates

[4] From UNHSC Cost Estimates; Most of original costs were from 2004 and converted to 2010 dollars using U.S. Department of Labor (USDOL). (2012). Bureau of Labor Statistics consumer price index inflation calculator. http://www.bls.gov/data/inflation_calculator.htm

[5] From Cost Estimate of MA TT Rizzo Project (2008 Dollars)

[6] 2010 costs were converted to 2016 values to adjust for inflation. The ENR Cost Index Method was used for this conversion.

Table 1 includes all of the BMPs that are included in the Opti-Tool. The unit costs represent the dollar amount ($) per cubic foot of storage volume (ft^3), where the storage volume reflects the (design) physical static storage capacity that the relevant BMP can hold. This volume includes the volume of ponding water *and* the volume of water retained in the porous media or subbase materials if applicable. (This storage volume does *not* represent the *treated* volume of stormwater, which may be significantly higher than the physical storage volume of a BMP particularly for systems that are sized dynamically or

by a water quality flow rate as opposed to a water quality volume.) This unit cost per storage volume captured by a BMP differs from other (perhaps more traditional) methods that can be used. By choosing to use the unit cost per storage volume instead of volume of water treated, we are trying to eliminate confusion over what the actual dimensions of the BMP will be for the costs being estimated. Additionally, this use of the unit cost per storage volume is consistent with the approach used in developing the BMP performance curves (used in the Opti-Tool) where the x-axis is the actual **physical storage capacity** to hold water. Lastly, expressing the unit costs in this manner will benefit users who are simply interested in using the unit costs (outside of the Opti-Tool) by eliminating the step of modeling hydrology and routing the water through the BMP, which can yield widely varying results depending on modeling approach and supporting assumptions. Attachment A describes the method used in calculating the design storage volume for each of the selected BMPs.

Also, each unit cost per storage value represents the capital cost of construction/installation of the BMP and includes a 35% design/engineering/contingency (D & E) cost. This 35% fixed percentage of the total construction cost follows a general "rule of thumb," often used by consulting firms. Based upon a conversation between Mark Voorhees and Jamie Houle (two members of the Opti-Tool cost subcommittee), a decision was made to include this D&E cost. The values in Table 1 do *not* include the cost of purchasing any land, nor does it include any O&M costs (which is discussed in more detail in a subsequent section). Therefore, each unit cost in Table 1 that was based on the CRWA's 2010 values was calculated by multiplying the relevant BMP cost by 1.35.

Since the CRWA study did not include cost estimates for porous pavement or sand filters, which are BMPs included in the Opti-Tool, relevant data was obtained from Jamie Houle of the University of New Hampshire Stormwater Center (UNHSC). He also provided additional cost estimates (as denoted by Footnote 4 in Table 1) for some of the other BMPs included in the tool. UNHSC can provide valuable data because they have been directly involved with the engineering, design and construction of numerous LID controls, as well as evaluating multiple stormwater treatment systems over multiple years at their primary field research facility in Durham, N.H. Since they could provide cost information for both porous asphalt pavement and pervious concrete, separately, the general category of porous pavement was divided into the aforementioned two sub-categories.

It should be noted that the costs used for the Opti-tool *assume linearity*, which will both allow for *and* incentivize the scaling to smaller-sized systems. For example, EPA has estimated that *smaller* capacity designs for BMPs, rather than large-sized BMPs, can increase both the technical and economic feasibility of installing controls, particularly for retrofits. The assumption of linearity was made for the following reasons: 1) Limited data currently exists on the cost of small capacity systems. Until a larger pool of cost data becomes available which will allow for the development of a non-linear cost curve, the current method is the best available alternative; 2) As the installation of smaller systems becomes more wide-spread, it is likely that economies of scale will develop and cost savings will occur. For example, if one entity is contracted to install multiple small systems at once, materials can be bought in bulk and the installation process can become more efficient and less expensive; 3) An undersized system built to treat a large area can be a very cost effective approach. As an example, there should not be a significant cost difference between a 1-inch system treating 1 acre and a 1/10-inch-system that treats 10 acres, since the absolute capacity of the system is the same in both cases. This topic of linearity will be revisited in the future when more data is available.

Since UNHSC typically calculates the capital costs per cubic foot (ft^3) *treated*, using WQv, Jamie Houle converted the costs to represent the capital costs per BMP storage volume (ft^3). This was necessary so the capital cost data would be consistent with the method used in the Opti-Tool. Also, all of the costs were converted to 2010, and ultimately 2015, dollars. As with the CRWA costs, the UNHSC capital costs were already adjusted to include the 35% design/engineering/contingency (D & E) cost. Details of all of these calculations, and any other assumptions made, are presented in Attachment B.

When developing cost estimates, another topic for consideration was whether or not to address the issue of inflation. CRWA's BMP cost estimates were based on capital costs from 2010. As previously stated, UNHSW's cost estimates have also already been converted to constant 2010 dollars using consumer price index inflation rates [U.S. Department of Labor (USDOL) 2014].[1] Therefore, there was the option of converting all of these 2010 costs to 2016 costs, using the U.S. Department of Labor's consumer price index inflation calculator. However, another suggestion was made to use the ENR Cost Index method to adjust for inflation instead because it more closely tracks construction work. At least one New England state (i.e., Vermont) also uses the ENR Cost Index method, so this could provide some consistency, as well. Therefore, the decision was made to ultimately convert all of the costs to 2016 values using the ENR Cost Index method. These values are reflected in Table 1.

To use the index, one calculates the quotient of the current index number (based on the month and year of *current* date) divided by the index number from a given date (e.g., June of 2010). Since the month was not known for the 2010 costs, the month of June was used as an estimate. This assumption was used because it falls mid-way between the construction season and would likely provide a reasonable estimate. Once the quotient was calculated, it was multiplied by the construction cost (found in the middle column in Table 1, above) to provide the 2016 construction cost value

B. Cost Adjustment Factor

Since the cost of installing a BMP will vary depending on the specific site location, the TAC subcommittee believed it was important for the Opti-Tool to include a scalable cost adjustment factor. The proposed cost estimates for the Opti-Tool (in Table 1) are all based on a Cost Adjustment Factor of 1. However, each Opti-Tool user has the option to choose and enter into the tool a cost adjustment factor that is appropriate for their site. This will adjust the storage volume cost function in the Opti-Tool.

For example, the CRWA report included the cost factors summarized in Table 2.

[1] Reference: U.S. Department of Labor (USDOL). (2014). Bureau of Labor Statistics consumer price index inflation calculator." ⟨http://www.bls.gov/data/inflation_calculator.htm⟩(Sep. 12, 2014)

Table 2: Example of Cost Adjustment Factors

BMP Type	**EXAMPLE** Cost Adjustment Factor
New BMP in undeveloped area	1
New BMP in partially developed area	1.5
New BMP in developed area	2
Difficult installation in highly urban settings	3

(Source: Table 4 of Appendix B of CRWA's Spruce Pond Brook Subwatershed Project for Town of Franklin)

The assumption made was that it would cost more to install a new BMP in a developed area (with more site constraints) than it would cost to install the same BMP in a previously undeveloped area. So in the above example, the cost adjustment factor would be 2 for installing a BMP in a previously developed area versus a cost adjustment factor of 1 for installing a BMP in an undeveloped area.

It should be noted that Table 2 (above) provides just *one example* of adjustment factors. The factor should be flexible enough so that another location (or Opti-Tool user) can adjust it, as needed. For example, the Charles River Watershed (in eastern Massachusetts) used an adjustment factor of 2 for installing a BMP in a developed area, while the State of Vermont uses an adjustment factor of 1.4 to estimate the cost of installing a BMP for existing development.

C. Maintenance (O&M) Costs

Originally, one goal was to include Operation and Maintenance (O&M) costs as part of the cost estimates for the Opti-Tool. These O&M costs would help to provide a more realistic reflection of the long-term expenses of structural storm water controls, which is obviously critical in the practical, real-world implementation of BMPs. However, it is difficult to obtain accurate maintenance costs and they will be highly variable depending on the size, location and equipment needed to perform long-term O&M.

This point was highlighted by a key finding in EPA's recent (2013) publication, *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs.* The report indicated that only a small percentage of the entities that implement LID and GI approach for stormwater management conduct economic analyses due to the "uncertainties surrounding costs, operation and maintenance (O&M) requirements, budgetary constraints, and difficulties associated with quantifying the benefits provided by LID/GI" and the need "to obtain better estimates of the O&M costs associated with different types of LID/GI projects" was a key finding of the report.

As previously mentioned, one article entitled, *Comparison of Maintenance Cost, Labor Demands, and System Performance for LID and Conventional Stormwater Management* (Houle *et al. 2013)*, did contain relevant information for BMP costs in the New England region. During initial discussions between EPA Region I (Mark Voorhees) and UNHSC (Jamie Houle), there was concern that not enough data existed on O&M costs to propose accurate values for each of the BMPs included in the Opti-Tool. There was also

the concern that the O&M costs were not scaleable. For example, initial O&M costs for each BMP were based on the cost of operation and maintenance per year per acre of IC treated. Scaled differences such as the annual O&M costs for treating 0.5 acres of IC or 2 acres of IC have **not** been evaluated and may or may **not** result in a simple linear relationship. Yet the Opti-Tool costs subcommittee also realized the importance of including some maintenance parameter in order to *initiate* the conversation on the importance of accounting for O&M to maintain the functionality of the BMPs. Therefore Table 3, below, presents these annual maintenance costs (in $) for select BMPs, as well as the annual maintenance hours. Although the O&M costs have been presented in this memo, only the O&M **hours** will be included (as a separate field) in the Opti-Tool.

Table 3: Maintenance Costs ($) and Hours per year for select BMPs – From UNHSC

BMP	Maintenance Cost ($) per year	Annual Maintenance Hours
Bioretention	$1,890.00	20.7
Chamber System	Not Assessed	Not Assessed
Detention Pond	$2,380.00	24.0
Gravel Wetland	$2,138.33	21.7
Porous Asphalt	$1,080.00	6.0
Pervious Concrete	$1,080.00	6.0
Retention Pond	$3,060.00	28.0
Sand Filter	$2,807.50	28.5

*Note: initial costs based on cost of maintenance per year per acre of IC treated

Annual maintenance strategies were evaluated by directly quantifying hours spent categorizing maintenance activities, and assessing difficulty of those activities. To better illustrate costs and anticipate maintenance burdens, activities were characterized into distinct categories and a standard cost structure was applied. This unit conversion can easily be adapted according to local conditions, current economic climate, and regional cost variations which is why we decided to go with maintenance **hours** as those were directly measured and should remain constant. These maintenance activity categories allow more accurate cost predictions and provide insight into the appropriate assignment of maintenance responsibilities.

Annual maintenance costs were normalized to 2012 dollars and calculated for all SCMs by both dollars and personnel hours per acre of IC treated per system per year. It is important to note that inflation was not considered in life cycle maintenance cost projections.

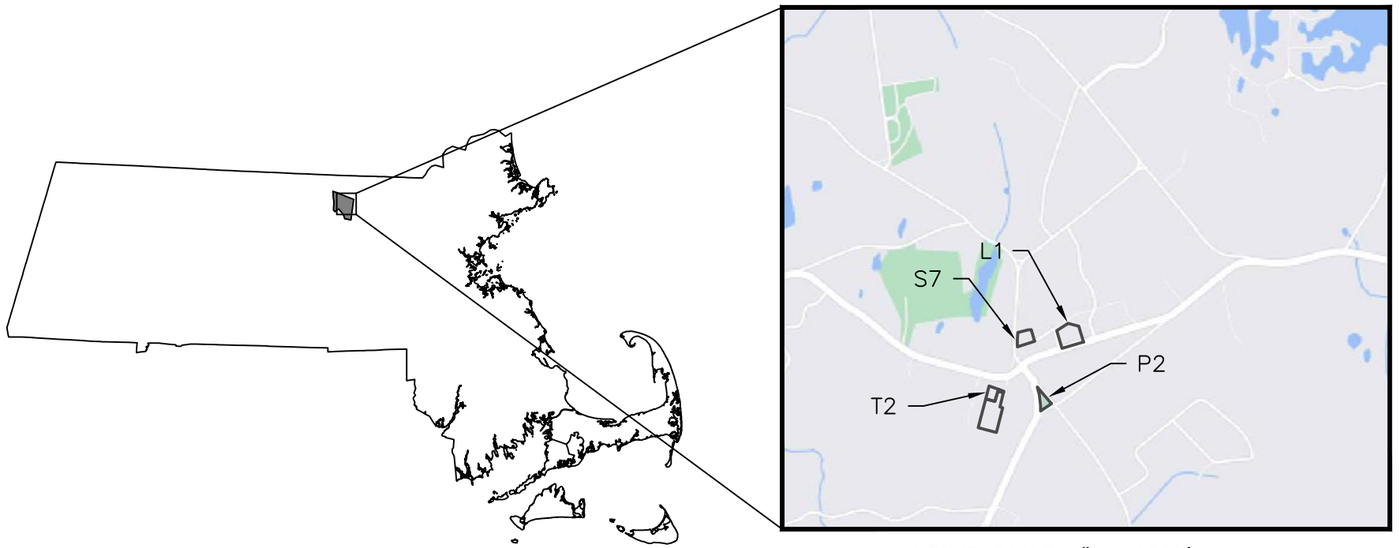
MUNICIPAL PROPERTY BMP RETROFITS

Attachment B:
Pre-Conceptual Designs for Top Locations

TOWN OF LUNENBURG

MUNICIPAL PROPERTY BMP RETROFITS
LUNENBURG, MA

JUNE 2022



LOCUS SCALE 1" = 2000'

SHEET	TITLE
C-1	BOYS AND GIRLS CLUB OF LUNENBURG
C-2	LUNENBURG PUBLIC LIBRARY
C-3	LUNENBURG HISTORICAL SOCIETY
C-4	HISTORICAL DISTRICT TOWN COMMON

COMPREHENSIVE ENVIRONMENTAL INCORPORATED • BOLTON, MASSACHUSETTS

GENERAL NOTES

LEGEND

- PROJECT PARCEL
- PROPERTY LINE
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- EXISTING BUILDING
- EDGE OF PAVEMENT
- FLOW DIRECTION ARROW
- PROPOSED DRAIN PIPE

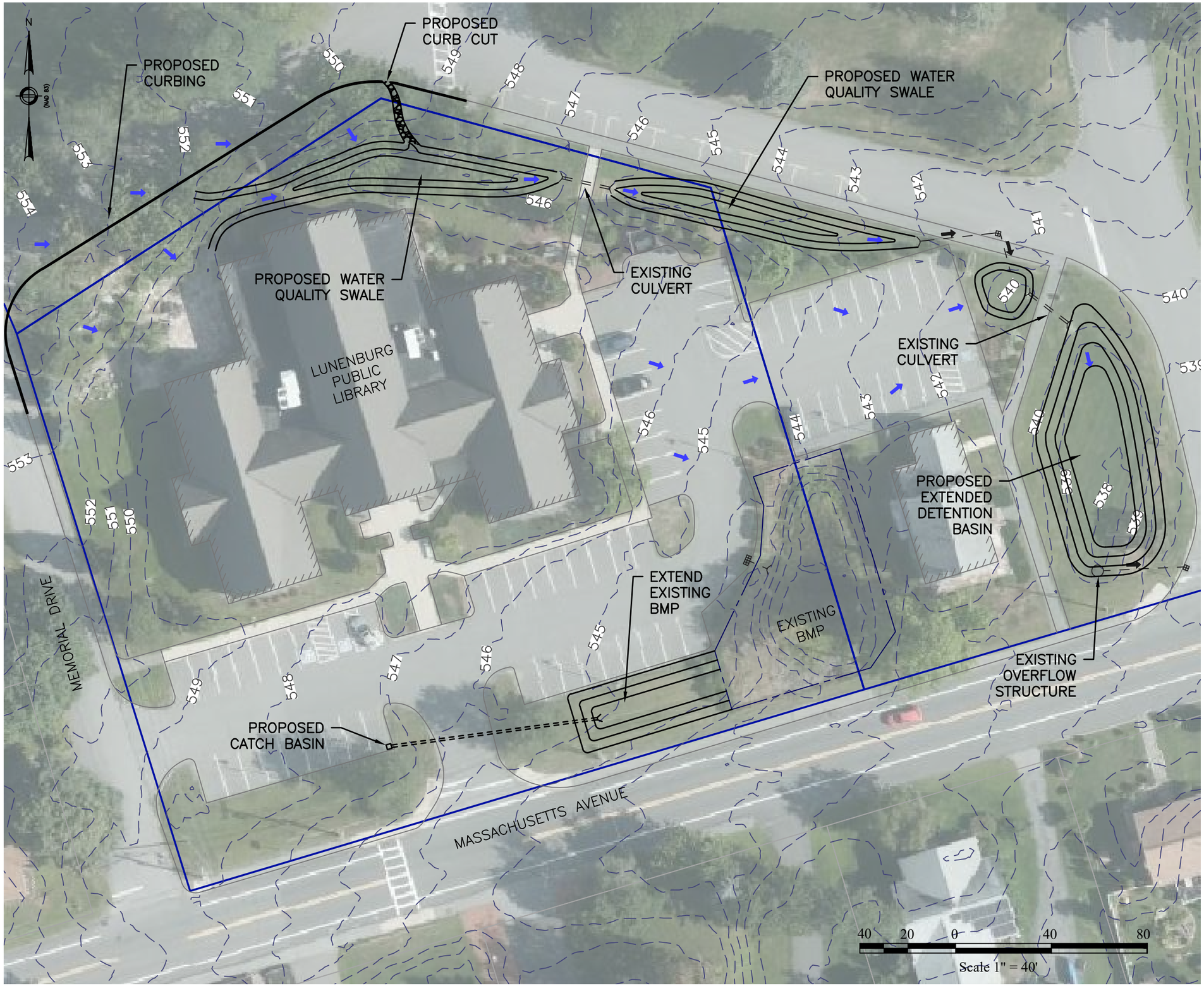
COMPREHENSIVE ENVIRONMENTAL INCORPORATED

41 MAIN STREET
BOLTON, MA 01740

PROPOSED CONDITIONS
BOYS AND GIRLS CLUB OF LUNENBURG
PLAN VIEW

TOWN OF LUNENBURG, MA

Project No.: 356-04 Date: 12/9/2021	Sheet
Drawn By: NP	C-1
Checked By: NC	
Scale: AS SHOWN	



GENERAL NOTES

LEGEND

- PROJECT PARCEL
- PROPERTY LINE
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- EXISTING BUILDING
- EDGE OF PAVEMENT
- FLOW DIRECTION ARROW
- PROPOSED DRAIN PIPE

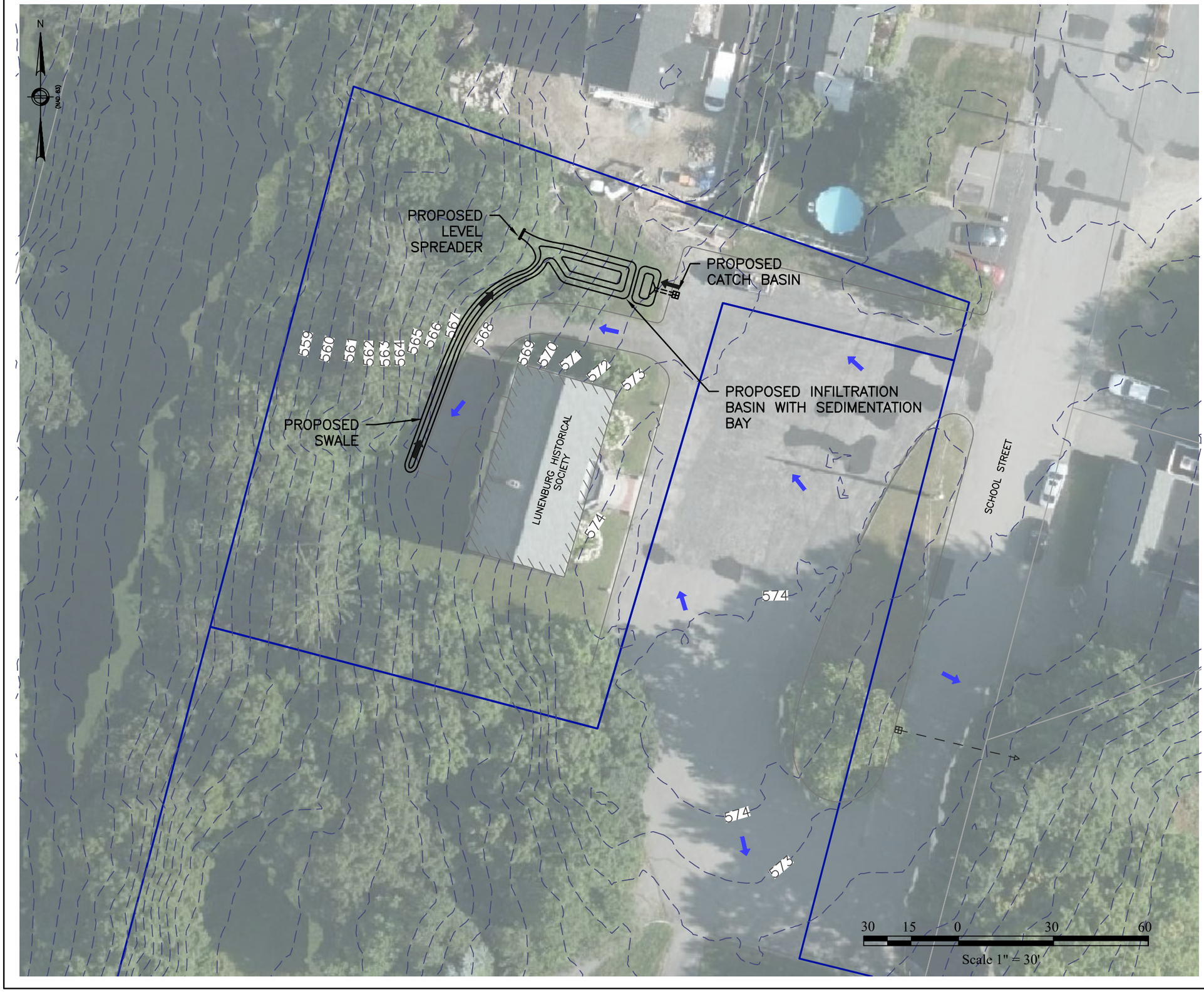
COMPREHENSIVE ENVIRONMENTAL INCORPORATED

41 MAIN STREET
BOLTON, MA 01740

PROPOSED CONDITIONS LUNENBURG PUBLIC LIBRARY PLAN VIEW

TOWN OF LUNENBURG, MA

Project No.: 356-04 Date: 12/9/2021	Sheet
Drawn By: NP	C-2
Checked By: NC	
Scale: AS SHOWN	



GENERAL NOTES

LEGEND

- PROJECT PARCEL
- PROPERTY LINE
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- EXISTING BUILDING
- EDGE OF PAVEMENT
- FLOW DIRECTION ARROW
- PROPOSED DRAIN PIPE

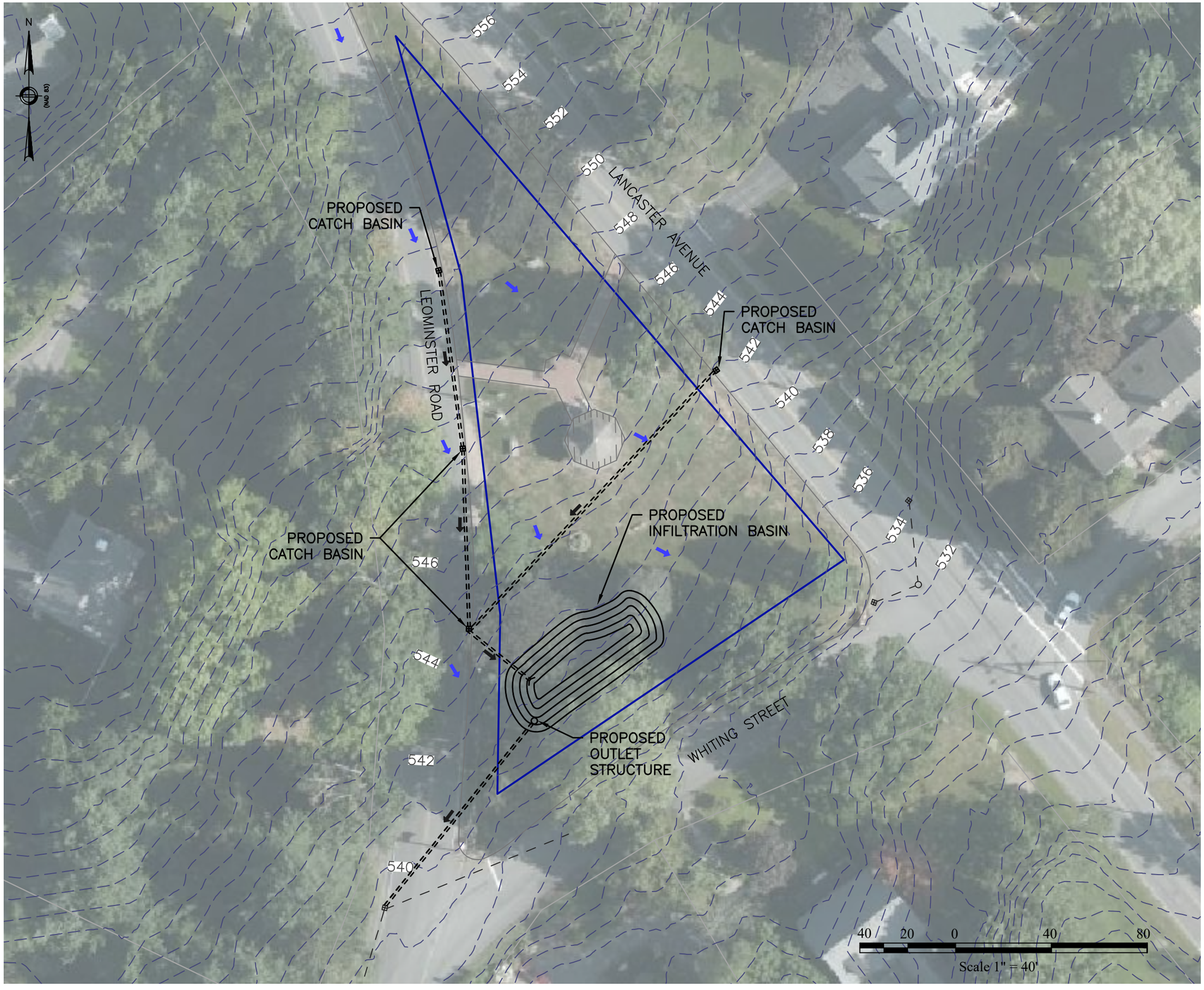
COMPREHENSIVE ENVIRONMENTAL INCORPORATED

41 MAIN STREET
BOLTON, MA 01740

PROPOSED CONDITIONS LUNENBURG HISTORICAL SOCIETY PLAN VIEW

TOWN OF LUNENBURG, MA

Project No.: 356-04 Date: 12/9/2021	Sheet
Drawn By: NP	C-3
Checked By: NC	
Scale: AS SHOWN	



GENERAL NOTES

LEGEND

- PROJECT PARCEL
- PROPERTY LINE
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- EXISTING BUILDING
- EDGE OF PAVEMENT
- FLOW DIRECTION ARROW
- PROPOSED DRAIN PIPE

COMPREHENSIVE ENVIRONMENTAL INCORPORATED

41 MAIN STREET
BOLTON, MA 01740

PROPOSED CONDITIONS HISTORICAL DISTRICT TOWN COMMON PLAN VIEW

TOWN OF LUNENBURG, MA

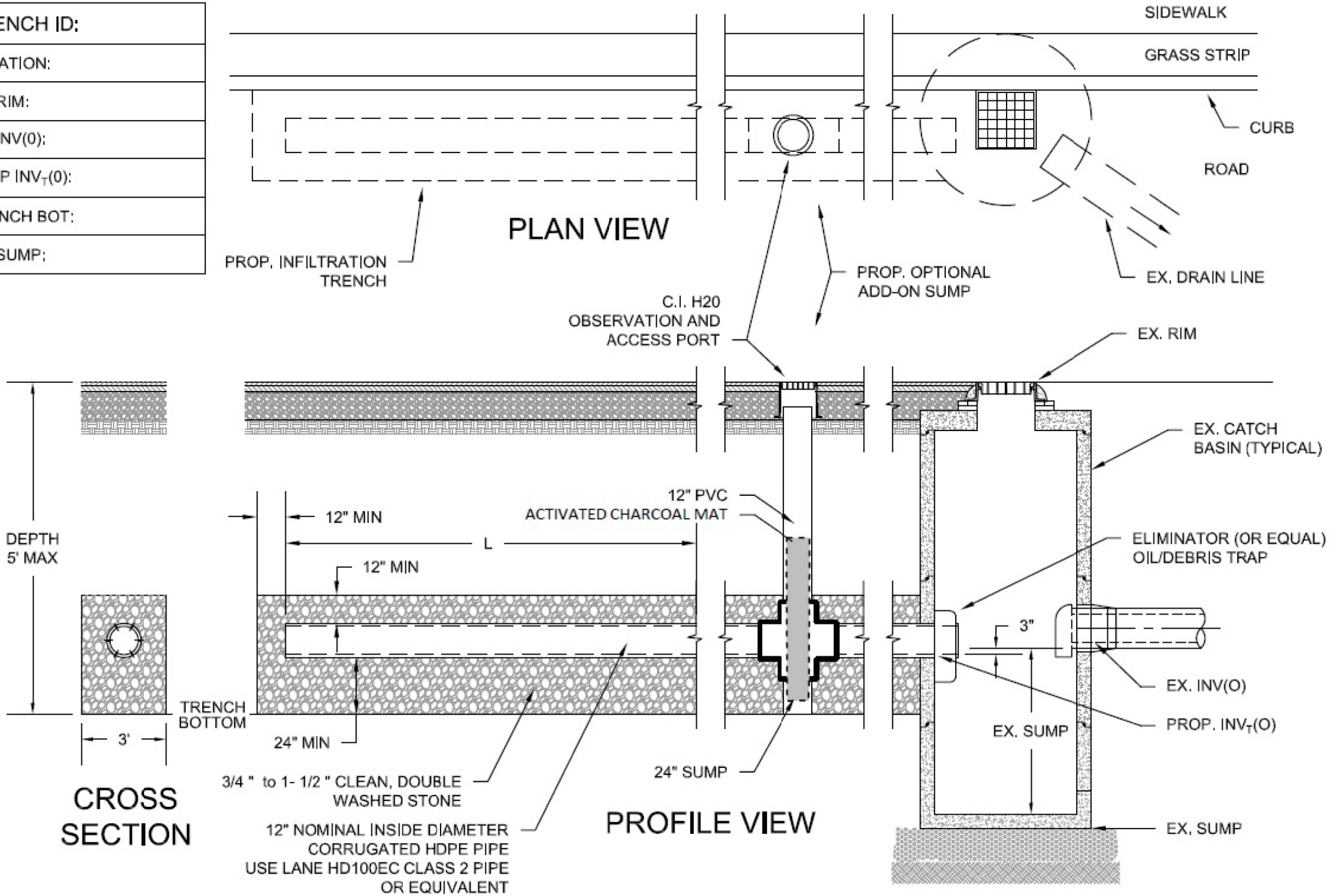
Project No.: 356-04 Date: 12/9/2021	Sheet C-4
Drawn By: NP	
Checked By: NC	
Scale: AS SHOWN	

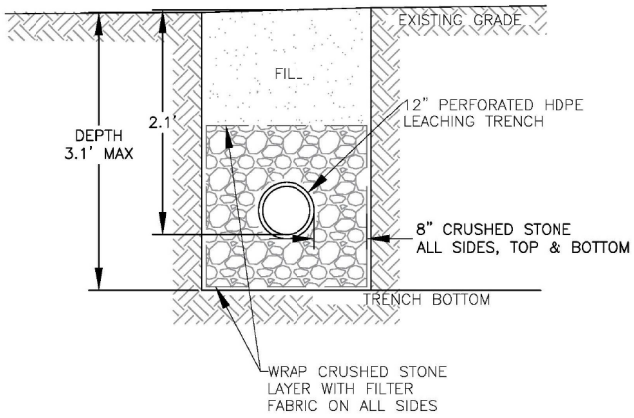
MUNICIPAL PROPERTY BMP RETROFITS

Attachment C:

Example Roadway and Intersection BMP Improvements

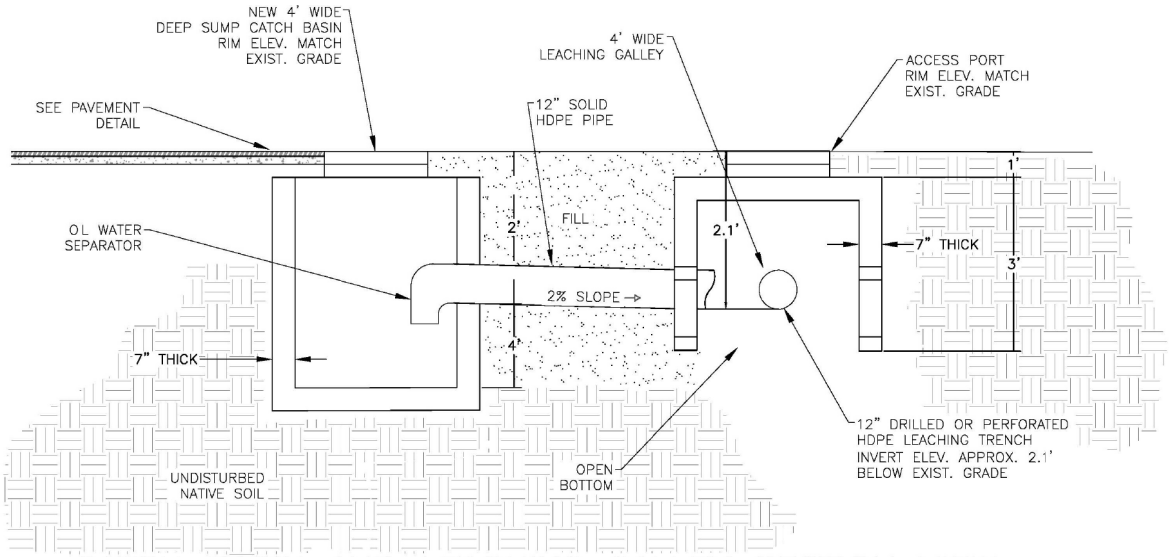
TRENCH ID:
LOCATION:
EX. RIM:
EX. INV(0):
PROP INV_T(0):
TRENCH BOT:
EX. SUMP:





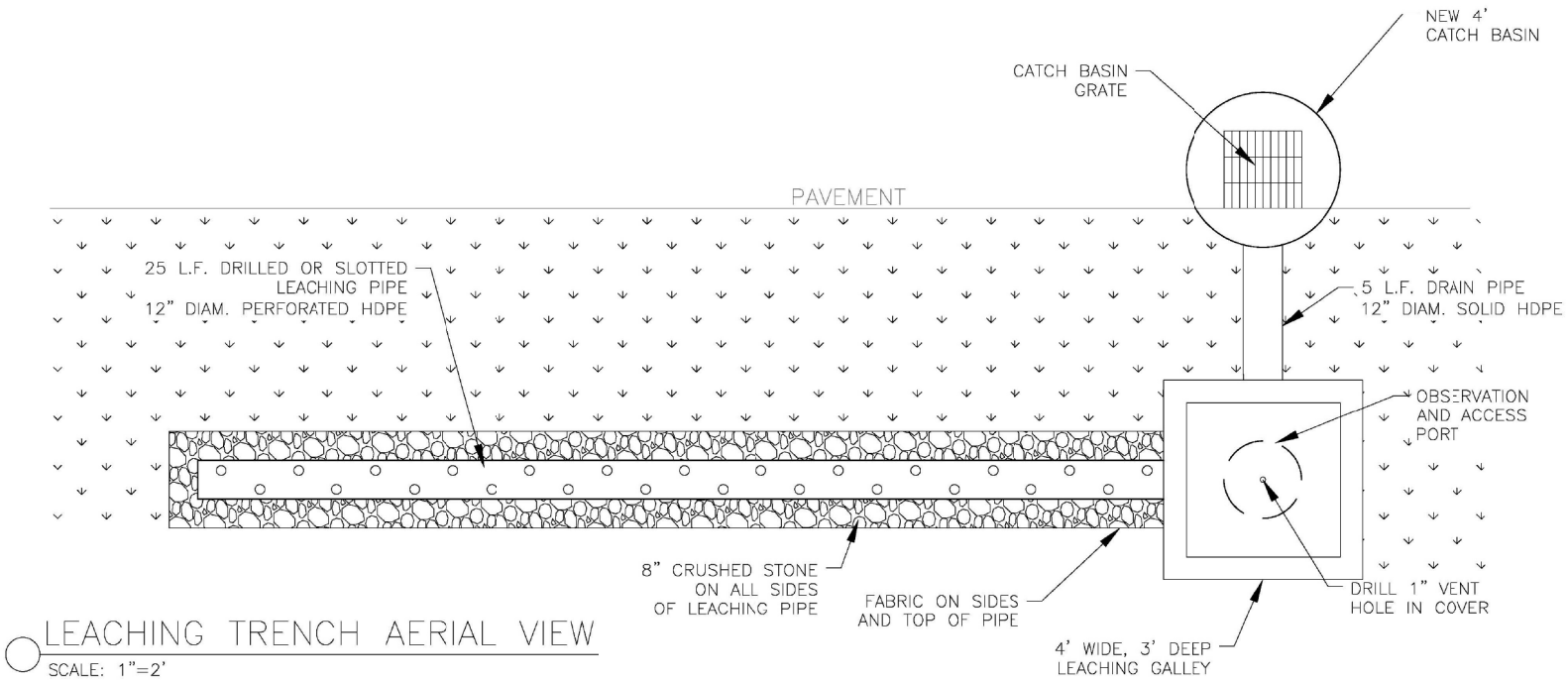
LEACHING TRENCH SECTION VIEW

SCALE N.T.S.



CATCH BASIN AND LEACHING GALLEY SECTION VIEW

SCALE: 1"=3'



LEACHING TRENCH AERIAL VIEW

SCALE: 1"=2'

Appendix F

Street Sweeping Optimization Plan

MI-1, Street Sweeping

Street sweeping is performed to remove sediments from streets and parking lots before it is washed into catch basins and waterways.

Procedures and Practices

- Sweep all Town-owned streets within the urbanized area with the exception of high-speed limited access highways at least once per year in the spring.
- For areas subject to nitrogen and phosphorus TMDL and impaired waters requirements, sweep streets once in the spring and once in the fall.
- If required, sweep priority areas such as those with construction sites or areas subject to heavier sanding and/or traffic volumes multiple times a year to minimize sediment accumulation.
- Sweep all Town parking lots in spring after snow melts.
- If possible, notify residents and businesses of street sweeping schedule and requirements such as restricted parking and removal of objects that could obstruct sweeping operations.
- Lightly spray water on streets before sweeping to minimize airborne dust.
- Avoid pushing materials into or around storm drains and catch basins.
- Do not use kick brooms or sweeper attachments that tend to spread dirt.
- When unloading sweeper, make sure there is no dust or sediment release.
- After sweeping is finished, properly dispose of sweeper wastes (see below). Never dispose sweep debris into the storm drain systems, catch basins, or waterways.
- Never store street sweepings in areas where stormwater could transport fine materials to the storm drain system or a waterbody.
- If possible, clean catch basins after streets are swept.

Prior to the Start of the Sweeping Season (Spring)

- Train employees on the proper maintenance and operation of equipment and on the proper storage and disposal of street sweepings.
- Ensure all sweeping equipment is in good working order and conduct maintenance as needed (see Equipment Maintenance Section).
- Ensure road crews are familiar with sweeping routes to efficiently cover the entire municipality.

Prior to Leaving the Facility for Sweeping

- Speak with supervisor to determine special circumstances (i.e. rain, priority areas) and to confirm sweeping route.
- Inspect all vehicles. Check fluid levels and fill to proper levels. Ensure lights are in working order. Document any repairs.

Street Sweeping

- Operate all sweepers according to the manufacturer's recommended settings, standards, and procedures.
- While sweeping, drive between the optimal speed limit.
- If spills occur or illegal discharges are seen, report to your supervisor.
- Do not perform sweeping during heavy rainfall.

Upon Return to the Facility

- Provide daily progress reports on the number of miles and names of roads swept to supervisor.
- Wash vehicle following the Vehicles and Equipment Washing SOP (VM-2).
- Before parking any truck or equipment after use, check all fluid levels. Note any minor repairs conducted and other repairs that may be needed. Follow the Vehicle and Equipment Maintenance SOP (VM-1).

Storage, Disposal and Reuse

Storage

- Store separately from catch basin cleaning materials.
- Store street sweepings on an impermeable surface away from areas that receive stormwater runoff.
- Cover street sweeping piles with tarps to prevent rainwater from generating contaminated stormwater.
- Any Town employee handling the street sweepings should wear appropriate personal protective equipment, such as a dust mask, safety goggles, long-sleeved shirts and long pants at all times.

Reuse

Street sweepings may also be used as fill in public ways or as an additive to compost without prior approval from MassDEP provided certain conditions are met:

- Not been collected from Urban Center Roads (defined as local roads in central commercial and retail business districts and industrial and manufacturing areas).
- Used under the road surface or as fill along the side of the road within the public way.
- Not used in residential areas.
- Kept above the level of the groundwater.
- Not used in designated "No Salt Areas".
- Not used within the 100 foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas.
- Not used within 500 feet of a ground or surface drinking water supply.

Inspection and Maintenance

- Inspect sweepers before sweeping to ensure they are in good working order. Maintain and adjust as necessary.
- Inspect tarp to ensure pile is covered and no tears.

- Inspect erosion controls weekly and after major storms to ensure they are free of tears and sediment buildup. Repair as needed.
- Immediately abate any nuisance conditions (i.e., noise, dust, odor).
- Train employees on proper street sweeping procedures.

Recordkeeping and Reporting

- Use attached Street Sweeping Log to document street sweeping activities.
- Town employees should record:
    - Miles of roadway swept.
    - Tons or cubic yards of street sweeping materials generated.
    - Tons or cubic yards of street sweeping materials disposed of.
    - Tons or cubic yards of street sweeping materials reused as fill.

Street Sweeping Log

Date:_________________ **Precipitation in the last three days?** **Yes** **No**

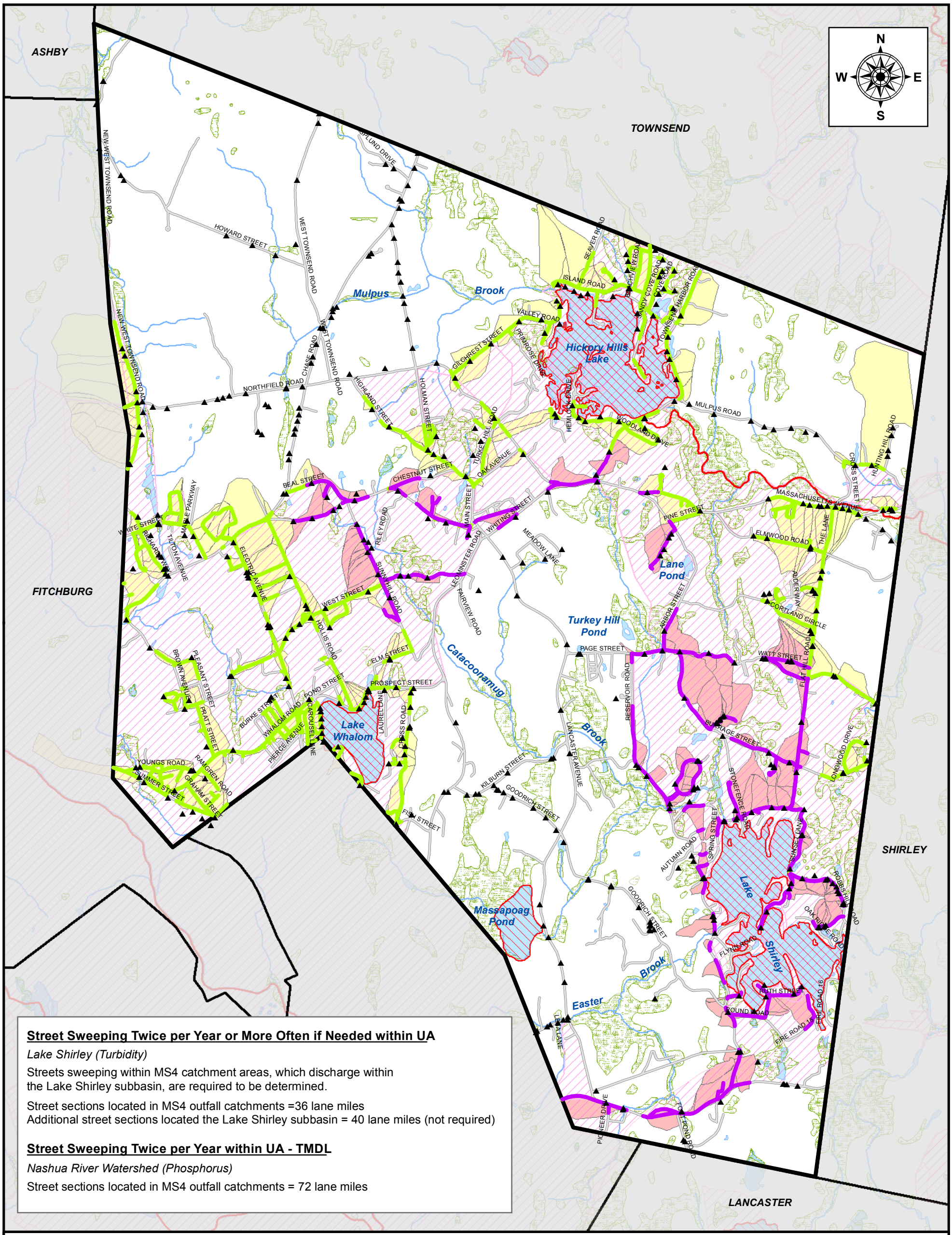
Weather Today:____

Supervisor/Crew Leader:_______________________________________

Street Swept (Name)	Miles	Observed Potential Sources of Pollution	Volume or Mass of Material Removed	Comments
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		

Total Sediment Accumulated from Route (as weighed at landfill):_______________ tons

* Provide additional comments to describe the observations made for the category. Comments should also identify issues that hinder street sweeping progress (i.e., parked cars, obstructions).



Street Sweeping Twice per Year or More Often if Needed within UA

Lake Shirley (Turbidity)

Streets sweeping within MS4 catchment areas, which discharge within the Lake Shirley subbasin, are required to be determined.

Street sections located in MS4 outfall catchments =36 lane miles
Additional street sections located the Lake Shirley subbasin = 40 lane miles (not required)

Street Sweeping Twice per Year within UA - TMDL

Nashua River Watershed (Phosphorus)

Street sections located in MS4 outfall catchments = 72 lane miles

Legend

- ▲ MS4 Outfall
- Urbanized Area

303d Water Bodies

- Impaired Lake, Pond
- Impaired River, Stream

Hydrography

- Lake, Pond, River
- Wetlands
- Stream, Brook

MS4 Catchments within Urbanized Area

- Sweep Twice per Year or More (Lake Shirley, Nashua River)
- Sweep Twice per Year (Nashua River)

Streets within MS4 Catchments

- Sweep Twice per Year or More (Turbidity)
- Sweep Twice per Year (Phosphorus)

0 2,500 5,000 7,500 10,000 Feet

Street Sweeping Map

Sweeping per Phase II Requirements

Lunenburg, Massachusetts

Comprehensive Environmental Inc.

Appendix G

Catch Basin Optimization Plan

Plan for Optimizing Catch Basin Cleaning

Lunenburg, MA

June 30, 2019

Prepared For:

Town of Lunenburg
17 Main St
Lunenburg, MA 01462

Prepared by:

Comprehensive Environmental Inc.
41 Main Street
Bolton, MA 01740

Table of Contents

Plan for Optimizing Catch Basin Cleaning – Lunenburg, MA

List of Appendices

1 Introduction

This Catch Basin Cleaning Optimization Plan has been prepared by Lunenburg, MA to address the catch basin inspection, cleaning and maintenance 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 MS4 Permit."

The 2016 MS4 Permit requires the permittee to document its plan for optimizing catch basin cleaning, inspections, or its schedule for gathering information to develop the optimization plan. This plan documents the Town's existing catch basin cleaning program and its plans for gathering additional information to refine its program to meet the requirements of the permit.

2 Permit Requirements

This Catch Basin Cleaning Optimization Plan addresses Section 2.3.7.1.a.iii.2 of the 2016 MS4 Permit (Infrastructure Operations and Maintenance), which includes the following requirements:

- **Establish a schedule** with the goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50 percent full[1];

- **Prioritize** inspection and maintenance for catch basins:
  - located near construction activities[2]. These should be cleaned more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings;
  - discharging to impaired waters where the pollutant of concern is E. coli or enterococcus; and
  - with sumps more than 50% full during consecutive inspections.

- **Establish proper documentation** of catch basin inspections to include:
  - the location and total number of catch basins;
  - the location and total number of catch basins cleaned or inspected; and
  - the total volume or mass of material removed from catch basin

- **Develop an optimization plan** for catch basin cleaning, inspection plans, or a schedule for gathering information to develop the optimization plan in the first annual report and in the SWMP.

[1] A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.
[2] Roadway construction; residential, commercial, or industrial development or redevelopment.

3 Existing Catch Basin Management Program

The Town has 955 catch basins to clean and maintain. Refer to the map in **Appendix A**. The Town currently cleans approximately three quarters of their catch basins each year using a clamshell truck purchased in 2017 and a late model cab and chassis and a body unit made specifically for catch basin cleaning. All catch basins are cleaned approximately once every two years.

Lunenburg has also prioritized certain catch basins that are cleaned more frequently, including those at areas around major water bodies, Lake Whalom, Hickory Hills Lake, and Lake Shirley, and those at the town center area. Catch basin cleanings at priority areas are completed about once a year and the basins are inspected twice yearly, once at the conclusion of winter and again in the late fall. The materials are stored at its old landfill.

4 Plans to Refine Catch Basin Cleaning Optimization

4.1 Optimization Methodology

Lunenburg will continue to implement its existing yearly catch basin cleaning schedule, during which time, it will collect data on the sump depth and sediment depth in each catch basin. A spreadsheet will be used to track sediment depth at each location. The catch basin inspection form included with the standard operating procedure (SOP) in **Appendix B** will be used to document data collected during cleaning.

A minimum of two years of data will be collected and evaluated to determine the status of the catch basins and whether the sump was more than half full. The catch basins that are more than 50% full will be evaluated for potential factors that may have contributed to it being 50% full (i.e., smaller sump, nearby construction, surrounding land uses, location in town). The evaluation will be used to identify catch basins that require more frequent inspection and/or cleaning and to develop an optimization plan that prioritizes these structures accordingly.

4.2 Catch Basin Cleaning Standard Operation Procedure (SOP)

All catch basins will be inspected and cleaned following the standard operating procedures (SOP) provided in **Appendix B**.

4.3 Catch Basin Cleanings Storage and Disposal

Lunenburg currently disposes of catch basin cleanings at its old landfill. The Town will explore possible beneficial uses for its collected catch basin cleanings.

Appendix A

Map of Drainage Infrastructure

Stormwater Infrastructure Map

Lunenburg, MA

Comprehensive Environmental Incorporated

N
W E
S

0 0.25 0.5 0.75 1
Miles

Data source: MassGIS, Town of Lunenburg

Legend

- Outfalls
- Catch Basin
- Leaching Catch Basin
- Drainage Manhole
- Dry Well
- Inlet
- Culvert
- Detention Basin
- Infiltration Basin
- Swale
- Interconnections
- DOT Outfall
- DOT Manhole
- DOT Catch Basin
- Drainage Pipe
- Sewer Pipes
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Non-Urban Area

10/29/2021

Appendix B

Standard Operating Procedures for Catch Basin Cleaning and Inspection

MI-2, Catch Basin Cleaning & Inspection

Catch basin cleaning (CBC) is performed to remove sediments from structures before it is washed into waterways. For additional information, see the Town's Catch Basin Cleaning Optimization Plan.

Schedule

The Town has approximately 955 catch basins to clean and maintain. Approximately three quarters of catch basins are cleaned each year using a clamshell truck purchased in 2017 and a late model cab and chassis and a body unit made specifically for catch basin cleaning. All catch basins are cleaned approximately once every two years. Lunenburg has also prioritized certain catch basins that are cleaned more frequently, including those at areas around major water bodies, Lake Whalom, Hickory Hills Lake, and Lake Shirley, and those at the town center area. Catch basin cleanings at priority areas are completed about once a year and the basins are inspected twice yearly, once at the conclusion of winter and again in the late fall. The materials are stored at its old landfill.

Procedures and Practices

1. If possible, notify residents and businesses of catch basin cleaning schedule to restrict parking that could obstruct catch basin cleaning operations.
2. Work upstream to downstream when cleaning catch basins within a drainage network.
3. Clean sediment and trash off grate before removing grate.
4. Inspect the outside of the grate and inside of the catch basin to determine cleaning needs and for structural integrity.
5. Either manually use a shovel to remove accumulated sediments, use a bucket loader to remove accumulated sediments, or use a high pressure washer to clean any remaining material out of the catch basin while capturing the slurry with a vacuum.
6. If necessary, after the catch basin is cleaned, use the rodder of a vacuum truck to clean downstream pipe and pull back sediment that might have entered downstream pipe.
7. After cleaning is finished, properly dispose of collected sediments (see below).
8. Collect and dispose of fluids during catch basin cleaning. Do not discharge fluids to a wetland or waterway.
9. If any suspected illicit discharges are observed or suspected, notify your supervisor.
10. At the end of each day, document location and number of catch basins cleaned, amount of waste collected, and disposal method for all screenings.

Storage and Disposal

Storage

- The materials are stored at its old landfill.
- Store separately from street sweeping materials.
- Store materials on an impermeable surface away from areas that receive stormwater runoff.

- Cover piles with tarps to prevent rainwater from generating contaminated stormwater.
- Any Town employee handling the street sweepings should wear appropriate personal protective equipment, such as a dust mask, safety goggles, long-sleeved shirts and long pants at all times.

Disposal

Catch basin cleanings must be disposed of at landfills as daily cover. Sampling of the catch basin cleaning materials is not required unless there is evidence that cleanings were contaminated by a spill or other means. No reuse is allowed without first obtaining a Beneficial Use Determination (BUD) from MassDEP

Inspection and Maintenance

- Clean catch basins to maintain sediment levels in sumps at less than 50% full.
- If catch basins are more than 50% full for two consecutive cleaning events, catch basins should either be cleaned more often or the contributing area should be investigated for sediment sources.
- Inspect catch basins for structural integrity and evidence of illicit discharges during cleaning.
- Inspect tarp to ensure pile is covered and no tears.
- Immediately abate any nuisance conditions (i.e., noise, dust, odor).
- Train employees on proper CBC procedures.

Recordkeeping and Reporting

- Use attached Catch Basin Inspection Form when inspecting catch basins. Town employees should record:
    - Number of catch basins inspected.
    - Number of catch basins cleaned.
    - Log of catch basins cleaned or inspected.
    - Tons or cubic yards of catch basin cleaning materials generated.
- Use attached Catch Basin Maintenance/Repair Log to document CBC activities.

Catch Basin Inspection Procedures

Option 1: Inspection during Cleaning

1. Clean sediment and trash off of grate.
2. Remove grate.
3. Fill out **Catch Basin Inspection Form** with basin-specific information:
    - **Before cleaning**:
        - Do a visual inspection of outside of grate.
        - Do a visual inspection of the inside of the catch basin to determine cleaning needs and structural issues.
        - Measure depth from rim of catch basin to top of sediment.
        - Measure depth from rim of catch basin to the top of the outlet pipe.
        - Take photo of catch basin.
    - **Clean catch basin**:
        - For manual removal, place removed material in a location protected from potential runoff and place cleanings in a vehicle for transport to designated disposal area.
        - OR use a high-powered vac truck to remove sediment.
    - **After cleaning**:
        - Measure depth from rim to bottom of catch basin.
        - Measure depth of sum (outlet pipe to bottom of catch basin).
        - Note if the catch basin is more than 50% full with sediment.
        - Note if the catch basin requires maintenance or it there are pollutants present.
        - Take photo of catch basin.
4. If any illicit discharges are observed or suspected, notify supervisor.

Option 2: Interim Inspection between Cleaning Cycles

1. Clean sediment and trash off grate.
2. Remove grate.
3. Fill out **Catch Basin Inspection Form** with basin-specific information:
    - Do a visual inspection of outside of grate.
    - Do a visual inspection of the inside of the catch basin to determine cleaning needs and structural issues.
    - Measure depth from rim of catch basin to top of sediment.
    - Using sump depth collected during previous cleaning, note if the catch basin is more than 50% full with sediment.
    - Note if the catch basin requires maintenance or if there are pollutants present.
4. If any illicit discharges are observed or suspected, notify supervisor.

Catch Basin Inspection Form

Inspection Information			
Catch Basin ID			
Street Location		GPS Location	
Inspector's Name			
Date of Inspection		Time of Inspection	
Weather (circle)	Dry Light Rain Heavy Rain Snow		

Catch Basin Information

Location	**Surface Type**	**Grate**
☐ Road/Curb ☐ Alley ☐ Ditch ☐ Parking Lot ☐ Driveway ☐ Sidewalk Other:_____	☐ Asphalt ☐ Gravel ☐ Concrete ☐ Grass/Dirt Other:_____	____inches x ____ inches Material: _____ Shape:

Catch Basin Condition

CB Damage: No Yes	Comment:

	Materials (circle)					**Condition (circle)**			
Grate	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Frame	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Chimney	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Walls	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Trap/Hood	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Sump	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent

Sediment Depth and IDDE (inches)

A. Depth from Rim to Top of Sediment: _____ B. Depth from Rim to Bottom of Basin (after vac): _____ C. Sump Depth: _____ D. Depth of Sediment (B-A): _____ E. More than 50% Full of Sediment? (D/C): _____ **CB Cleaned?** No Yes **Suspected illicit discharge?** No Yes	Check those Present: __Sanitary Waste/Smell __Excessive Sediment __Oil Sheen __Floatables/Trash __Pet Waste: Other:_____ Potential Source: _____

Catch Basin Maintenance/Repair Log

Structure ID	Location (Street Name, Approximate Address)	Inspection Date	Problem(s) Identified, Comments	Date of Maint/Repair	Type of Maintenance/Repair, Comments

Appendix H

List of Stormwater BMPs and Inspection/Maintenance Results

STORMWATER INSPECTION REPORT

To:	Mr. Jack Rodriquez, Lunenburg DPW Director
From:	Nick Cristofori, P.E., Comprehensive Environmental Inc.
Date:	June 12, 2020
Locations:	Butterfly Lane, Cortland Circle, Fire/Police Station, Gabe's Place, Landfill, Lena Lane, Lunenburg Public Library, Pleasant Street, Richard's Way, Robbs Hill, Senior Center, Summer Street, White Street, Whitetail Crossing
Town:	Lunenburg, MA
Inspectors:	Sara Nelson, CEI
Inspection Dates:	May 20, 2020 and May 21, 2020

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, regulated communities such as Lunenburg are required to annually inspect stormwater Best Management Practices (BMPs) within the regulated Urbanized Area (UA) and maintain as needed. In response, Comprehensive Environmental Inc. (CEI) performed an inspection of stormwater BMPs at the identified locations on May 20, 2020 and May 21, 2020 to evaluate general conditions and document recommended maintenance items for follow-up action in order to meet permit requirements.

The Town of Lunenburg DPW identified 24 different BMPs that required inspections in order to meet permit requirements. Of the 24 identified BMPs, CEI located 23 of them, however, was unable to locate detention basin #3 on Richard's Way as it was located behind private properties. BMP locations are identified by street name, with locations shown on a town-wide GIS map. Table 1 below details the locations and individual BMPs that were inspected, while Table 2 summarizes maintenance needs for each location. Table 3 at the end of the report provides additional inspection results and details of maintenance needs. BMP inspection results are detailed in the attached inspection sheets attached to this report, along with representative photo documentation.

At the time of the inspections, the weather was approximately 60 to 80 degrees and sunny for both days. Weather over a three-day period leading up to May 20th and May 21st was between 60 and 80 degrees and dry. Sara Nelson of CEI performed the inspections and noted the following general condition and maintenance needs:

Table 1 – Stormwater Infrastructure Inspected

Location	BMP ID	Stormwater BMP Type	Overall Condition	Requires Maintenance
Butterfly Ln	BL-1	Detention Basin #1	Good	No
Butterfly Ln	BL-2	Detention Basin #2	Good	No
Cortland Circle	CC-1	Detention Basin	Fair	Yes (minor)
Fire/Police Station	FP-1	Detention Basin #1	Good	No
Fire/Police Station	FP-2	Detention Basin #2	Good	No

Table 1 (continued) – Stormwater Infrastructure Inspected

Location	BMP ID	Stormwater BMP Type	Overall Condition	Requires Maintenance
Gabe's Place	GP-1	Underground Infiltration System and Leaching Catch Basin	Fair	Yes (minor)
Landfill – south	LF-1	Detention Basin #1	Good	No
Landfill – west	LF-2	Detention Basin #2	Good	No
Landfill – east	LF-3	Detention Basin #3	Fair	Yes (minor)
Lena Lane	LL-1	Underground Infiltration System	Good	No
Memorial Drive Senior Ctr.	SC-1	Bioretention Area	Good	No
Public Library	PL-1	Detention Basin	Good	No
Richard's Way	RW-1	Detention Basin #1	Good	No
Richard's Way	RW-2	Detention Basin #2	Good	No
Richard's Way	RW-2	Detention Basin #3	Could not locate	
Robbs Hill	RH-1	Underground Infiltration System #1	Good	No
Robbs Hill	RH-2	Underground Infiltration System #2	Good	No
Robbs Hill	RH-3	Underground Infiltration System #3	Good	No
Robbs Hill	RH-4	Underground Infiltration System #4	Good	No
Robbs Hill	RH-5	Detention Basin	Fair	Yes (minor)
Summer Street	SS-1	Underground Infiltration System #1	Fair	Yes (minor)
Summer Street	SS-2	Underground Infiltration System #2	Good	No
Whitetail Crossing	WC-1	Detention Basin #1	Good	No
Whitetail Crossing	WC-2	Detention Basin #2	Good	No

Recommendations

The majority of the BMPs are in good operating order while a few are in fair condition and require minor maintenance as noted on the attached inspection sheets. Minor maintenance generally includes removal of plant material buildup, sediment vacuuming, trimming back or removal of vegetation, curb or edge of road maintenance, and general landscaping.

Table 2 below provides a brief summary of maintenance requirements for each BMP, while Table 3 provides additional information on inspection results. Based on CEI's inspections, the maintenance items identified in Table 2 below should be completed in order to improve BMP functionality.

Table 2 – BMP Maintenance Recommendations

BMP ID / Location	Recommendations
CC-1 Cortland Circle	• Cut/remove vegetation as needed to maintain function • Remove and replace vegetation as needed to maintain function
GP-1 Gabe's Place	• Remove sediment within the infiltration area and scarify bottom surface
LF-3 Landfill – east	• Cut/remove vegetation as needed to maintain function
RH-5 Robbs Hill	• Remove sediment within the infiltration area and scarify bottom surface • Jet and clean pipe
SS-1 Summer street	• Remove sediment and debris to restore storage capacity • Remove sediment within the infiltration area and scarify bottom surface • Jet and clean pipe
All other BMPs	• N/A, no maintenance required

If you have any further questions or would like additional information, please feel free to contact me at 800.725.2550 x303 or ncristofori@ceiengineers.com. Thank you.

Nick Cristofori, P.E.
Principal, Project Manager

Attachments:

- Stormwater inspection reports and photograph

STORMWATER INSPECTION REPORT

To:	Mr. Jack Rodriquez, Lunenburg DPW Director
From:	Nick Cristofori, P.E., Comprehensive Environmental Inc.
Date:	June 3, 2021
Locations:	Butterfly Lane, Cortland Circle, Fire/Police Station, Gabe's Place, Landfill, Lena Lane, Lunenburg Public Library, Pleasant Street, Richard's Way, Robbs Hill, Senior Center, Summer Street, White Street, Whitetail Crossing
Town:	Lunenburg, MA
Inspectors:	Noah Parent, Iain Church and Sara Nelson, CEI
Inspection Dates:	May 4, 2021 and May 19, 2021

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, regulated communities such as Lunenburg are required to annually inspect stormwater Best Management Practices (BMPs) within the regulated Urbanized Area (UA) and maintain as needed. In response, Comprehensive Environmental Inc. (CEI) performed an inspection of stormwater BMPs at the identified locations on May 4, 2021 and May 19, 2021 to evaluate general conditions and document recommended maintenance items for follow-up action in order to meet permit requirements.

Inspections

The Town of Lunenburg DPW previously identified 24 different BMPs that required inspections to meet permit requirements. However, after CEI completed two rounds of BMP inspections and was unable to directly locate a number of underground infiltration systems, further discussions with the town indicated that eight underground infiltration systems are unlikely to exist. Additionally, during inspections on May 4th, CEI identified an additional BMP that is within the towns urbanized area. This new BMP was identified as CC-2, located at the intersection of Cortland Circle and Flat Hill Road. Thus, the town has 17 known stormwater BMPs that need to be inspected. BMP locations are identified by street name, with locations shown on a town-wide GIS map. Table 1 below details the locations and individual BMPs that were inspected, while Table 2 summarizes maintenance needs for each location. Table 3 at the end of the report provides additional inspection results and details of maintenance needs. BMP inspection results are detailed in the attached inspection sheets attached to this report, along with representative photo documentation.

At the time of the inspections on May 4th, the weather was approximately 45 to 50 degrees and cloudy. Weather over a three-day period leading up to May 4th was between 60 and 80 degrees. Significant rainfall on May 4th was recorded as 0.36 inches. The rainfall on May 4th ended prior to the start of BMP inspections. At the time of the inspections on May 19th, the weather was approximately 75 to 80 degrees and sunny. Weather over a three-day period leading up to May 19th was between 60 and 80 degrees.

Table 1 – Stormwater Infrastructure Inspected

Location	BMP ID	Stormwater BMP Type	Overall Condition	Requires Maintenance
Butterfly Ln	BL-1	Infiltration Basin #1	Good	No
Butterfly Ln	BL-2	Infiltration Basin #2	Good	No
Cortland Circle	CC-1	Detention Basin	Fair	No
Cortland Circle	CC-2	Detention Basin	Fair	No
Fire/Police Station	FP-1	Detention Basin #1	Good	No
Fire/Police Station	FP-2	Detention Basin #2	Fair	Yes (minor)
Landfill – south	LF-1	Infiltration Basin #1	Good	No
Landfill – west	LF-2	Infiltration Basin #2	Good	No
Landfill – east	LF-3	Detention Basin #3	Good	No
Memorial Drive Senior Ctr.	SC-1	Swale Conveyance	Good	No
Public Library	PL-1	Detention Basin	Good	No
Richard's Way	RW-1	Detention Basin #1	Fair	Yes (minor)
Richard's Way	RW-2	Detention Basin #2	Good	No
Richard's Way	RW-3	Detention Basin #3	Fair	Yes
Robbs Hill	RH-5	Detention Basin	Good	No
Whitetail Crossing	WC-1	Detention Basin #1	Good	No
Whitetail Crossing	WC-2	Detention Basin #2	Good	No

Recommendations

The majority of the BMPs are in good to fair operating order while a few are in fair condition and require minor maintenance as noted on the attached inspection sheets. Minor maintenance generally includes removal of plant material buildup, sediment removal, trimming back or removal of vegetation, and general landscaping.

Table 2 below provides a brief summary of maintenance requirements for each BMP, while Table 3 provides additional information on inspection results. Based on CEI's inspections, the maintenance items identified in Table 2 below should be completed in order to improve BMP functionality.

Table 2 – BMP Maintenance Recommendations

BMP ID / Location	Recommendations
FP-2 Fire/Police Station	• Cut/remove vegetation from riprap spillway to maintain function • Remove sediment from top of outlet structure
RW-1 Richard's Way	• Remove sediment within the infiltration area and scarify bottom surface • Jet and clean inlet pipe from parking lot
RW-3 Richard's Way	• Remove woody vegetation from basin, side slopes, earthen berm and spillway • Remove invasive species (Multiflora Rose)
All other BMPs	• N/A, no maintenance required

If you have any further questions or would like additional information, please feel free to contact me at 800.725.2550 x303 or ncristofori@ceiengineers.com. Thank you.

Nick Cristofori, P.E.
Principal, Project Manager

Attachments:

- Table 3 – Stormwater Infrastructure Inspected and Maintenance Recommendations
- BMP map
- Stormwater inspection reports and photographs

STORMWATER INSPECTION REPORT

Table 3 – Stormwater Infrastructure Inspected and Maintenance Recommendations

Location	BMP ID	Stormwater BMP Type	Inspection Date	Field Observations	Action Standard	Inspection or Maintenance Action
BMPs requiring routine inspection with no immediate follow up action required						
Butterfly Ln	BL-1	Detention Basin #1	5/4/2021	System in good condition.	N/A	No immediate actions. Inspect annually.
Butterfly Ln	BL-2	Detention Basin #2	5/4/2021	System in good condition.	N/A	No immediate actions. Inspect annually.
Cortland Cir	CC-1	Detention Basin #1	5/4/2021	Cracked inlet pipe - still functioning	50% of cross section covered in cracks	No immediate actions. Inspect annually.
Cortland Cir	CC-2	Detention Basin #2	5/4/2021	Debris accumulation.	Vegetation impacting function / capacity or access.	No immediate actions. Inspect annually.
Fire/Police Station	FP-1	Detention Basin #1	5/4/2021	System in good condition.	N/A	No immediate actions. Inspect annually.
Landfill – south	LF-1	Detention Basin #1	5/4/2021	System in good condition.	N/A	No immediate actions. Inspect annually.
Landfill – west	LF-2	Detention Basin #2	5/4/2021	Sediment accumulation.	Less than ½ depth from bottom to invert.	No immediate actions. Inspect annually and remove sediment as needed.
Landfill – east	LF-3	Detention Basin #3	5/4/2021	Vegetation on side slopes.	Vegetation not impacting function / capacity or access.	No immediate actions. Inspect annually and remove vegetation as needed.

STORMWATER INSPECTION REPORT

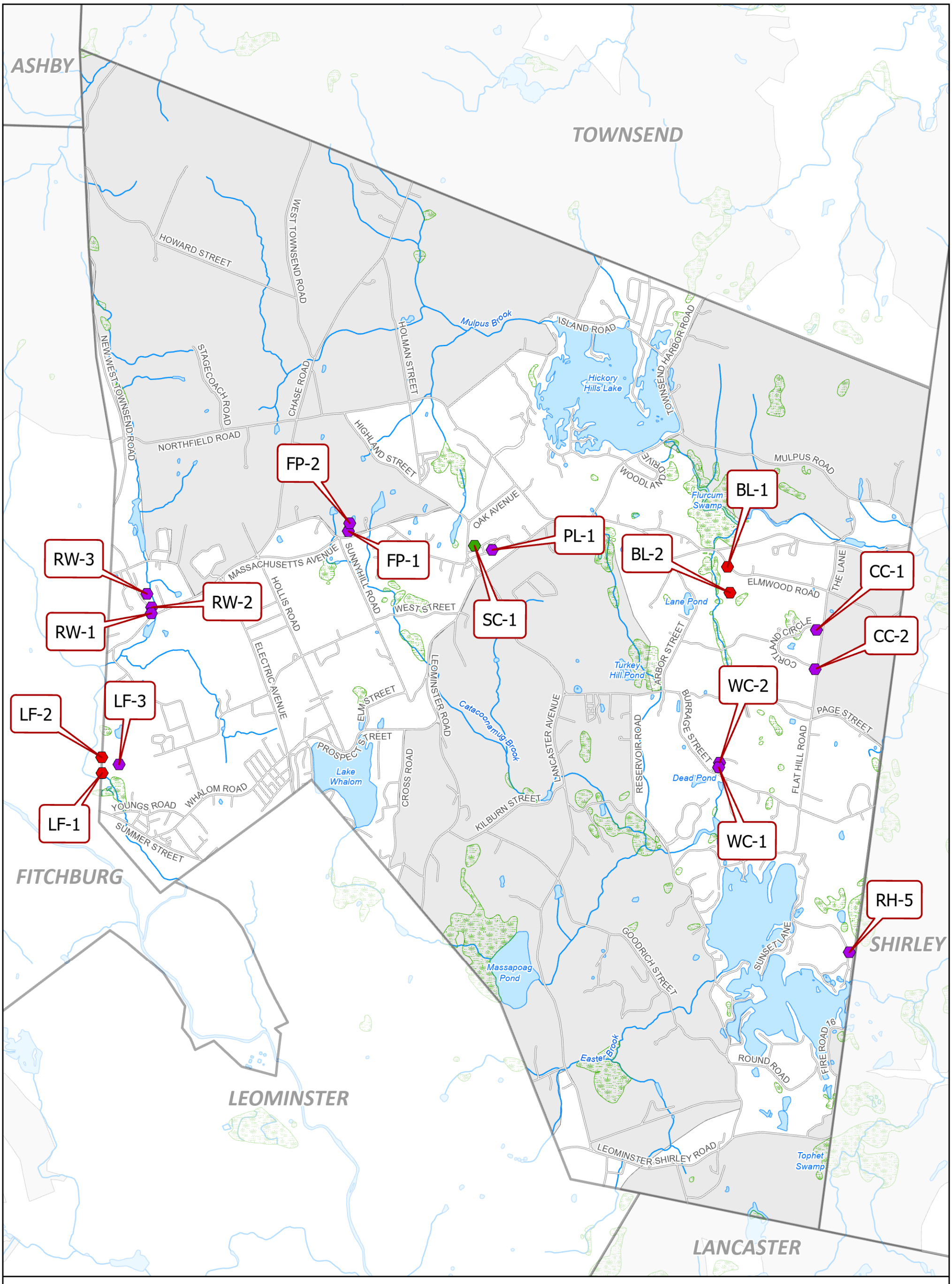
Location	BMP ID	Stormwater BMP Type	Inspection Date	Field Observations	Action Standard	Inspection or Maintenance Action
BMPs requiring routine inspection with no immediate follow up action required						
Public Library	PL-1	Detention Basin	5/19/2021	Debris accumulation.	Vegetation NOT impacting BMP function.	No immediate actions. Inspect annually and remove debris as needed.
				Woody vegetation in spillway.	Woody vegetation <3 inches caliper.	No immediate actions. Inspect annually.
Richard's Way	RW-1	Detention Basin #1	5/4/2021	Debris accumulation.	Vegetation impacting function / capacity or access.	No immediate actions. Inspect annually.
Richard's Way	RW-2	Detention Basin #2	5/4/2021	Overgrown vegetation on side slopes/bottom	Vegetation NOT impacting BMP function.	No immediate actions. Inspect annually.
Memorial Drive Senior Center	SC-1	Bioretention Area	5/4/2021	System in good condition.	N/A	No immediate action. Inspect annually.
Whitetail Crossing	WC-1	Detention Basin #1	5/4/2021	Overgrown vegetation on side slopes/bottom.	Vegetation NOT impacting BMP function.	No immediate actions. Inspect annually.
Whitetail Crossing	WC-2	Detention Basin #2	5/4/2021	Clogged Inlet/Outlet Piping	Any portion of pipe clogged < ¼ capacity	No immediate actions. Inspect annually.
Robb's Hill	RH-5	Detention Basin	5/4/2021	Clogged Inlet/Outlet Piping	Any portion of pipe clogged < ¼ capacity	No immediate actions. Inspect annually.

STORMWATER INSPECTION REPORT

Location	BMP ID	Stormwater BMP Type	Inspection Date	Field Observations	Action Standard	Inspection or Maintenance Action
BMPs Requiring Minor Maintenance						
Richard's Way	RW-2	Detention Basin #2	5/4/2021	Small amounts of Multiflora Rose	Invasive Species	**Remove and dispose of invasive plants per regulations.**
				Overgrown woody vegetation on earthen embankment.	Woody vegetation <3 inches caliper.	**Cut/remove woody vegetation as needed to maintain function.**
Whitetail Crossing	WC-1	Detention Basin #1	5/4/2021	Woody vegetation in spillway.	Woody vegetation <3 inches caliper.	**Cut/remove woody vegetation as needed to maintain function.**
				Small amounts of Multiflora Rose	Invasive Species	**Remove and dispose of invasive plants per regulations.**
Fire/Police Station	FP-2	Detention Basin #2	5/4/2021	Sediment Accumulation	Greater than ½ depth from bottom to invert.	**Remove sediment to restore storage capacity.**
				Woody vegetation in spillway.	Woody vegetation <3 inches caliper.	**Cut/remove woody vegetation as needed to maintain function.**

STORMWATER INSPECTION REPORT

Location	BMP ID	Stormwater BMP Type	Inspection Date	Field Observations	Action Standard	Inspection or Maintenance Action
BMPs Requiring Minor Maintenance						
Richards Way	RW-1	Detention Basin #1	5/4/2021	Clogged Inlet/Outlet Piping	Any portion of pipe clogged < ¼ capacity	**Restore flow from inlet pipe. (Jet and clean)**
Richards Way	RW-3	Detention Basin #1	5/4/2021	Overgrown vegetation on side slopes/bottom	Vegetation impacting BMP function.	**Cut/remove vegetation as needed to maintain function.**
				Woody vegetation in spillway.	Woody vegetation <3 inches caliper.	**Cut/remove woody vegetation as needed to maintain function.**
				Overgrown woody vegetation on earthen embankment.	Woody vegetation <3 inches caliper.	**Cut/remove woody vegetation as needed to maintain function.**
				Small amounts of Multiflora Rose	Invasive Species	**Remove and dispose of invasive plants per regulations.**



Legend

- Detention Basin
- Infiltration Basin
- Swale Conveyance
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Non-Urban Area

N W E S

0 1

Miles

Stormwater BMP Map

Lunenburg, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Lunenburg, CEI

6/3/2021

STORMWATER BMP INSPECTION REPORT

To: Adam Burney, Land Use Director

From: Nick Cristofori, P.E., Comprehensive Environmental Inc.

Date: May 16, 2022

Locations: Butterfly Lane, Cortland Circle, Fire/Police Station, Landfill, Lunenburg Public Library, Richard's Way, Robbs Hill, Senior Center, Whitetail Crossing

Town: Lunenburg, MA

Inspectors: Kevin Barbara and Danica Cucchi, CEI

Inspection Dates: April 21, 2022

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, regulated communities such as Lunenburg are required to annually inspect stormwater Best Management Practices (BMPs) within the regulated Urbanized Area (UA) and maintain as needed. In response, Comprehensive Environmental Inc. (CEI) performed an inspection of stormwater BMPs at the identified locations on April 21, 2022 to evaluate general conditions and document recommended maintenance items for follow-up action in order to meet permit requirements.

Inspections

At the conclusion of the previous round of inspections in 2021, Lunenburg and CEI identified 17 different BMPs that required inspections to meet permit requirements. BMP locations are identified by street name, with locations shown on a town-wide GIS map. Table 1 below details the locations and individual BMPs that were inspected. BMP inspection results are detailed in the attached inspection sheets attached to this report, along with representative photo documentation. At the time of the inspections on April 21st, the weather was approximately 45 to 50 degrees and partly cloudy. Weather over a three-day period leading up to April 21st was between 50 to 60 degrees and no rain events.

Table 1 – Stormwater Infrastructure Inspected

Location	BMP ID	Stormwater BMP Type	Overall Condition	Requires Maintenance
Butterfly Ln	BL-1	Infiltration Basin #1	Good	No
Butterfly Ln	BL-2	Infiltration Basin #2	Good	No
Cortland Circle	CC-1	Detention Basin #1	Fair	Yes (minor)
Cortland Circle	CC-2	Detention Basin #2	Fair	No
Fire/Police Station	FP-1	Detention Basin #1	Good	No
Fire/Police Station	FP-2	Detention Basin #2	Fair	Yes (minor)
Landfill – south	LF-1	Infiltration Basin #1	Good	No
Landfill – west	LF-2	Infiltration Basin #2	Good	No
Landfill – east	LF-3	Detention Basin #3	Good	No
Memorial Drive Senior Ctr.	SC-1	Swale Conveyance	Good	No
Public Library	PL-1	Detention Basin	Good	No
Richard's Way	RW-1	Detention Basin #1	Fair	Yes (minor)

Table 1 (continued) – Stormwater Infrastructure Inspected

Location	BMP ID	Stormwater BMP Type	Overall Condition	Requires Maintenance
Richard's Way	RW-2	Detention Basin #2	Good	No
Richard's Way	RW-3	Detention Basin #3	Fair	Yes (minor)
Robbs Hill	RH-5	Detention Basin	Good	No
Whitetail Crossing	WC-1	Detention Basin #1	Good	No
Whitetail Crossing	WC-2	Detention Basin #2	Good	No

Recommendations

The majority of the BMPs are in good operating order while a few are in fair condition and require minor maintenance as noted on the attached inspection sheets. Minor maintenance generally includes removal of plant material buildup, sediment removal, trimming back or removal of vegetation, and general landscaping. Table 2 below provides a brief summary of maintenance requirements for each BMP, while Table 3 provides additional information on inspection results.

Table 2 – BMP Maintenance Recommendations

BMP ID / Location	Recommendations
CC-1 Cortland Circle	• Remove vegetation from inlet pipe • Remove invasive species (Phragmites) • Repair area around headwall
FP-2 Fire/Police Station	• Cut/remove vegetation from riprap spillway to maintain function • Remove sediment from top of outlet structure
RW-1 Richard's Way	• Remove sediment within the infiltration area and scarify bottom surface • Jet and clean inlet pipe from parking lot
RW-3 Richard's Way	• Remove woody vegetation from basin, side slopes, earthen berm and spillway • Remove invasive species (Multiflora Rose)
All other BMPs	• N/A, no maintenance required

Locations should be maintained as outlined above. Inspections should continue annually with the next inspection occurring in spring 2023. If additional town-owned BMPs are identified, they should also be maintained as needed and inspected annually. BMP maps and inventories should also be updated to reflect all BMPs, and as-built plans should be retained on file where possible to aid in future inspections. If you have any further questions or would like additional information, please feel free to contact me at 800.725.2550 x303 or ncristofori@ceiengineers.com. Thank you.

Nick Cristofori, P.E.; Principal, Project Manager

Attachments:

- Table 3 – Stormwater Infrastructure Inspected and Maintenance Recommendations
- BMP map
- Stormwater inspection reports and photographs

STORMWATER BMP INSPECTION REPORT

Table 3 – Stormwater Infrastructure Inspected and Maintenance Recommendations

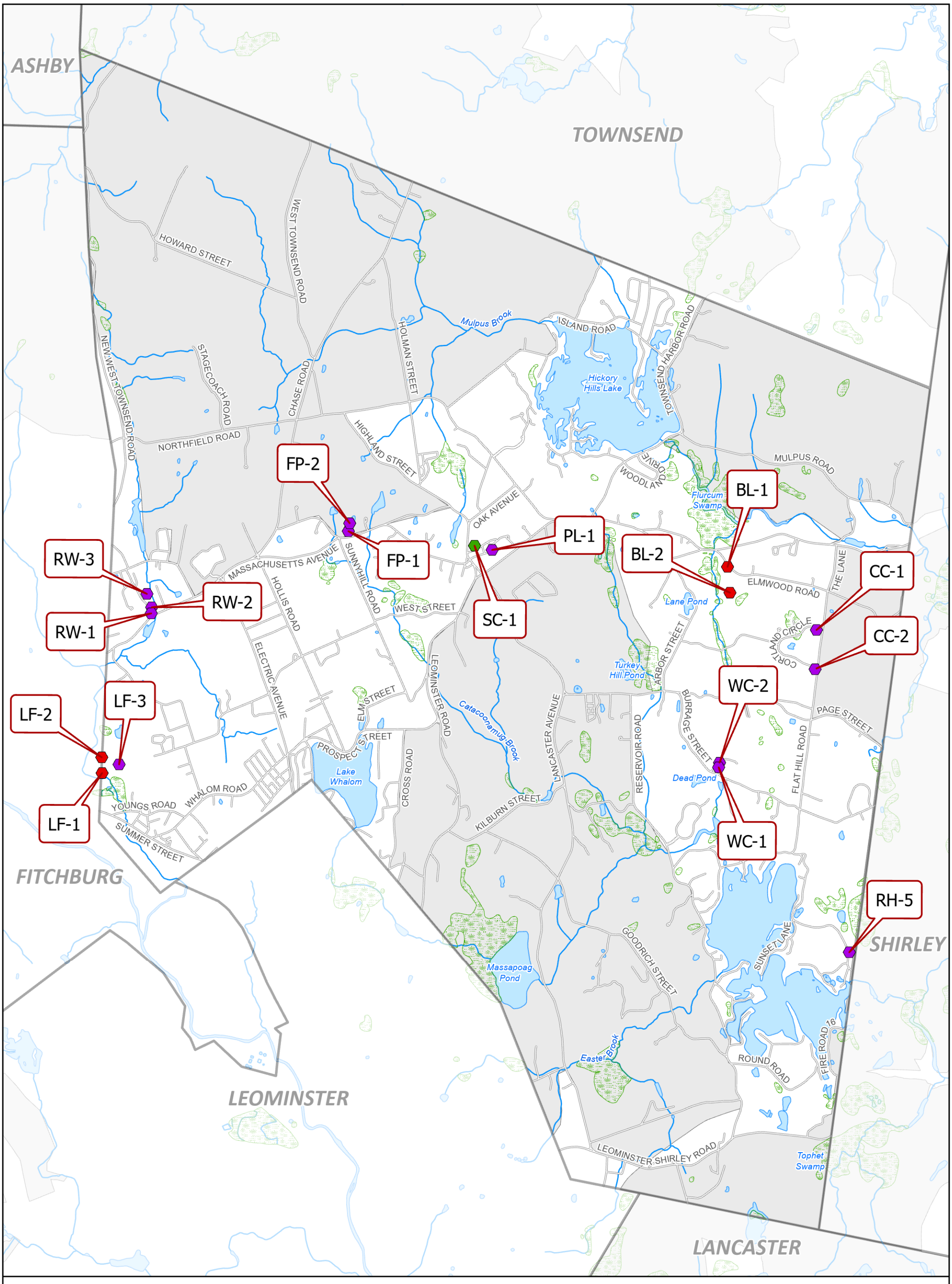
Location	BMP ID	Stormwater BMP Type	Inspection Date	Field Observations	Action Standard	Inspection or Maintenance Action
BMPs requiring routine inspection with no immediate follow up action required						
Butterfly Ln	BL-1	Infiltration Basin #1	4/21/2022	Minor presence of invasive species	Vegetation not impacting function of BMP.	No immediate actions. Inspect annually.
Butterfly Ln	BL-2	Infiltration Basin #2	4/21/2022	System in good condition.	N/A	No immediate actions. Inspect annually.
Cortland Cir	CC-2	Detention Basin #2	4/21/2022	Dead vegetation and blocked outlet grates.	Vegetation impacting function / capacity or access and remove blockage/debris.	No immediate actions. Inspect annually.
Fire/Police Station	FP-1	Detention Basin #1	4/21/2022	Dead vegetation and invasive species.	Vegetation minorly impacting function of BMP.	No immediate actions. Inspect annually.
Landfill – south	LF-1	Infiltration Basin #1	4/21/2022	Minor presence of invasive species.	Vegetation not impacting function of BMP.	No immediate actions. Inspect annually.
Landfill – west	LF-2	Infiltration Basin #2	4/21/2022	System in good condition.	N/A	No immediate actions. Inspect annually.
Landfill – east	LF-3	Detention Basin #3	4/21/2022	System in good condition.	N/A	No immediate actions. Inspect annually.
Memorial Drive Senior Center	SC-1	Water Quality Swale	4/21/2022	Sediment Accumulation	Not drastically affecting BMP.	No immediate action. Inspect annually.
Public Library	PL-1	Detention Basin	4/21/2022	Sediment accumulation.	Less than ½ depth from bottom to invert.	No immediate actions. Inspect annually and remove sediment as needed.
				Clogged pipe.	Not impacting BMP.	No immediate actions. Inspect annually.

STORMWATER BMP INSPECTION REPORT

Location	BMP ID	Stormwater BMP Type	Inspection Date	Field Observations	Action Standard	Inspection or Maintenance Action
BMPs requiring routine inspection with no immediate follow up action required						
				Overgrown vegetation on side slopes with presence of invasive species.	Vegetation NOT impacting BMP function.	No immediate actions. Inspect annually.
Richard's Way	RW-2	Detention Basin #2	4/21/2022	Overgrown vegetation on side slopes/bottom and presence of invasive species.	Vegetation NOT impacting BMP function.	No immediate actions. Inspect annually.
Robb's Hill	RH-5	Detention Basin	4/21/2022	Clogged Inlet/Outlet Piping	Any portion of pipe clogged < ¼ capacity	No immediate actions. Inspect annually.
Whitetail Crossing	WC-1	Detention Basin #1	4/21/2022	Overgrown vegetation and presence of invasive species.	Vegetation minimally impacting BMP function.	No immediate actions. Inspect annually.
Whitetail Crossing	WC-2	Detention Basin #2	4/21/2022	Overgrown vegetation and presence of invasive species.	Vegetation minimally impacting BMP function.	No immediate actions. Inspect annually.

STORMWATER BMP INSPECTION REPORT

Location	BMP ID	Stormwater BMP Type	Inspection Date	Field Observations	Action Standard	Inspection or Maintenance Action
BMPs Requiring Minor Maintenance						
Cortland Cir	CC-1	Detention Basin #1	4/21/2022	Clogged inlet, presence of invasive species, and structural damage	Pipe clogged more than ¼ capacity, remove impacting invasive species, foundation poor condition and more than 50% headwall rocks falling apart.	**Clean pipe, remove invasive species, repair foundation structure for headwall.**
Fire/Police Station	FP-2	Detention Basin #2	4/21/2022	Sediment Accumulation	Greater than ½ depth from bottom to invert.	**Remove sediment to restore storage capacity.**
				Blocked outlet grates and clogged outlet.	More than ¼ capacity clogged and 25% blockage of outlet.	**Remove debris and blockage.**
				Woody vegetation in spillway.	Woody vegetation <3 inches caliper.	**Cut/remove woody vegetation as needed to maintain function.**
Richards Way	RW-1	Detention Basin #1	4/21/2022	Clogged Inlet/Outlet Piping	Any portion of pipe clogged < ¼ capacity	**Restore flow from inlet pipe. (Jet and clean)**
Richards Way	RW-3	Detention Basin #1	4/21/2022	Overgrown vegetation on side slopes/bottom.	Vegetation impacting BMP function.	**Cut/remove vegetation as needed to maintain function.**
				Woody vegetation in spillway.	Woody vegetation >3 inches caliper.	**Cut/remove woody vegetation as needed to maintain function.**
				Overgrown woody vegetation on earthen embankment.	Woody vegetation >3 inches caliper.	**Cut/remove woody vegetation as needed to maintain function.**
				Small amounts of Multiflora Rose	Invasive Species	**Remove and dispose of invasive plants per regulations.**



Legend

- Detention Basin
- Infiltration Basin
- Swale Conveyance
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Non-Urban Area

N W E S

0 1

Miles

Stormwater BMP Map

Lunenburg, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Lunenburg, CEI

6/3/2021

Appendix I

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: Town of Lunenburg

EPA NPDES Permit Number: MAR041206

Primary MS4 Program Manager Contact Information

Name: Heather Lemieux Title: Town Manager

Street Address Line 1: Town Hall

Street Address Line 2: P.O. Box 135

City: Lunenburg State: MA Zip Code: 01462

Email: hlemieux@lunenburgonline.com Phone Number: (978) 582-4130

Fax Number: na

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.lunenburgma.gov/boards-commissions-committees/stormwater-task-force

Date SWMP was Last Updated: June 30, 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:

    https://www.lunenburgma.gov/boards-commissions-committees/stormwater-task-force; IDDE Plan, Table 4-1
- ☒ 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

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 Attachment 3 to Appendix F 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:

Public Education and Outreach - The town has developed a comprehensive stormwater education website with audience-specific information provided for download and provides numerous opportunities throughout the year for information dissemination. The Town has not yet developed seasonal educational messages for all

seasons as required for phosphorus water quality limited waterbodies, however, will do so during Year 2. Note that the Town did distribute a targeted leaf litter flyer in fall 2018 as required.

Stormwater BMP Inspections - The Town is currently developing an inventory of its town-owned Stormwater BMPs. Inspections are expected to begin during fall of Year 2.

IDDE Training - A representative from the SWTF attended an IDDE Outfall Screening training seminar on April 25, 2019 on conjunction with the Central MA Stormwater Coalition at the Framingham DPW. During Year 2, the Town will develop an internal employee IDDE Training program, with annual training to be performed starting in Year 2.

Nitrogen/Phosphorus Structural BMP Tracking - The Town will begin evaluation of its permittee-owned stormwater BMPs during future years in conjunction with preparing the nutrient source identification reports. It is expected this task will not start until at least Year 3.

Increased Sweeping for High Pollutant Loads - This was determined not to be necessary for the Town as these areas are not observed to accumulate more sediment and debris than other areas within the Town.

Part III: Receiving Waters/Impaired Waters/TMDL

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

Yes ☒ No ☐

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

Part III of the NOI did not list Lake Shirley (MA81122) as being impaired for Turbidity. As such, the Town is subject to Appendix H part V for this waterbody. This has been reflected in the Town's SWMP Plan.

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: 11

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: Video, Think Blue Massachusetts "Fowl Water"

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: External Contractor - ThinkBlue

Measurable Goal(s):

9,052 social media impressions from Town residents.

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:

The ThinkBlue campaign was not included in the NOI

BMP: Press Release, "Clean Water Begins with You"

Message Description and Distribution Method:

Published an educational press release in the local Worcester Telegram & Gazette, "Clean Water Begins with You" from ThinkBlue.

Targeted Audience: Residents

Responsible Department/Parties: External Contractor - State Stormwater Coalition

Measurable Goal(s):

Worcester Telegram & Gazette has a print circulation of approximately 22,000 and 800,000 monthly unique visitors.

Message Date(s): October 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:

The ThinkBlue campaign was not included in the NOI

BMP: Press Release "Clean Water Begins with You"

Message Description and Distribution Method:

Published an educational press release in the local Wicked Local paper, "Clean Water Begins with You" from ThinkBlue.

Targeted Audience: Residents

Responsible Department/Parties: External Contractor - State Stormwater Coalition

Measurable Goal(s):

Wicked Local has a print circulation of approximately 1.4 million and 2.2 million monthly unique visitors.

Message Date(s): October 3, 2018 and December 30, 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:

The ThinkBlue campaign was not included in the NOI

BMP: Press Release "Massachusetts Towns Team Up to Take on Pollution"

Message Description and Distribution Method:

Published an educational press release in the local Lunenburg Ledger, "Massachusetts Towns Team Up to Take on Pollution".

Targeted Audience: Residents

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Publish at least 1 newspaper article per year.

Message Date(s): October 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:

News articles were not included in the NOI, however were identified as an effective way to disseminate information to the public.

BMP: Brochure, Leaf Litter

Message Description and Distribution Method:

Distribute targeted leaf litter message in the fall to meet phosphorus water quality limited waterbody requirements.

Targeted Audience: Residents, Business/Commercial/Institution

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Make flyer available at the Town Hall, on the Town website, on the Public Access Channel, and at the special town meeting held on November 13, 2018.

Message Date(s): November 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: Press Release, Rain Barrels, Composting Bins, Kitchen Composting

Message Description and Distribution Method:

Published an educational press release in the local Lunenburg Ledger and on the local public access channel on rain barrels composting bins, and kitchen composting buckets.

Targeted Audience: Residents

Responsible Department/Parties: Town Manager

Measurable Goal(s):

Publish at least 1 newspaper article per year and post at least one public access channel message per year.

Message Date(s): April 12 and April 18, 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:

News articles were not included in the NOI, however were identified as an effective way to disseminate information to the public.

BMP: Flyer and Video, "Lawn and Garden Tips to Help Curb Stormwater"

Message Description and Distribution Method:

Televise a message on "Lawn and Garden Tips to Help Curb Stormwater" on the local cable public access channel, on the Stormwater Task Force website, on the Town's Facebook page, at the Public Library and Eagle House Senior Center.

Targeted Audience: Residents, Business/Commercial/Institution

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Make flyer available at two public locations, on the Town website, and on the Public Access Channel. 548 people have viewed the Facebook post, as well as 1,296 “followers”. The library and senior center had 13,207 and 45 visitors, respectively.

Message Date(s): April 18 through April 23, 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: Email, "Pollution Prevention for Industrial Sites"

Message Description and Distribution Method:

Emailed industrial users (based on tax assessor's use code) a fact sheet on "Pollution Prevention for Industrial Sites".

Targeted Audience: Industrial

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Send flyer to 5 unique industrial users within town.

Message Date(s): June 20, 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: Flyer, "Help Keep our Local Waters Clean and Healthy - You Can Make the Difference"

Message Description and Distribution Method:

Mailed a flyer with tax bills, "Help Keep our Local Waters Clean and Healthy - You Can Make the Difference".

Targeted Audience: Residents

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Mail an informational flyer with all 4,000+ tax bills.

Message Date(s): June 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:

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:

SWMP Plan for Download - The Town has posted the SWMP Plan on Town website along with contact information to allow for public comment.

Hickory Hills Garden Club Workshop - At the July 25, 2018 Hickory Hills Garden Club Workshop event, the Town did a presentation on rain garden installation.

Board of Selectmen Meeting - At the September 4, 2018 Board of Selectmen meeting, SWTF representatives spoke about the new MS4 permit and presented the draft NOI to the Board. There were approximately 30

people in the audience and an additional 236 people viewed a recording on YouTube.

Stillman's Country Fair - At the September 8, 2018 Stillman Farm fair, the SWTF hosted a booth that provided information on rain barrels and composting. Approximately 2,600 local residents attended the fair, purchasing 13 composting buckets and taking approximately 30 ThinkBlue rubber duckies.

Special Town Meeting - At the November 13, 2018 special town meeting, the SWTF spoke in support of a Citizen Petition Warrant Article to ban plastic bags. Approximately 100 people were in attendance and the article passed.

Central Massachusetts Regional Stormwater Coalition (CMRSC) Annual Meeting - At the November 14, 2018 CMRSWC annual meeting, SWTF representatives attended a workshop that in part included information on stormwater educational materials that are available, including Enviroscape, ThinkBLue, and Fair Booth materials.

MA Association of Conservation Commissions Conference - At the March 2, 2019 annual conference, SWTF representatives manned a ThinkBlue booth and distributed rubber duckies to attendees.

MA Congress of Lakes and Ponds (COLAP) Annual Meeting - At the April 12, 2019 COLAP annual meeting, SWTF representatives and other community members from the Hickory Hills Lake association attended a workshop on stormwater mitigation efforts held at the Massachusetts Fish and Wildlife Field Headquarters.

Annual Town Meeting - At the May 4, 2019 town meeting, the SWTF distributed 40 ThinkBlue informational sheets on Lawn & Garden Tips to Help Curb Stormwater Pollution and 30 informational sheets on Bin, Barrel, and Bucket sales.

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:

The Town established a Stormwater Task Force (SWTF) consisting primarily of several department heads during previous years to in part oversee permit compliance and promote public education and participation throughout Lunenburg. The SWTF met a total of 19 times between May 1, 2018 and June 30, 2019. The Town is also an active member of the Central Massachusetts Regional Stormwater Coalition.

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: 0

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: 0

Total number of SSOs removed: 0

MS4 System Mapping

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

The Town has completed multiple Phase I mapping requirements under the 2016 Permit. Outfalls, receiving waters, and impaired waters within the Town's urbanized area have been mapped. The Town will work toward identifying its stormwater treatment structures, interconnections with other towns, and open channel conveyances in Permit Year 2.

Screening of Outfalls/Interconnections

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

- ○ The outfall screening data is attached to the email submission
- ○ The outfall screening data can be found at the following website:

N/A, none completed to date

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

Number of outfalls screened: 0

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

Percent of total outfalls screened: 0%

Catchment Investigations

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

- ○ The catchment investigation data is attached to the email submission
- ○ The catchment investigation data can be found at the following website:

N/A, none completed to date

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:

N/A, not yet started

IDDE Progress

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

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

N/A, none found to date

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:

N/A, none found to date

Employee Training

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

IDDE Training - A representative from the SWTF attended an IDDE Outfall Screening training seminar on April 25, 2019 on conjunction with the Central MA Stormwater Coalition at the Framingham DPW. During Year 2, the Town will develop an internal employee IDDE Training program, with annual training to be performed starting in Year 2.

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: 6

Number of inspections completed: 15

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:

The current Town bylaws and regulations are partially in compliance with the Year 2 requirements, however do not meet all requirements pertaining to new development and redevelopment. The Town will draft a revised bylaw and accompanying regulations to meet all Year 2 requirements, and it is anticipated that revisions will be put up for vote at the spring 2020 town meeting.

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:

Under existing regulations, both the Con/Com and Planning Board require the submission of as-built drawings as part of their local rules and regulations. As part of the regulatory updates to be performed during Year 2, procedures for submittal of as-built drawings and long term operation and maintenance will be formalized across all applicable regulations to meet permit requirements.

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:

N/A, to be completed during future permit years.

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:

N/A, to be completed during future permit years.

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:

The Town is currently developing an inventory of its permittee-owned properties. Once completed, facilities will be evaluated for potential BMP retrofit opportunities during future permit years.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

The Town developed a Catch Basin Cleaning Optimization Plan during September 2019 as a component of its

If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:

- (●) The catch basin cleaning optimization plan or schedule is attached to the email submission
- ( ) The catch basin cleaning optimization plan or schedule can be found at the following website:

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

Number of catch basins inspected: 710

Number of catch basins cleaned: 710

Total volume or mass of material removed from all catch basins: 355 CY

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

Total number of catch basins: 955

If applicable:

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

Not yet applicable, pending collection of a second round of catch basin inspections.

Street Sweeping

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

The Town developed a Street Sweeping Optimization Plan during September 2019 as a component of its SWMP Plan. This consists of a map displaying sweeping requirements throughout the Town and a Standard Operating Procedure (SOP) for completing the sweeping.

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

- (●) Number of miles cleaned: 90
- ( ) 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:

DPW personnel observe all regulated town-owned roadways for maintenance needs, including street sweeping, during routine operations. Personnel also observe known trouble areas, such as projects with large-scale construction projects or projects with substantial land disturbance, for evidence of runoff-laden sediment onto roadways that may require more frequent sweeping in addition to that outlined under the Street Sweeping Optimization Plan. In addition, town residents periodically call the DPW to report localized areas needing sweeping that DPW personnel then visit to inspect. Should areas in need of additional sweeping be observed, the Town documents these areas as part of its Street Sweeping Optimization Plan and schedules areas for sweeping during the next upcoming round. Note that the Town applies no sand to roadways during winter operations, and thus observed sweeping needs are typically minimal. Inspections of rural uncurbed roadways conducted to date have not yet observed any needs for additional sweeping within regulated urbanized area roadways.

Winter Road Maintenance

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

The Town developed SOPs for winter road maintenance during September 2019. These SOPs will be included as part of a larger comprehensive Operation and Maintenance (O&M) Plan during Year 2 that covers other facilities and stormwater infrastructure.

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:

The Town is currently developing an inventory of its permittee-owned properties, to be completed by the end of Year 2.

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:

The Town is currently developing O&M Procedures for its Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment, to be completed by the end of Year 2.

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:

The Town is currently working towards completing SWPPPs for applicable facilities. The Town completed a preliminary review of its facilities during Year 1 and determined that only one facility is likely applicable and within the regulated area, the old landfill. During Year 2, the Town will complete a more comprehensive facility assessment and complete SWPPPs for applicable facilities by the end of Year 2.

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, not yet started.

O&M Procedures for Stormwater Treatment Structures

Describe the status of the written procedure for stormwater treatment structure maintenance:

The Town is currently developing an inventory of its town-owned Stormwater BMPs. Once complete, the Town will inspect all regulated stormwater BMPs annually and perform maintenance as needed.

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, not yet started.

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:

Activities performed during Year 1 include submittal of a Notice of Intent, development of a comprehensive Stormwater Management Program (SWMP) Plan, development of a comprehensive Illicit Discharge Detection and Elimination (IDDE) Plan which in part included creation of procedures for identifying and removing illicit discharges along with classifying and prioritizing catchment areas.

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)*

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 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:

As dry weather inspections are required for all regulated outfalls by the end of Year 3, the Town anticipates beginning these inspections during Year 2 to get a head start on sampling requirements. This will allow the Town more time to complete the inspections by the Year 3 deadline. The Town will also begin a preliminary evaluation of the feasibility of a stormwater utility.

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: Heather Lemieux

Title: Town Manager

Signature: Heather Lemieux

Date: 9/18/19

[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: Town of Lunenburg

EPA NPDES Permit Number: MAR041206

Primary MS4 Program Manager Contact Information

Name: Heather Lemieux Title: Town Manager

Street Address Line 1: Town Hall

Street Address Line 2: P.O. Box 135

City: Lunenburg State: MA Zip Code: 01462

Email: hlemieux@lunenburgonline.com Phone Number: (978) 582-4130

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.lunenburgma.gov/boards-commissions-committees/stormwater-task-force

Date SWMP was Last Updated: June 30, 2019

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

Stormwater Public Education website: https://www.lunenburgma.gov/departments/public-works/stormwater-management

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:

Phase I Mapping - mapping of open channel conveyances and any newly located outfalls is ongoing. Mapping interconnections with other MS4s (e.g. DOT) is ongoing, and it is expected that this will continue as part of DOT's own mapping efforts to be completed under a future TS4 permit.

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 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:

Outfall Inventory and Ranking - the outfall and interconnection inventory is updated on an ongoing basis as dry weather screening is performed. The priority ranking will be updated after dry weather inspections are completed and before catchment investigations commence.

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:

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:

Public Education and Outreach - the Town is part of the statewide ThinkBlue campaign which in part distributes a number of public outreach-related materials throughout the year. Lunenburg's stormwater webpage also has links to seasonal messages on grass clipping management, pet waste, and leaf litter disposal.

Structural BMPs - BMPs pollutant removal has not yet been computed, however, it is expected that this will be completed during Year 3.

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:

Increased Sweeping for High Pollutant Loads - This was determined not to be necessary for the Town as these areas are not observed to accumulate more sediment and debris than other areas within the Town.

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

Dry Weather Outfall Screening - The Town attempted to inspect a total of 243 known stormwater outfalls during dry weather for potential illicit discharges. Of the 243 known stormwater outfalls that were inspected, 202 were located and 7 of which were flowing. The flowing outfalls were sampled and 4 met the permit criteria for being likely to contain illicit discharges. These outfalls will be revisited and resampled and/or evaluated for illicit discharge sources during Year 3. The Town will attempt to locate and inspect the 41 outfalls that could not be located, as well as an additional 114 known outfalls that have not yet been visited, for dry weather flows during Year 3.

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:

As noted in the Year 1 Annual Report, Part III of the NOI did not list Lake Shirley (MA81122) as being impaired for Turbidity. As such, the Town is subject to Appendix H part V for this waterbody. This has been reflected in the Town's SWMP Plan.

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: Video, Think Blue Massachusetts "Fowl Water"

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: External Contractor - ThinkBlue

Measurable Goal(s):

31,538 social media impressions from Town residents.

Message Date(s): Ongoing

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:

The ThinkBlue campaign was not included in the NOI.

BMP: Stormwater Survey

Message Description and Distribution Method:

Stormwater Survey placed in hard copy form at Lunenburg's Senior Center, Town Hall, and Public Library. Stormwater survey posted on the Town's website and Facebook page and sent out to all town employees. Also handed out survey at the Special Town Meeting in November.

Targeted Audience: Residents, Business/Commercial/Institution

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Assess residents and businesses on knowledge of stormwater-related issues in the community.

Message Date(s): October 2019, January 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:

Attempt to gain a better understanding of community stormwater knowledge and the effects of the Town's public education program.

BMP: Press Release, Rain Barrels, Composting Bins, Kitchen Composting

Message Description and Distribution Method:

Published an educational press release in the local Lunenburg Ledger and on the local public access channel on rain barrels composting bins, and kitchen composting buckets.

Targeted Audience: Residents

Responsible Department/Parties: Town Manager

Measurable Goal(s):

Publish at least 1 newspaper article per year and post at least one public access channel message per year.

Message Date(s): February 14, 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:

News articles were not included in the NOI, however were identified as an effective way to disseminate information to the public.

BMP: Brochure, Leaf Litter

Message Description and Distribution Method:

Distribute targeted leaf litter message in the fall to meet phosphorus water quality limited waterbody requirements.

Targeted Audience: Residents, Business/Commercial/Institution

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Posted a flyer on leaf litter disposal on the Lunenburg Public Access Bulletin Scroll and Stormwater Task Force website.

Message Date(s): October 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: Brochure, Fertilizers and Lawn Care

Message Description and Distribution Method:

Included fertilizer application and lawn care message in the town meeting warrant booklet that is mailed to every registered voter in the town.

Targeted Audience: Residents

Responsible Department/Parties: Town Manager

Measurable Goal(s):

Mailed to every registered household in the town (4,732)

Message Date(s): May 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: Brochure, Fertilizers and Lawn Care

Message Description and Distribution Method:

Distribute targeted fertilizer application and lawn care message in the spring to meet phosphorus water quality limited waterbody requirements.

Targeted Audience: Residents, Business/Commercial/Institution

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Posted a flyer on leaf litter disposal on the Stormwater Task Force website and Facebook page.

Message Date(s): April - May 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:

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**:

SWMP Plan for Download - The Town has posted the SWMP Plan on Town website along with contact information to allow for public comment.

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**:

Central Massachusetts Regional Stormwater Coalition (CMRSC) - Lunenburg has been a member of this organization since 2016. Lunenburg attended a total of 9 meetings with the CMRSC during Year 2.

The Town established a Stormwater Task Force (SWTF) consisting primarily of several department heads during previous years to in part oversee permit compliance and promote public education and participation throughout Lunenburg. The SWTF met a total of 7 times during Year 2 from July 2019 through January 2020, after which COVID-19 prohibited further meetings.

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: 0

Number of SSOs removed: 0

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:

Phase I Mapping - all known outfalls, stormwater BMPs, and receiving waterbodies with impairments have been mapped to date. Initial catchment delineations have also been completed based on topographic mapping and available stormwater system information. Mapping of open channel conveyances and any newly located outfalls is ongoing. Mapping interconnections with other MS4s (e.g. DOT) is ongoing, and it is expected that this will continue as part of DOT's own mapping efforts to be completed under a future TS4 permit.

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: 243

Catchment Investigations

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

- ○ The catchment investigation data is attached to the email submission
- ○ The catchment investigation data can be found at the following website:

N/A, none completed to date

*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:

N/A, none found to date

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 the reporting period**:

An on-site IDDE training session was held on February 26, 2020 with applicable DPW staff at the DPW Garage.

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: 2

Number of inspections completed: 24

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:

Under the current stormwater regulations, developers are required to submit as-built plans and a plan for ensuring operation and maintenance of stormwater BMPs during future years. The Town was working during Year 2 to update regulations to meet all updated permit requirements, such as updated stormwater standards, however, as a result of the COVID-19 outbreak, regulations were not updated as planned during Permit Year 2. The Town now anticipates completing stormwater regulatory updates as part of the Year 3 requirements under EPA's pending updated permit schedule.

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:

N/A, to be completed during future permit years.

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:

N/A, to be completed during future permit years.

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:

The Town completed an inventory of its permittee-owned properties during this permit year. Facilities will be evaluated for potential BMP retrofit opportunities during future permit years.

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: 79

Number of catch basins cleaned: 79

Total volume or mass of material removed from all catch basins: 37.5 cubic yards

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

Total number of catch basins: 955

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: 30

◉ Volume of material removed: 73 cubic yards

○ Weight of material removed: [Select Units]

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:

Not applicable, no corrective actions have been taken to date. Note that a SWPPP was completed on June 30, 2020 for the Catch Basin Cleanings and Street Sweepings Storage Area at the closed landfill. Quarterly site inspections will begin during Year 3.

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):

N/A, not started yet.

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:

Structural BMP Inspections - all known structural BMPs were inspected in May 2020. Any required maintenance will be performed during Year 3.

COVID-19 Impacts

Optional: If any of the above year 2 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 3 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

- 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:

The SWMP Plan and IDDE Plan will be updated during FY-21 to address all work performed through Year 3. This will include incorporating the above items into the SWMP Plan and/or IDDE Plan as necessary, incorporate results from outfall dry weather screening, as well as documenting results of other annual activities below such as BMP inspections.

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:	Heather Lemieux	Title:	Town Manager
Signature:	Heather Lemieux Digitally signed by Heather Lemieux Date: 2020.09.24 10:10:58 -04'00'	Date:	09/24/20

[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: Town of Lunenburg

EPA NPDES Permit Number: MAR041206

Primary MS4 Program Manager Contact Information

Name: Heather Lemieux Title: Town Manager

Street Address Line 1: Town Hall

Street Address Line 2: P.O. Box 135

City: Lunenburg State: MA Zip Code: 01462

Email: hlemieux@lunenburgonline.com Phone Number: (978) 582-4130

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.lunenburgma.gov/boards-commissions-committees/stormwater-task-force

Date SWMP was Last Updated: June 30, 2021

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 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:

Dry Weather Outfall Screening - During 2019 and 2020, the Town attempted to inspect all 321 known stormwater outfalls within the urbanized area during dry weather to investigate for potential illicit discharges. Of the 321 known stormwater outfalls that were attempted to be inspected, 256 were located and 9 of which were flowing. All flowing outfalls were sampled and did not meet the permit criteria for being highly likely to contain illicit discharges from sanitary sources. The remaining 63 outfalls could not be located, however, will be inspected for dry weather flows as the outfalls are located and/or evaluated at the next upgradient structure. The Town has hired a consultant to assist with this task. Work is anticipated to occur during Year 4. Note, numbers above represent all outfall screening completed to date. Numerous outfalls were revisited between Year 2 and Year 3 and thus it is difficult to quantify the number of outfalls screened in individual years.

Update Outfall Inventory and Priority Ranking - Outfall inventory and priority ranking was conducted concurrent with a comprehensive update of the SWMP and IDDE Plans, completed on June 30, 2021. The Town will continue to locate and inspect additional stormwater infrastructure during future permit years.

Construction and Post-Construction Bylaw - The Town updated its "Chapter 204 Stormwater and Storm Sewers" bylaw to include a new section on "Stormwater Management; NPDES Phase II Permits" (adopted November 17, 2020) which regulates construction projects greater than 1 acre. This bylaw meet all permit requirements for construction and post-construction requirements, including provisions for new/ redevelopment to remove 90%/80% of total phosphorus and 60%/50% of total suspended solid, respectively.

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:

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:

As noted under Part III below, the town only recently became aware that the Nashua River was also listed as impaired for e.coli. Thus, a fact sheet has not been distributed to dog owners at the time of issuance or renewal. The Town will work to implement this during future years. However, a seasonal message has been distributed during the summer as outlined under the Phosphorus impaired waters requirements 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)

Potential structural BMPs

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

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

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

Street Sweeping - Streets were swept only once during Permit Year 3.

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:

Increased Sweeping for High Pollutant Loads - This was determined not to be necessary for the Town as these areas are not observed to accumulate more sediment and debris than other areas within the Town.

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:

The Town has determined it is subject to the following additional TMDL and Impaired Waters requirements:
-Nashua River (MA81-05), bacteria impaired waters requirements (Appendix H, Part III)
-Lake Shirley (MA81122), turbidity impaired waters requirements (Appendix H, Part V)

The Town also updated its list of outfalls and receiving waters as new outfalls were found during the dry weather screening. The inspection results are attached to this annual report and a list and updated prioritization are also kept with the Town's IDDE Plan.

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**: 4

*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: Video, ThinkBlue Massachusetts "Fowl Water"

Message Description and Distribution Method:

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

Targeted Audience: Residents

Responsible Department/Parties: External Contractor - ThinkBlue

Measurable Goal(s):

Follow statewide "Think Blue" campaign on social media platforms. Social media impressions for the town totaled 18,868 from Town residents.

Message Date(s): May 17th to June 4th, 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:

The ThinkBlue campaign was not included in the NOI.

BMP: Brochure, Leaf Litter

Message Description and Distribution Method:

Distribute targeted leaf litter message in the fall to meet phosphorus water quality limited waterbody requirements.

Targeted Audience: Residents, Business/Commercial/Institution

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Posted a flyer on leaf litter disposal on the Stormwater Task Force website, distributed through Facebook, and placed at the Town Hall, Library, and Senior Center for collection.

Message Date(s): Fall 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: Brochure, Fertilizers and Lawn Care

Message Description and Distribution Method:

Distribute targeted fertilizer application and lawn care message in the spring to meet phosphorus water quality limited waterbody requirements.

Targeted Audience: Residents, Business/Commercial/Institution

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Posted a flyer on leaf litter disposal on the Stormwater Task Force website, distributed through Facebook, and placed at the Library and Senior Center for collection. This flyer was also included in the May 2021 annual town meeting warrant booklet that gets mailed to every registered voter in town

Message Date(s): Spring 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: Brochure, Pet Waste Collection

Message Description and Distribution Method:

Distribute targeted pet waste management message in the summer to meet phosphorus water quality limited waterbody requirements.

Targeted Audience: Residents, Business/Commercial/Institution

Responsible Department/Parties: Stormwater Task Force

Measurable Goal(s):

Posted a flyer on pet waste management on the Stormwater Task Force website, distributed through Facebook, and placed at the Library and Senior Center for collection

Message Date(s): Summer 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:

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**:

SWMP Plan for Download - The Town has posted the SWMP Plan and other relevant information on Town website along with contact information to allow for public comment.

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**:

Leading up to and during the November 2020 Town Meeting where the updated construction and post-construction bylaw was adopted, the process provided public hearings and discussion at a series of public meetings, distribution of the proposed bylaw to all residential addresses, and a discussion of the bylaw and the overarching regulatory framework at Special Town Meeting.

The Stormwater Task Force also displayed information on rain barrels, composting, and their benefits at both the Special and Annual Town Meeting.

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: 0

Number of SSOs removed: 0

MS4 System Mapping

Optional: Provide additional status information regarding your map:

All known outfalls, stormwater BMPs, and receiving waterbodies with impairments have been mapped to date. Initial catchment delineations have also been completed based on topographic mapping and available stormwater system information. Mapping of open channel conveyances and any newly located outfalls is ongoing. Mapping interconnections with other MS4s (e.g. DOT) is ongoing, and it is expected that this will continue as part of DOT's own mapping efforts to be completed under a future TS4 permit.

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: 256

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

Percent of outfalls screened: 80

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

During 2019 and 2020, the Town attempted to inspect all 321 known stormwater outfalls within the urbanized area during dry weather to investigate for potential illicit discharges. Of the 321 known stormwater outfalls that were attempted to be inspected, 256 were located and 9 of which were flowing. All flowing outfalls were sampled and did not meet the permit criteria for being highly likely to contain illicit discharges from sanitary sources. The remaining 63 outfalls could not be located, however, will be inspected for dry weather flows as the outfalls are located and/or evaluated at the next upgradient structure. The Town has hired a consultant to assist with this task. Work is anticipated to occur during Year 4. Note, numbers above represent all outfall screening completed to date. Numerous outfalls were revisited between Year 2 and Year 3 and thus it is difficult to quantify the number of outfalls screened in individual years.

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: 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**:

Two DPW employees attended IDDE workshop presented by Central Mass Stormwater Coalition on 5/26/2021

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: 5

Number of inspections completed: 15

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

As-built Drawings

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

Number of as-built drawings received: 0

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

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:

N/A, to be completed during Permit 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:

N/A, to be completed during Permit Year 4.

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:

The Town completed an inventory of its permittee-owned properties during this permit year. Facilities will be evaluated for potential BMP retrofit opportunities during Permit Year 4.

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: 121

Number of catch basins cleaned: 121

Total volume or mass of material removed from all catch basins: 120 cubic yards

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

Total number of catch basins: 955

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: 20
- ( ) Volume of material removed: 52 cubic yards
- ( ) Weight of material removed: [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: 0

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

Additional Information

Monitoring or Study Results

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

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

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

Additional Information

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

COVID-19 Impacts

Optional: If any of the above year 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: Heather Lemieux Title: Town Manager

Signature: Heather Lemieux Date: 9/23/21

[Signatory may be a duly authorized representative]