

# Stormwater Management Program

## Sherborn, Massachusetts

Revised November  
2020



Prepared by:

**AECOM**

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# **Stormwater Management Program (SWMP)**

Sherborn, MA

7 Butler Street, Sherborn, MA 01770

EPA NPDES Permit Number : MA041157

# Background

## Stormwater Regulation

The Stormwater Phase II Final Rule was promulgated in 1999 and was the next step after the 1987 Phase I Rule in EPA'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 additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES 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.

## Permit Program Background

On May 1, 2003, EPA Region 1 issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 small MS4 permit) consistent with the Phase II rule. The 2003 small MS4 permit covered "traditional" (i.e., cities and towns) and "non-traditional" (i.e., Federal and state agencies) 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 2016 MS4 general permit, which became effective on July 1, 2018.

## Stormwater Management Program (SWMP)

The SWMP describes and details the activities and measures that will be implemented to meet the terms and conditions of the permit. The SWMP accurately describes the permittees plans and activities. The document should be updated and/or modified during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term. The main elements of the stormwater management program are (1) a public education program in order to affect public behavior causing stormwater pollution, (2) an opportunity for the public to participate and provide comments on the stormwater program (3) a program to effectively find and eliminate illicit discharges within the MS4 (4) a program to effectively control construction site stormwater discharges to the MS4 (5) a program to ensure that stormwater from development projects entering the MS4 is adequately controlled by the construction of stormwater controls, and (6) a good housekeeping program to ensure that stormwater pollution sources on municipal properties and from municipal operations are minimized.

## Town Specific MS4 Background (optional)

The Town of Sherborn's stormwater discharges were authorized under the 2003 MS4 Permit, and on September 28, 2018 a Notice of Intent (NOI) was submitted to US EPA to request coverage under the 2016 MS4 Permit. Due to its coverage under the previous permit, the Town currently implements many BMPs to demonstrate compliance with the six minimum control measures. This SWMP identifies enhancements to existing BMPs as well as new BMPs to demonstrate compliance with the 2016 MS4 Permit. Please note that since there are no industrial facilities in Sherborn, no messages will be send to this audience. Existing mapping identifies all known outfalls, and will be updated as needed to address 2016 MS4 Permit requirements. In addition to information included per the US EPA SWMP Template, attachments are included to provide additional explanatory information where appropriate. A table outlining the timeline of each BMP that Sherborn is performing is located at the last page of this document for convenient reference.

Over 20 years ago, the EPA launched the Clean Charles Initiative with the hopes of making the Lower Charles

River fishable and swimmable again. While the effort successfully reduced bacterial contamination in the river, nutrient discharges continue to impair water quality. EPA and MassDEP have outlined targets to reduce phosphorus levels in the watershed and are using the MS4 permit to spur action within Charles River watershed municipalities. Under requirements for the Charles River Phosphorus TMDL, Sherborn is required to address stormwater discharges of Phosphorus through a Phosphorus Control Plan. The Plan is a phased approach to addressing Phosphorus through additional implemented non-structural and structural BMPs. There are three phases, each phase has a required reporting component and is spaced out by five years with many required milestones along the way. Ultimately the goal is to reduce Phosphorus input by the required amount before 2038. Sherborn will continue to update this Plan as it develops.

Through consultation with Michelle Vuto of EPA on December 11, 2018, it was confirmed that the Charles River Pathogen TMDL does not apply to Sherborn. The regulated outfalls in Sherborn do not discharge to the Charles River (MA72-05). This part of the permit applies to municipalities "that discharge to a waterbody segment listed in Table F-8 in Appendix F." Charles River (MA72-05) is listed under Sherborn in this table. However, inspection of the outfall map, reveals that there are no regulated outfalls that discharge to the Charles River in Sherborn. In fact, the regulated area in Sherborn is 0.6 miles from the Charles River at its closest point. Any discharge applicable to this part of the permit must be a direct discharge to the impaired waterbody listed, and since there are no regulated outfalls in Sherborn that discharge to the Charles River (MA72-05), this part is not applicable.

# Small MS4 Authorization

The NOI was submitted on

The NOI can be found at the following (document name or web address):

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Authorization to Discharge was granted on

The Authorization Letter can be found (document name or web address):

# Stormwater Management Program Team

## SWMP Team Coordinator

Name	Sean Killeen	Title	Sean Killeen, DPW Director/Facilities M
Department	DPW		
Phone Number	(508) 651-7878	Email	skilleen@sherbornma.org
Responsibilities	Responsible for maintaining and repairing all town owned property and infrastructure. Stormwater program lead.		

## SWMP Team

Name	Allary Braitsch	Title	Conservation Agent
Department	Conservation Commission		
Phone Number	(508) 651-7863	Email	conservation@sherbornma.org
Responsibilities	The Sherborn Conservation Commission is a department led by the Conservation Agent with an administrative assistant and rotating volunteer membership. The Conservation Commission is responsible for the protection, promotion and development of the Town's natural resources and implementation of environmental protection regulations in the Town. The Commission's primary task is the administration and enforcement of the state Wetlands Protection Act (Ch. 131 §40) and the Town's Wetlands By-Law (Chapter 17 of the Sherborn General By-laws).		

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Name	Gino Carlucci	Title	Town Planner
Department	Planning		
Phone Number	(508) 651-7855	Email	planning@sherbornma.org
Responsibilities	The Planning Board's role in development is to review and approve the subdivision of land, site plans (for businesses), certain special permits, and the removal or alteration of trees and stone walls within the Town right-of-way along designated Scenic Roads. It is also responsible for drafting and maintaining a master plan.  The Planning Board is governed by local, state and federal statutes regulating the development of land. It therefore must ensure that each project meets the spirit and intent of the local Zoning By-laws and the Rules and Regulations of the Sherborn Planning Board, as well as state and federal law, and the town's General Plan.		


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Name	Ellen Hartnett	Title	BOH Administrator
Department	Board of Health		
Phone Number	(508) 651-7852	Email	ehartnett@sherbornma.org
Responsibilities	<p>The Mission of the Sherborn Board of Health is to assess and address the needs of the Sherborn community in order to improve and protect the health and safety of its residents. The Board will develop, maintain, and advocate for programs aimed at ensuring a safe environment, reducing known health risks, and applying known preventive health measures. The Board will work to ensure compliance with Town and State health regulations. The Board recognizes the distinctiveness of the Town of Sherborn and may, with careful consideration and objectivity, use current scientific information to enact or revise local regulations in the best interest of public health. The Board will affect its mission through the Board of Health Administrator, Health Agent, and staff, and in cooperation with State and Federal agencies.</p>		

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Name	Chris Canney	Title	Building Commisioner
Department	Building		
Phone Number	(508) 651-7851	Email	ccanney@sherbornma.org
Responsibilities	<p>The mission of the Sherborn Building Department is to contribute to the protection of the public and the enhancement of the unique character of Sherborn's built environment through equitable interpretation and enforcement of building codes, zoning codes and Town by-laws with focus on the following principles:</p> <p>Customer Service - Mutually achieved understanding of each other's needs through creative problem solving;</p> <p>Legal Compliance - Ensuring compliance with local, state and federal laws to achieve and sustain a safe built environment.</p>		

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Name	Jeanne Guthrie	Title	BOS Administrative Assistant and also 
Department	Board of Selectmen		
Phone Number	(508) 651-7850	Email	jeanne.guthrie@sherbornma.org
Responsibilities	<p>Chief Elected Officers of the town of Sherborn committed to quality representation of all constituents and protecting the general welfare of the community. Jeanne is also on the Zoning Board of Appeals.</p>		



# Receiving Waters

The following table lists all receiving waters, impairments and number of outfalls discharging to each waterbody segment.

OR

The information can be found in the following document or at the following web address:

<https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/sherborn.pdf>

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment											Other pollutant(s) causing impairments
		Chloride	Chlorophyll-a	Dissolved Oxygen/DO Saturation	Nitrogen	Oil & Grease/PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus		
Tributaries to Dirty Meadow Brook	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* not a listed impaired water
Small isolated wetlands	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* not a listed impaired water
Tributary to Indian Brook	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* not a listed impaired water
Small unnamed pond	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* not a listed impaired water
Large wetland system	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* not a listed impaired water
Dopping Brook	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* not a listed impaired water
Sewall Brook wetland system	17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* not a listed impaired water
Indian Brook	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* not a listed impaired water
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# Eligibility: Endangered Species and Historic Properties

\*Reminder: The proper consultations and updates to the SWMP must be conducted for construction projects related to your permit compliance where Construction General Permit (CGP) coverage, which requires its own endangered species and history preservation determination, is NOT being obtained.

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## Attachments:

- The results of Appendix C U.S. Fish and Wildlife Service endangered species screening determination
- The results of the Appendix D historic property screening investigations
- If applicable, any documents from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other Tribal representative to mitigate effects

These attachments are required within one year of the permit effective date and are:

- Attached to this document (document names listed below)

Attachment A - Endangered Species

- Publicly available at the website listed below

See Attachment A in the document at this web address: <https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/sherborn.pdf>

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Under what criterion did permittee determine eligibility for ESA?

- Criterion A       Criterion B       Criterion C

Under what criterion did permittee determine eligibility for Historic Properties?

- Criterion A       Criterion B       Criterion C       Criterion D (NH only)

Below add any additional measures for structural controls that you're required to do through consultation with U.S. Fish and Wildlife Service (if applicable):

Sherborn was not required to do any additional measures for structural controls as a result of consultation with USFWS.

Below add any additional measures taken to avoid or minimize adverse impacts on places listed, or eligible for listing, on the NRHP, including any conditions imposed by the SHPO or THPO (if applicable):

Sherborn's MS4 is covered under the 2003 Permit eligibility with the National Historic Preservation Act was previously determined. There is no expansion planned to the MS4 as part of this permit. Therefore the Town is covered under Criterion A. No additional measures were required in order to protect historical properties.

# MCM 1

## Public Education and Outreach

### Permit Part 2.3.2

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

**Examples and Templates:**

[EPA's Stormwater Education Toolbox](#)

[MassDEP's Stormwater Outreach Materials](#)

Other templates relevant to MCM 1 can be found here: <https://www.epa.gov/npdes-permits/stormwater-tools-new-england#peo>

**BMP: Interactive MS4 Map Posted Online**

**BMP Number (Optional)** 1.1

**Document Name and/or Web Address:**

**Description:**

**Targeted Audience:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

**Message Date(s):**

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**BMP: Web Page for Businesses**

**BMP Number (Optional)** 1.2

**Document Name and/or Web Address:**

**Description:**

**Targeted Audience:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

**Message Date(s):**

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**BMP: Meetings with Developers and the Farm Pond Committee Liaison**

**BMP Number (Optional) 1.3** \_\_\_\_\_

**Document Name and/or Web Address:**

**Description:**

Connect developers with the Farm Pond Committee liaison to disseminate information on programs and best stormwater management activities. The Committee educates the public & watershed residents about Farm Pond issues and what they can do to improve water quality. When a new resident or new construction occurs on the pond, they reach out immediately, get their email information and send them information about the pond, and issues it faces with stormwater.

**Targeted Audience:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

Continue to appoint liaisons to developers that have projects in town. The liaisons will provide information on relevant programs and activities.

**Message Date(s):**

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**BMP: Web Page/BMP Recommendations**

**BMP Number (Optional) 1.4** \_\_\_\_\_

**Document Name and/or Web Address:**

**Description:**

Provide links to Stormwater BMPs and other water quality educational resources on the Town's website targeted toward developers.

**Targeted Audience:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

Efforts have been ongoing. The Town will continue to educate and help apply best management practices in 2018 and beyond. At least one message per 5 year permit term is required.

**Message Date(s):**

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**BMP: Post SWMP on Town Website**

**BMP Number (Optional) 1.5** \_\_\_\_\_

**Document Name and/or Web Address:**

**Description:**

Post this Stormwater Management Program on the Town Website

**Targeted Audience:** Residents

**Responsible Department/Parties:** Conservation Commission, DPW, Planning Board

**Measurable Goal(s):**  
Post this document online with updates as the SWMP evolves.

**Message Date(s):** Year 2 (FY 2020) and beyond

**BMP:Brochures/Pamphlets for Businesses**

**BMP Number (Optional)** 1.6

**Document Name and/or Web Address:**

**Description:**  
Brochures that pertain to the role that businesses can take to reduce impacts from stormwater will be made available at public buildings including the Town Hall, Library, and Transfer Station. Use outreach materials and guidance from various sources (Think Blue Massachusetts, MassDEP, Cape Cod Stormwater) for creating handouts. This will implement outreach for relevant impairments in Town. See: <https://www.thinkbluemassachusetts.org/for-businesses>.

**Targeted Audience:** Businesses, institutions and commercial facilities

**Responsible Department/Parties:** Conservation, Planning

**Measurable Goal(s):**  
Brochures will be made available to businesses, institutions, and commercial facilities annually. One message per 5 year permit term is required.

**Message Date(s):** Year 3 (FY 2021)

**BMP:**

**BMP Number (Optional)**

**Document Name and/or Web Address:**

**Description:**

**MCM 2**  
**Public Involvement and Participation**  
Permit Part 2.3.3

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

**BMP: Public Review of Stormwater Management Program**

**BMP Number (Optional)** 2.1

**Location of Plan and/or Web Address:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

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**BMP: Public Participation in Stormwater Management Program Development**

**BMP Number (Optional)** 2.2

**Description:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

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**BMP:**

**BMP Number (Optional)** \_\_\_\_\_

**Document Name and/or Web Address:**

**Description:**

**Responsible Department/Parties:**

**Measurable Goal(s):**



# MCM 3

## Illicit Discharge Detection and Elimination (IDDE) Program

Permit Part 2.3.4

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

**Examples and Templates:**

[IDDE Program Template and SOPs](#)

Other templates relevant to IDDE can be found here: <https://www.epa.gov/npdes-permits/stormwater-tools-new-england#idde>

**BMP: IDDE Legal Authority**

**BMP Number (Optional)** 3.1

**Completed** (by May 1, 2008)

**Ordinances Link or Reference:**

**Department Responsible for Enforcement:**

---

**BMP: Sanitary Sewer Overflow (SSO) Inventory**

**BMP Number (Optional)** 3.2

**Completed** (by year 1)

**Document Name and/or Web Address:**

**Description:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

**SSO Reporting:**

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.

<input type="text" value="NA"/>	<input type="text"/>
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**BMP: Map of Storm Sewer System**

**BMP Number (Optional)** 3.3

**Phase I Completed**   
(by year 2)

**Phase II Completed**   
(by year 10)

**Document Location and/or Web Address:**

**Description:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

Phase I - Completed: Updated MS4 map to include: open channel conveyances, interconnections with other MS4s and other storm sewer systems, municipally-owned stormwater treatment structures, waterbodies identified by name and indication of all use impairments, and initial catchment delineations.  
Phase II: By June 30, 2028, update map to include: outfall locations, pipes, manholes, catch basins, refined catchment delineations, and municipal sanitary sewer system.

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**BMP: IDDE Program**

**BMP Number (Optional)** 3.4

**Written Document Completed** (by year 1)

**Document Name and/or Web Address:** Attachment B- IDDE Program

**Description:**

Create a written IDDE program using the guidance in permit part 2.3.4.6 through 2.3.4.8 and EPA provided templates. The IDDE document shall include assessment and ranking (problem, high priority, low priority) of outfalls and interconnections, catchment investigations, and written procedures describing sampling protocols. See BMPs 3.6 - 3.8 below for more details.

**Responsible Department/Parties:** DPW, Consultant

**Measurable Goal(s):**

Create a written IDDE plan by the end of Year 1 and incorporate it into the SWMP. Conduct 100% of outfall screening on High and Low Priority Outfalls before the end of Year 3. Complete catchment investigations for 100% of the Problem Outfalls within seven (7) years of the permit's effective date. Complete 100% of all catchment investigations within 10 years of the permit's effective date.

**The outfall/interconnection inventory and initial ranking and the dry weather outfall and interconnection screening and sampling results can be found:**

This information will be referenced once available. It will be included in Attachment B before Year 3 as part of the IDDE Program documents.

---

**BMP: Employee Training**

**BMP Number (Optional)** 3.5

**Description:**

Train employees that are involved in the IDDE program on it's implementation as described in the IDDE Plan.

**Responsible Department/Parties:** DPW, Consultant

**Measurable Goal(s):**

Training occurs annually starting in 2019 and is recorded in each annual report.

---

**BMP: Implement Catchment Investigations portion of IDDE Program**

**BMP Number (Optional)** 3.6

**Completed**

**Document Name and/or Web Address:** See the IDDE Program in Attachment B.

**Description:**

Implement catchment investigations using the procedures outlined in the written IDDE Plan. Investigations shall include inspection of junction manholes for evidence of connections with sanitary system and visual/olfactory signs of sewage and/or other illicit connections. Review catchments for System Vulnerability Factors (SVFs) which would indicate higher potential for illicit connections. Catchments with one or more SVFs must be further evaluated with wet weather sampling at the catchment outfall. For any illicit discharges identified during the catchment investigation procedure, identify the source of illicit discharge and eliminate the illicit source.

**Responsible Department/Parties:** DPW, Consultant

**Measurable Goal(s):**

Proceed to implement catchment investigations as follows: initiate problem outfall catchment investigation by the end of Year 2 (FY 2020) and complete by FY 2025; then complete low and high priority catchment investigations. There are currently no problem outfalls in Sherborn. Complete low and high priority catchment investigations by Year 10 (FY 2028).

---

**BMP: Conduct Dry Weather Screening**

**BMP Number (Optional)** 3.7

**Completed**

**Document Name and/or Web Address:** IDDE program in Attachment B

**Description:**

Conducted dry weather screening of outfalls using the procedures outlined in the written IDDE program. Conducted sampling after 24 hours of no more than 0.1 inches of rainfall or significant snow melt. Outfalls were inspected for flow as they were mapped during preliminary outfall inspections. Dry weather screening was completed for all outfalls where flow was previously observed on October 13, 2020. There was no flow at any of the outfalls during dry weather screening and no evidence of IDDE was detected during inspections or screening.

**Responsible Department/Parties:** DPW, Consultant

**Measurable Goal(s):**

Complete dry weather screening of the remaining outfalls by Year 3 (June 30, 2021).

---

**BMP: Conduct Wet Weather Screening**

**BMP Number (Optional)** 3.8

**Completed**

**Document Name and/or Web Address:**

**Description:**

Conduct outfall sampling using the procedures outlined in the written IDDE program and permit conditions. Wet weather screening shall be conducted for all catchments with one (1) SVF or more.

**Responsible Department/Parties:**

**Measurable Goal(s):**

Complete in accordance with the catchment investigation schedule identified above under BMP 3.6. Catchment investigations are not complete until wet weather screening is complete. Wet weather screening will be complete by June 30, 2028.

---

**BMP:**

**BMP Number (Optional)** \_\_\_\_\_

**Completed**

**Document Name and/or Web Address:**

**Description:**

**Responsible Department/Parties:**

**Measurable Goal(s):**

---

# MCM 4

## Construction Site Stormwater Runoff Control

### Permit Part 2.3.5

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

**Examples and Templates:**

Examples and templates relevant to MCM 4, including model ordinances and site inspection templates, can be found here: <https://www.epa.gov/npdes-permits/stormwater-tools-new-england#csrc>

**BMP: Sediment and Erosion Control Ordinance**

**BMP Number (Optional)** 4.1

**Completed** (by May 1, 2008)

**Ordinances Link or Reference:** The Sediment and Erosion Control regulatory requirements from the 2003 permit have been incorporated in the Planning Board regulations at the following web page: <https://www.sherbornma.org/sites/sherbornma/files/uploads/rules.pdf>

**Department Responsible for Enforcement:** Planning, Building

---

**BMP: Site Plan Review Procedures**

**BMP Number (Optional)** 4.2

**Written procedures completed** (by year 1)

**Document Name and/or Web Address:** Planning Board regulations: <https://www.sherbornma.org/sites/sherbornma/files/uploads/rules.pdf>

**Description:**

Site Plan review procedures were completed and have been incorporated in the Planning Board regulations at the above web page. Procedures for site plan review are in Section 3 of the regulations starting on page 15.

**Responsible Department/Parties:** Planning, Building

**Measurable Goal(s):**

This goal has been completed.

---

**BMP: Site Inspections and Enforcement of Sediment and Erosion Control Measures Procedures**

**BMP Number (Optional)** 4.3

**Completed** (by year 1)

**Document Name and/or Web Address:** Planning Board regulations: <https://www.sherbornma.org/sites/sherbornma/files/uploads/rules.pdf> in Section 3.2.3.t on page 31

**Description:**

Requirements for construction operators to implement a sediment and erosion control program have been adopted and completed as required in permit part 2.3.5.c.ii. The planning board regulations at the web address above meet these requirements. Details on frequency and content of inspections, reporting procedures, and the enforcement mechanism are included throughout the regulations.

**Responsible Department/Parties:** Planning, Building

**Measurable Goal(s):**

This goal has been completed.

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**BMP: Waste Control**

**BMP Number (Optional)** 4.4

**Completed**

**Document Name and/or Web Address:** Comprehensive Stormwater Management Bylaw. Chapter 25.

**Description:**

Adoption of requirements to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes

**Responsible Department/Parties:** Planning, Conservation, Building

**Measurable Goal(s):**

Update of existing regulations was completed in August 2019.

---

Add BMP



# MCM 5

## Post Construction Stormwater Management in New Development and Redevelopment

Permit Part 2.3.6

**Objective:** The objective of an effective post construction stormwater management program is to reduce the discharge of pollutants found in stormwater to the MS4 through the retention or treatment of stormwater after construction on new or redeveloped sites and to ensure proper maintenance of installed stormwater controls.

**Examples and Templates:**

Examples and templates relevant to MCM 5, including model ordinances and bylaw review templates and guidance can be found here: <https://www.epa.gov/npdes-permits/stormwater-tools-new-england#pcsm>

**BMP: Post-Construction Ordinance**

**BMP Number (Optional)** 5.1

**Completed** (by year 2)

**Town Ordinances Link or Reference:**

The requirements for a post-construction ordinance as described in permit part 2.3.6.a.ii is satisfied by the Planning Board regulations: 'https://www.sherbornma.org/sites/sherbornma/files/uploads/rules.pdf' in Section 3.4.2.16 on page 18 and Section 4.4 - 'Drainage Design' on page 44.

This is also reiterated in Section 12- "Drainage" in the Board of Health regulations at: 'https://www.sherbornma.org/sites/sherbornma/files/uploads/2014regulations.pdf' starting on page 30.

**Department Responsible for Enforcement:**

Planning, Building, Health

---

**BMP: Street Design and Parking Lot Guidelines Report**

**BMP Number (Optional)** 5.2

**Completed** (by year 4)

**Document Name and/or Web Address:**

To be provided once complete

**Description:**

Develop a report assessing municipal 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.

**Responsible Department/Parties:**

Planning

**Measurable Goal(s):**

The Street Design and Parking Lot Guidelines Report will be provided before the end of Year 4. Recommendations will be implemented as outlined in the schedule in the report with progress mentioned each year in the annual report.

---

**BMP: Green Infrastructure Report**

**BMP Number (Optional)** 5.3

**Completed** (by year 4)

**Document Name and/or Web Address:**

To be provided once complete

**Description:**

Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist

**Responsible Department/Parties:** Planning, Building, Conservation

**Measurable Goal(s):**

The Green Infrastructure Report will be provided before the end of Year 4. Recommendations are implemented as outlined in the schedule in the report with progress mentioned each year in the annual report.

---

**BMP: List of Municipal Retrofit Opportunities**

**BMP Number (Optional)** 5.4

**Completed** (by year 4)

**Document Name and/or Web Address:** To be provided once available.

**Description:**

Identify at least five permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually. Prioritization should include consideration of BMPs that reduce nitrogen discharges due to TMDL requirements. A listing of planned structural BMPs and a schedule for implementation will also be included. More details are in permit part 2.3.6.1.d.

**Responsible Department/Parties:** Planning

**Measurable Goal(s):**

The List of Municipal Retrofit Opportunities will be completed by the end of Year 4 (June 30, 2022) and updated as needed.

---

**BMP:As-built plans for on-site stormwater control**

**BMP Number (Optional)** 5.5

**Completed**

**Document Name and/or Web Address:** Sherborn Planning Board Regulations at: '<https://www.sherbornma.org/sites/sherbornma/files/uploads/rules.pdf>'. As-built plan requirements are found in section 3.2.11.e.16. The requirement for long term O&M procedures is found under the requirement for compliance with the Massachusetts Stormwater Handbook in 3.4.2.16 on page 18.

**Description:**

Procedures to require submission of as-built drawings of on-site stormwater controls can be found in the planning board regulations at the website above in section 3.2.11.e.16. The requirement for compliance with the Massachusetts Stormwater Handbook in the planning board regulations in section 3.4.2.16 ensures adequate long-term operation and maintenance of stormwater management practices that are put in place after the completion of a construction project through compliance with Handbook Standard #9. These procedures may include the use of dedicated funds or escrow accounts for development projects or the acceptance of ownership by the permittee of all privately owned BMPs. These procedures may also include the development of maintenance contracts between the owner of the BMP and the permittee. Alternatively, these procedures

may include the submission of an annual certification documenting the work that has been done over the last 12 months to properly operate and maintain the stormwater control measures. Sherborn will report in the annual report on the measures that the have been utilized to meet this requirement.

**Responsible Department/Parties:** Planning

**Measurable Goal(s):**

This is completed. Sherborn will continue to employ these procedures as part of their regulations.

---

Add BMP

# MCM 6

## Good Housekeeping and Pollution Prevention for Permittee Owned Operations

Permit Part 2.3.7

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

**Examples and Templates:**

Examples and templates relevant to MCM 6, including SOP templates for catch basin cleaning, street sweeping, vehicle maintenance, parks and open space management, winter deicing, and Stormwater Pollution Prevention Plans can be found here: <https://www.epa.gov/npdes-permits/stormwater-tools-new-england#gh>

## PERMITTEE OWNED FACILITIES

### BMP: Parks and Open Spaces Operations and Maintenance Procedures

BMP Number (Optional) 6.1

Written Document Completed (by year 2)

Document Name and/or Web Address:

#### Description:

Develop an inventory for all permittee owned parks and open spaces. Create and implement written O&M procedures for these facilities including all requirements contained in 2.3.7.a.ii.1 of the permit. Written O&M procedures will include the following:

- >Procedures to address the proper use, storage, and disposal of pesticides, herbicides, and fertilizers including minimizing the use of these products and using only in accordance manufacturer's instruction.
- >Evaluation of lawn maintenance and landscaping activities to ensure practices are protective of water quality. Slow release fertilizers are required at all Town owned properties currently using fertilizer. Additional protective practices may include reduced mowing frequencies, proper disposal of lawn clippings, and use of alternative landscaping materials (e.g., drought resistant planting).
- >Procedures to address erosion or poor vegetative cover when the permittee becomes aware of it; especially if the erosion is within 50 feet of a surface water.
- >Pet waste handling collection and disposal locations at all parks and open space where pets are permitted, including the placing of proper signage concerning the proper collection and disposal of pet waste.
- >Procedures to address waterfowl congregation areas where appropriate to reduce waterfowl droppings from entering the MS4.
- >Procedures for management of trash containers at parks and open space.

Responsible Department/Parties:

#### Measurable Goal(s):

This is complete. The O&M procedures described above have been created and implemented on 100% of the parks and open spaces.

#### Properties List (Optional):

---

### BMP: Buildings and Facilities Operations and Maintenance Procedures

BMP Number (Optional) 6.2

Written Document Completed (by year 2)

Document Name and/or Web Address:

#### Description:

Inventory all permittee owned buildings and facilities where pollutants are exposed to stormwater runoff. This can include schools, town offices, police, and fire stations, municipal pools and parking garages and other permittee-owned or operated buildings or facilities. Create written O&M procedures including all requirements contained in 2.3.7.a.ii.2 of the permit. Written O&M procedures may include the following:

- >Evaluate the use, storage, and disposal of petroleum products and other potential stormwater pollutants.

- >Provide employee training as necessary so that those responsible for handling these products know proper procedures.
- >Ensure that Spill Prevention Plans are in place, if applicable, and coordinate with the fire department as necessary.
- >Develop management procedures for dumpsters and other waste management equipment.
- >Sweep parking lots and keep areas surrounding the facilities clean to reduce runoff of pollutants.

**Responsible Department/Parties:** DPW, Recreation, Schools, Police, Fire

**Measurable Goal(s):**

This is complete. O&M procedures have been created and implemented on 100% of buildings and facilities where pollutants are exposed to stormwater runoff.

**Properties List (Optional):**

List included in O&M Procedures in Attachment C

---

**BMP: Vehicles and Equipment Operations and Maintenance Procedures**

**BMP Number (Optional)** 6.3

**Written Document Completed (by year 2)**

**Document Name and/or Web Address:** See Attachment C

**Description:**

Inventory all permittee owned vehicles and equipment. Implement the following procedures for vehicles and equipment:

- >Establish procedures for the storage of permittee vehicles so that vehicles with fluid leaks shall be stored indoors or containment shall be provided until repaired.
- >Evaluate fueling areas owned or operated by the permittee. If possible, fueling areas will be placed under cover in order to minimize exposure.
- >Establish procedures to ensure that vehicle wash waters are not discharged to the municipal storm sewer system or to surface waters. This permit does not authorize such discharges. See Attachment C for vehicle wash waters

**Responsible Department/Parties:** DPW, Recreation, Schools, Police, Fire

**Measurable Goal(s):**

This is complete. O&M procedures have been created and implemented for 100% of vehicles and equipment according to the above document.

**Properties List (Optional):**

List included in O&M Procedures in Attachment C

---

**INFRASTRUCTURE**

**BMP: Infrastructure Operations and Maintenance Procedures**

**BMP Number (Optional)** 6.4

**Written Procedure Completed** (by year 2)

**Document Name and/or Web Address:** See Attachment D

**Description:**

Sherborn has established a program for repair and rehabilitation of MS4 infrastructure. The written program includes the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4.

**Responsible Department/Parties:** DPW

**Measurable Goal(s):**

This is complete. The program has been written so that 100% of infrastructure is maintained to ensure proper function in accordance with the procedures above.

**BMP: Catch Basin Cleaning Program**

**BMP Number (Optional)** 6.5

**Written Procedure Completed** (by year 1)

**Document Name and/or Web Address:** See Attachment D

**Description:**

Currently the DPW keeps a daily log of all operations, including catch basin cleaning, and maintenance. Catch basins are inspected on a rotating schedule each year. Cleaning is completed as needed during inspection events. To comply with the permit, Sherborn will establish a schedule for catch basin cleaning with the specific target, such that each catch basin is no more than 50% full and clean catch basins on that schedule.

**Responsible Department/Parties:** DPW

**Measurable Goal(s):**

This is complete. A program has been created where all catch basins are cleaned in accordance to the catch basin cleaning program such that no catch basin is more than 50% full at any given time. Document the number of catch basins inspected/cleaned and the volume removed in annual report.

**BMP: Street Sweeping Program**

**BMP Number (Optional)** 6.6

**Written Procedure Completed** (by year 1)

**Document Name and/or Web Address:** See Attachment D

**Description:**

Sherborn has established and implemented street sweeping procedures that are adapted to reduce pollutants to



waterways. Street sweeping of roadways in the regulated area is performed by Town staff at least twice yearly, in the spring and fall, and when necessary after storm events. Sweeping multiple times annually is part of the Phosphorus Control Plan, mandated by the Charles River Phosphorus TMDL. Debris is disposed in accordance with current MassDEP guidelines (Policy #BAW-18-001; <https://www.mass.gov/files/documents/2018/05/14/street-sweepings.pdf>). The DPW keeps a log of street sweeping, including dates and street names. The operation plan includes a focus on roads that have drainage infrastructure that discharges near or directly to waterways.

**Responsible Department/Parties:** DPW

**Measurable Goal(s):**

This is complete. The program has been written that will annually sweep 100% of all streets and 50% of all municipal parking lots in Spring and Fall in accordance with the schedule above.

---

**BMP: Winter Road Maintenance Program**

**BMP Number (Optional)** 6.7

**Written Procedure Completed (by year 1)**

**Document Name and/or Web Address:** See Attachment D

**Description:**

Establish and implement procedures for winter road maintenance. Procedures include the use and storage of sand and salts, prevention of snow disposal to waterways, the evaluation of alternative methods, and minimization of chloride containing materials. See Attachment D for further guidance.

**Responsible Department/Parties:** DPW

**Measurable Goal(s):**

This is complete. The program has been written that establishes and implements procedures for winter road maintenance as outlined above. Evaluate at least one salt/chloride alternative for use in the municipality.

---

**BMP: Stormwater Treatment Structures Inspection and Maintenance Procedures**

**BMP Number (Optional)** 6.8

**Completed (by year 1)**

**Document Name and/or Web Address:** See Attachment D

**Description:**

Establish and implement inspection and maintenance procedures and frequencies for stormwater treatment structures such as water quality swales, retention/detention basins, infiltration structures, proprietary treatment devices or other similar structures. The procedures will require inspection and maintenance of 100% of treatment structures at least annually to ensure proper function.

**Responsible Department/Parties:** DPW

**Measurable Goal(s):**

This is complete. The program has been written for the inspection and maintenance of stormwater treatment structures.

**BMP: SWPPP**

**BMP Number (Optional)** 6.9

**Completed (by year 2)**

**Document Name and/or Web Address:** Attachment

**Description:**

Create SWPPP's for town owned or operated waste handling facilities where pollutants are exposed to stormwater in accordance with permit requirements in 2.3.7.b.iii. The only facility in Sherborn that requires a SWPPP is the DPW facility.

**Responsible Department/Parties:** Consultant, DPW

**Measurable Goal(s):**

A SWPPP was developed and implemented for the DPW facility.

**BMP:**

**BMP Number (Optional)** \_\_\_\_\_

**Completed**

**Document Name and/or Web Address:** \_\_\_\_\_

**Description:**

\_\_\_\_\_

**Responsible Department/Parties:** \_\_\_\_\_

**Measurable Goal(s):**

\_\_\_\_\_

**BMP:**

# Annual Evaluation

## Year 1 Annual Report

Document Name and/or Web Address:

Sherborn Annual Report\_092419.pdf <https://www3.epa.gov/region1/npdes/stormwater/ma/reports/2019/sherborn-ma-ar19.pdf>

## Year 2 Annual Report

Document Name and/or Web Address:

2020 Sherborn Annual Report Submittal 092820.pdf

## Year 3 Annual Report

Document Name and/or Web Address:

## Year 4 Annual Report

Document Name and/or Web Address:

## Year 5 Annual Report

Document Name and/or Web Address:

## Year X Annual Report

Document Name and/or Web Address:

Add a Year

# TMDLs and Water Quality Limited Waters

Select the applicable Impairment(s) and/or TMDL(s).

## **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 and Pathogen       Metals       Nitrogen       Phosphorus

Clear Impairments and TMDLs

# Charles River Watershed Phosphorus TMDL

<b>PCP Phase</b>	<b>Document Location</b>
I (completed by year 5)	Located in Attachment F. See a preliminary Phosphorus Control Plan outline in the Attachment F cover sheet.
II (completed by year 10)	
III (completed by year 15)	

## **List of Attachments**

### **Attachment A- Endangered Species**

- Official IPaC Species list

### **Attachment B- IDDE Program and Appendices (Includes the Outfall Map and SSO monitoring)**

### **Attachment C- O&M Procedures for Facilities**

- Parks
- Buildings and Facilities
- Vehicles and Equipment

### **Attachment D- O&M for Infrastructure**

- Infrastructure (Year 2 requirement)
- Catch Basin Cleaning
- Street Sweeping
- Winter Road Maintenance
- Stormwater Treatment Structures

### **Attachment E- SWPPP (Year 2 requirement)**

- DPW Yard

### **Attachment F- Charles River Phosphorus Control Plan**

- Permit Requirements and Calculations
- Phase I
  - Legal Analysis (Year 2)
  - Funding Source Analysis (Year 3)
  - Define Scope of PCP (Year 4)
  - Complete Phase I Report (Year 5)
  - Annual Performance Evaluations and Implementations (Year 6-10)
- Continues with Phase II & Phase III

### **Attachment G- Tasks and Schedule Table**

**Attachment A- Endangered Species**

- **Official IPaC Species list**



# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
New England Ecological Services Field Office  
70 Commercial Street, Suite 300  
Concord, NH 03301-5094  
Phone: (603) 223-2541 Fax: (603) 223-0104  
<http://www.fws.gov/newengland>

In Reply Refer To:  
Consultation Code: 05E1NE00-2018-SLI-2475  
Event Code: 05E1NE00-2018-E-05744  
Project Name: Sherborn MA MS4

July 20, 2018

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

## To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.



A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
-

## Official Species List

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

This species list is provided by:

**New England Ecological Services Field Office**

70 Commercial Street, Suite 300

Concord, NH 03301-5094

(603) 223-2541

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## Project Summary

Consultation Code: 05E1NE00-2018-SLI-2475

Event Code: 05E1NE00-2018-E-05744

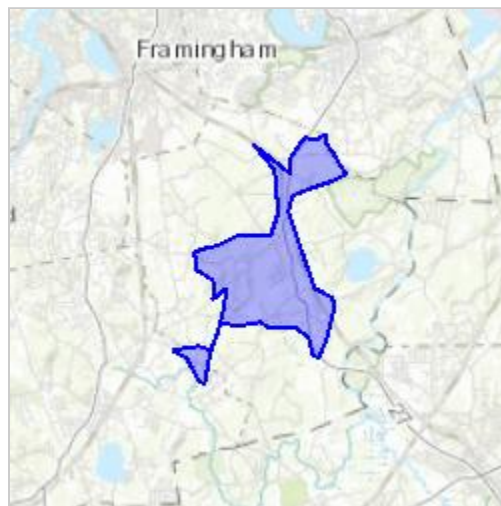
Project Name: Sherborn MA MS4

Project Type: Remote Video Surveillance

**Project Description:** This consultation is for the regulated discharges from the stormwater system in Sherborn, MA in support of the 2018 MS4 NOI application. The location of this project is the rough extent of the designated MS4 regulated areas in Sherborn. The stormwater outfalls in this area are previously existing. The actual action areas are downstream from these discharge points but a larger area has been selected to be conservative. The map that is maintained by MassDEP/NHESP was also consulted (address: <https://mass-oeoa.maps.arcgis.com/apps/Viewer/index.html?appid=de59364ebbb348a9b0de55f6febfdf52>). There are no documented Northern Long-eared Bat Maternity roost sites or Winter Hibernacula in or near the project area. No illicit discharges have been found to these outfalls. Roost trees, hibernaculum, and other trees would not be significantly affected by the stormwater discharge.

### Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/42.23823846800005N71.37812930189256W>



Counties: Middlesex, MA

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## Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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**Attachment B- IDDE Program and Appendices  
(Includes the Outfall Map and SSO monitoring)**

**Attachment C- O&M Procedures for Facilities**

- **Parks**
- **Buildings and Facilities**
- **Vehicles and Equipment**

**Attachment D- O&M Procedures for Infrastructure**

- **Infrastructure**
- **Catch Basin Cleaning**
- **Street Sweeping**
- **Winter Road Maintenance**
- **Stormwater Treatment Structures**

**Attachment E- SWPPPs (Year 2 requirement)**

- **DPW Yard/Transfer Station**



## **Attachment F- Charles River Phosphorus Control Plan**

- **Permit Requirements and Calculations**
- **Phase I**
  - **Legal Analysis (Year 2)**
  - **Funding Source Analysis (Year 3)**
  - **Define Scope of PCP (Year 4)**
  - **Complete Phase I Report (Year 5)**
    - **BMP Descriptions**
    - **O&M**
    - **Schedules**
    - **Cost Estimates**
  - **Annual Performance Evaluations and Implementations (Year 6-10)**
- **Phase II**
  - **Create Phase II Plan (Year 10)**
  - **Milestones Continue...**
- **Phase III**

# Summary of Potential BMPs for Phosphorus Reduction

## Sherborn, MA



AECOM Technical Services

Kate Mignone, P.E.

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May 6, 2020

# 1 Introduction

This memo summarizes the findings relevant to the planning effort of determining various phosphorus (P) reduction BMPs, structural and non-structural, contributing to the Charles River watershed that will be considered for the Sherborn Annual Report. The following report will primarily focus on non-structural BMPs for paved surfaces in Sherborn within both the urbanized area and across the entire community. These findings are based off of previously developed tools, materials, procedures, and examples to estimate potential phosphorus load reduction; parameters listed in the MA EPA MS4 General Permit Guidelines Appendix F, Attachment 2 (entitled 'Phosphorus Reduction Credits for Selected Enhanced Non-Structural BMPs in the Watershed') were used to determine loading and reduction rates for different land uses.

According to the Massachusetts Exhibit A Proposed Permit Modifications, the required annual phosphorus load reductions have been increased to the amounts in Table 1.

**Table 1: Required Phosphorus Load Reduction**

	Baseline Watershed Phosphorus Load, kg/yr/ (lbs/yr)	Stormwater Phosphorus Load Reduction Requirement, kg/yr (lbs/yr)	Allowable Phosphorus Load, kg/yr (lbs/yr)	Stormwater Percent Reduction in Phosphorus Load (%)
Community Annual	846 (1,865)	156 (344)	690 (1,521)	18
Urbanized	203 (447)	52 (115)	151 (333)	26

The Community Annual load is over a total paved acreage of 919 acres. If Sherborn were to enact P reduction through the entire community, the P reduction required would be 18%. Within the urbanized area, the paved area is 220 acres. If Sherborn looked at P reduction through just this area, it would require P reduction of 26%.

It may be easier to implement the P reduction on a town-wide basis, due to equity and other factors within the community. However, it may be less costly for the Town to complete the P reduction within the more concentrated urbanized area.

At this time, this memorandum is for P reduction options in paved areas, primarily to implement non-structural controls. The next step in the P reduction would be to look at land use in the entire community versus only the town-owned and managed paved areas.

If the Town were to include Town owned and managed paved areas, using non-structural control measures alone, this will not reach phosphorus reduction levels required to comply with permit regulations (see Table 1), which means structural BMP options will need to be implemented. Structural BMPs have been included in Section 3 for consideration to help reach phosphorus reduction goals.

## 2 Non-Structural Control Measures for Stormwater Management

Non-structural BMPs focus on preserving and utilizing existing natural features and systems already available to the Town in order to manage current stormwater resources and prevent pollution. Non-structural BMPs explored for use in Sherborn are detailed in the following sections. It is important to note that the non-structural controls described below limit not only phosphorus, but also nitrogen, TSS, and bacteria loading, although this summary will be focusing solely on P reduction.

A summary of non-structural control measures and their potential phosphorus load reductions is displayed in Table 2. Phosphorus reduction is based off of paved acreage of 990 acres for the entire community and 220 acres for the urbanized area, and a land use coefficient of 1.78 (lb/acre/yr)<sup>1</sup>.

**Table 2: Summary of Non-Structural BMPs for Phosphorus Removal**

Non-Structural BMP	Urbanized Area Phosphorus Load Reduction (lb/yr)	Community Wide Area Phosphorus Load Reduction (lb/yr)
Street Sweeping	3.91	17.62
Catch Basin Cleaning	7.83	32.72
Leaf Litter Control and Collection	19.58	88.11
<b>Total P Reduction</b>	<b>31.32</b>	<b>138.45</b>

### 2.1 Street Sweeping

Sherborn may earn a phosphorus reduction credit for conducting an enhanced sweeping program of impervious surfaces. Table 2-1 below outlines the default phosphorus removal factors for enhanced sweeping programs. The credit shall be calculated by using the following equation:

$$\text{Credit P sweeping} = \text{IA swept} \times \text{PLER IC-land use} \times \text{PRF sweeping} \times \text{AF}$$

Where:

Credit sweeping = Amount of phosphorus load removed by enhanced sweeping program (lb/year)

IA swept = Area of impervious surface that is swept under the enhanced sweeping program (acres)

PLER IC-land use = Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr)

PRF sweeping = Phosphorus Reduction Factor for sweeping based on sweeper type and frequency (see Table 2-1).

AF = Annual Frequency of sweeping. For example, if sweeping does not occur in Dec/Jan/Feb, the AF would be 9 mo./12 mo. = 0.75. For year-round sweeping, AF=1.0

<sup>1</sup> Table 3-1: Average annual distinct phosphorus (P) load export rates for use in estimating P load reduction credits in the MA MS4 Permit, Attachment 3 of Appendix F of MA EPA MS4 General Permit Guidelines

Calculation based on a street sweeping frequency of two times a year for the entire Town of Sherborn:

$$\begin{aligned} \text{Community Wide Area Credit sweeping (lb/yr)} &= \text{IA swept} \times \text{PLER IC-land use} \times \text{PRF sweeping} \times \text{AF} \\ \text{Credit sweeping (lb/yr)} &= 919 \text{ acres} \times 1.78 \times 0.01 \times 1 \\ \text{Credit sweeping (lb/yr)} &= 16.35 \text{ lb/yr} \end{aligned}$$

$$\begin{aligned} \text{Urbanized Area Credit sweeping (lb/yr)} &= \text{IA swept} \times \text{PLER IC-land use} \times \text{PRF sweeping} \times \text{AF} \\ \text{Credit sweeping (lb/yr)} &= 220 \text{ acres} \times 1.78 \times 0.01 \times 1 \\ \text{Credit sweeping (lb/yr)} &= 3.91 \text{ lb/yr} \end{aligned}$$

**Table 2-1: Phosphorus reduction Efficiency Factors ( $PRF_{\text{sweeping}}$ ) for Sweeping Impervious Areas**

Frequency <sup>1</sup>	Sweeper Technology	$PRF_{\text{sweeping}}$
2/year (spring and fall) <sup>2</sup>	Mechanical Broom	0.01
2/year (spring and fall) <sup>2</sup>	Vacuum Assisted	0.02
2/year (spring and fall) <sup>2</sup>	High-Efficiency Regenerative Air-Vacuum	0.02
Monthly	Mechanical Broom	0.03
Monthly	Vacuum Assisted	0.04
Monthly	High Efficiency Regenerative Air-Vacuum	0.08
Weekly	Mechanical Broom	0.05
Weekly	Vacuum Assisted	0.08
Weekly	High Efficiency Regenerative Air-Vacuum	0.10

## 2.2 Catch Basin Cleaning

The permittee may earn a phosphorus reduction credit, Credit CB, by removing accumulated materials from catch basins (i.e., catch basin cleaning) in the Watershed such that a minimum sump storage capacity of 50% is maintained throughout the year. The credit shall be calculated by using the following equation:

$$\text{Credit CB} = \text{IACB} \times \text{PLE IC-land use} \times \text{PRFCB}$$

Where:

Credit CB = Amount of phosphorus load removed by catch basin cleaning (lb/year)

IA CB = Impervious drainage area to catch basins (acres)

PLE IC-land use = Phosphorus Load Export Rate for impervious cover and specified land use (lb/acre/yr)

PRF CB = Phosphorus Reduction Factor for catch basin cleaning (see Table 2-3)

**Table 2-2: Phosphorus reduction efficiency factor (PRF CB) for semi-annual catch basin cleaning**

Frequency	Practice	PRF
Semi-annual	Catch Basin Cleaning	0.02

$$\begin{aligned} \text{Credit Catch Basin Cleaning (lbs/yr)} &= \text{IACB} \times \text{PLE IC-land use} \times \text{PRFCB} \\ \text{Credit Catch Basin Cleaning}^2 \text{ (lbs/yr)} &= 450 \text{ acres} \times 1.78 \text{ (lb/acre/yr)} \times (0.02) \\ \text{Credit Catch Basin Cleaning (lbs/yr)} &= 16.02 \end{aligned}$$

$$\begin{aligned} \text{Urbanized Area Credit Catch Basin Cleaning (lbs/yr)} &= \text{IACB} \times \text{PLE IC-land use} \times \text{PRFCB} \\ \text{Credit Catch Basin Cleaning (lbs/yr)} &= 220 \text{ acres} \times 1.78 \text{ (lb/acre/yr)} \times (0.02) \\ \text{Credit Catch Basin Cleaning (lbs/yr)} &= 7.83 \end{aligned}$$

$$\begin{aligned} \text{Community Wide Area Credit Catch Basin Cleaning (lbs/yr)} &= \text{IACB} \times \text{PLE IC-land use} \times \text{PRFCB} \\ \text{Credit Catch Basin Cleaning (lbs/yr)} &= 919 \text{ acres} \times 1.78 \text{ (lb/acre/yr)} \times (0.02) \\ \text{Credit Catch Basin Cleaning (lbs/yr)} &= 32.72 \end{aligned}$$

### 2.3 Leaf Litter Control and Collection Program

Leaf litter control has been proven to be an effective practice in reducing nutrient loading in stormwater and receiving waters, reducing phosphorus contributions in drainage systems up to 80%. These measures have been proven to be most effective in the fall, particularly before rainfall events. The practice of leaf litter control will go hand in hand with street cleaning. It is recommended the Town implement a leaf litter control program on its roadways and potentially offer collection of yard waste to residents.

The 2017 NH Small MS4 General Permit, Appendix F, Attachment 2 (entitled ‘Phosphorus Reduction Credits for Selected Enhanced Non-Structural BMPs in the Watershed’) states: “Towns can receive phosphorus reduction credit by performing regular gathering, removal, and disposal of landscaping wastes, organic debris, and leaf litter from impervious surfaces from which runoff discharges to the TMDL waterbody of its tributaries. In order to earn this credit, the permittee must gather and remove all landscaping wastes, organic debris, and leaf litter from all impervious roadways and parking lots at least once per week during the period of September 1 to December 1 of each year. The gathering and removal shall occur immediately following any landscaping activities in the Watershed and at additional times when necessary to achieve a weekly cleaning frequency. The permittee must ensure that the disposal of these materials will not contribute pollutants to any surface water discharges. The permittee may use an enhanced sweeping program (e.g., weekly frequency) as part of earning this credit provided that the sweeping is effective at removing leaf litter and organic materials.”

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<sup>2</sup> Total acreage of outfall catchments within MS4 area

The credit for leaf litter removal shall be determined by the following equation:

$$\text{Credit leaf litter} = (\text{Watershed Area}) \times (\text{PLE IC-land use}) \times (0.05)$$

Where:

Credit leaf litter = Amount of phosphorus load reduction credit for organic waste and leaf litter collection program (lb/year)

Watershed Area = All impervious area (acre) from which runoff discharges to the TMDL waterbody or its tributaries in the Watershed

PLE IC-land use = Phosphorus Load Export Rate for impervious cover and specified land use (lbs/acre/yr)

0.05 = 5% phosphorus reduction factor for organic waste and leaf litter collection program in the Watershed “

$$\text{Community Wide Area Credit leaf litter} = (\text{Watershed Area}) \times (\text{PLE IC-land use}) \times (0.05)$$

$$\text{Credit Leaf Litter (lb/yr)} = 990 \text{ acres} \times 1.78 \text{ (lb/acre/yr)} \times (0.05)$$

$$\text{Credit leaf Litter (lb/yr)} = 88.11 \text{ (lb/yr)}$$

$$\text{Urbanized Area Credit leaf litter} = (\text{Watershed Area}) \times (\text{PLE IC-land use}) \times (0.05)$$

$$\text{Credit Leaf Litter (lb/yr)} = 220 \text{ acres} \times 1.78 \text{ (lb/acre/yr)} \times (0.05)$$

$$\text{Credit leaf Litter (lb/yr)} = 19.58 \text{ (lb/yr)}$$

## 2.4 Urban Fertilizer Reduction

An option for another non-structural BMP that Sherborn could implement phosphorus reduction through urban fertilizer reduction, which can be achieved through public education and implementing new community practices and by-laws. This is a non-structural control that involves community outreach and engagement by means of town meetings, educational materials distributed residents, and community workshops. Phosphorus-removal credit is given based on the total area of turf grass for which fertilizers containing phosphorus are no longer used (these must be areas where phosphorus-containing fertilizers were applied in the past). First, the total acreage of applicable lawns must be determined using geospatial data. Next the PLER must be determined (based on pervious cover type and Hydrologic Soil Group (HSG)). A 33% phosphorus-reduction factor is then applied for the area, yielding the following equation (Equation 2-5 from the 2017 NH Small MS4 General Permit, Appendix F, Attachment 2):

$$\text{Fertilizer Reduction Phosphorus Removal Credit} = [\text{Area}] \times [\text{PLER}] \times [0.33]$$

This option has been considered and could be explored further and by-laws implemented to help with phosphorus reduction in Sherborn. This has been a topic of discussion for Sherborn with various proposed developments in the community.

### 3 Structural Control Measures for Stormwater Management

Based on the above non-structural BMP calculations and even with the implementation of by-laws for fertilizer use, Sherborn would not meet the Charles River Watershed P-reduction goals as noted in Section 1. It is recommended that Sherborn implement structural BMPs to achieve the P-reduction goals. The first locations Sherborn should investigate for structural BMPs would be Town-owned properties. If the P-reduction goal cannot be achieved with Town-owned properties alone, the next step would be partnering with larger property owners in the Community, i.e. local businesses or industries.

Structural BMPs are a common alternative to stormwater mitigation and treatment and in this case, phosphorus reduction. Structural BMPs can work in tandem with current non-structural controls when design and planning stages are taking place to prevent avoidable impacts while providing the highest amount of treatment. The structural BMP for any potential site should be chosen based on the current natural system, intended volume of water to be treated, land use, area available to construct or retrofit the BMP, HSG, phosphorus reduction goal, cost, and maintenance. Structural BMPs can be integrated to blend into the naturally occurring landscape, or a more conventional brick and mortar technique can be constructed. The structural control measures discussed in this section are described in further detail in Attachment 3 of Appendix F of the MA EPA MS4 General Permit Guidelines and the Specifications for the MA Stormwater Handbook. For design purposes, calculations in this section will use an HSG of A and an infiltration rate (IR) of 2.41 in/hr. Before implementing any structural controls in the field, soil should be tested to determine proper HSG for the specific area to be used for treatment. The following table lists various structural BMPs and their phosphorus reduction efficiencies:

**Table 3: Summary of Structural BMP P Reduction Efficiencies**

<b>Structural BMP</b>	<b>Percent (%) Phosphorus Reduction</b>
Disconnection	30-85%
Vegetated Swales	Varies
Infiltration Trench/ Basin	60% to 70%
Vegetated Filter Strip/Gravel Wetland System	20-60%
Sediment Forebay	Varies
Bioretention Basin/Rain Garden	30% to 100%
Constructed Stormwater Wetlands	40% to 60%
Wet Pond/Wet Retention Basin	30% to 70%
Sand Filter	10% to 50% *(up to 80% with steel wool)



### 3.1 Impervious Area Hydrologic Disconnection

Disconnection refers to the capturing of stormwater from impervious areas before entering the stormwater drainage system and redirecting flow to an existing vegetated or permeable area for infiltration, reducing the total runoff volume. Devices such as level spreaders to disperse the discharge and provide sheet flow should be employed whenever needed to increase recharge and avoid flow concentration and short circuiting through the pervious area.

Opportunities for disconnection include roof runoff, patios and driveways, sidewalks, and catch basins discharging to storm sewer systems or directly to a receiving water. Phosphorus reduction efficiency using this approach varies based on the ratio of impervious area (runoff volume) and receiving pervious area, thus requires thoughtful planning. Phosphorus reduction volume is calculated using the following equation:

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

or

$$\text{Disconnection Phosphorus Removal Credit (lbs/yr)} = \text{IA (acre)} \times \text{PLER IC-Com} \times \text{PRF}$$

Where:

IA (acre)= All impervious area (acres) from which runoff discharges to the TMDL waterbody or its tributaries in the Watershed

PLE IC-Com = Phosphorus Load Export Rate for impervious cover and commercial land use (lbs/acre/yr)

PRF = Phosphorus Reduction Rate based on land use

Land Use	PRF
Commercial and Industrial	0.3
High-Density Residential	0.3
Medium-Density Residential	0.48

**Table 3-1 Impervious Area Disconnection Performance Table<sup>3</sup>**

Impervious Area to Pervious Area Ratio	Soil Type HSG A
8:1	30%
6:1	37%
4:1	48%
2:1	64%
1:1	74%
1:2	82%
1:4	85%

<sup>3</sup> Table 3-31: Impervious Area Disconnection Performance Table, Attachment 3 of Appendix F of MA EPA MS4 General Permit Guidelines

### 3.2 Vegetated Swales

Water quality swales are vegetated open channels designed to treat the required water quality volume and to convey runoff from the 10-year storm without causing erosion. There are two different types of water quality swales that may be used to satisfy the Stormwater Management Standards:

- Dry Swales
- Wet Swales

Unlike drainage channels which are intended to be used only for conveyance, water quality swales and grass channels are designed to treat the required water quality volume and incorporate specific features to enhance their stormwater pollutant removal effectiveness. Water quality swales have higher pollutant removal efficiencies than grass channels. Phosphorus removal efficiencies range between 20% to 90%<sup>4</sup>.

**Table 3-2: Dry Water Quality Grass Swale with Detention Performance Table<sup>5</sup>**

<b>Dry Water Quality Grass Swale with Detention Performance Table: Long-Term phosphorus Load Reduction</b>								
<b>BMP Capacity: Depth of Runoff from Impervious Area (inches)</b>	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
<b>Cumulative Phosphorus Load Reduction</b>	2%	5%	9%	13%	17%	21%	29%	36%

### 3.3 Infiltration Trench/Basin

Infiltration trench provides temporary storage of runoff using the void spaces within the soil/sand/gravel mixture that is used to backfill the trench for subsequent infiltration into the surrounding sub-soils. Performance results for the infiltration trench can be used for all subsurface infiltration practices including systems that include pipes and/or chambers that provide temporary storage.

Infiltration basins are stormwater runoff impoundments that are constructed over permeable soils. Pretreatment is critical for effective performance of infiltration basins. Runoff from the design storm is stored until it exfiltrates through the soil of the basin floor. Total phosphorus removal efficiencies range between 60% to 70%.

<sup>4</sup> Volume 2 Chapter 2: Structural BMP Specifications for the Massachusetts Stormwater Handbook

<sup>5</sup> Table 3-25: Dry Water Quality Grass Swale with Detention Performance Table, Attachment 3 of Appendix F of MA EPA MS4 General Permit Guidelines

**Table 3-3: Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table<sup>6</sup>**

Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	34%	55%	78%	88%	93%	96%	99%	100%
Cumulative Phosphorus Load Reduction	33%	55%	81%	91%	96%	98%	100%	100%

### 3.4 Vegetated Filter Strip/Gravel Wetland System

Vegetated filter strips, also known as filter strips, grass buffer strips and grass filters, are uniformly graded vegetated surfaces (i.e., grass or close-growing native vegetation) that receive runoff from adjacent impervious areas. Vegetated filter strips typically treat sheet flow or small concentrated flows that can be distributed along the width of the strip using a level spreader. Vegetated filter strips are designed to slow runoff velocities, trap sediment, and promote infiltration, thereby reducing runoff volumes. Nutrient removal is dependent on filter strip area and depth.

- Reduces runoff volumes and peak flows.
- Slows runoff velocities and removes sediment.
- Low maintenance requirements.
- Serves as an effective pretreatment for bioretention cells
- Can mimic natural hydrology
- Small filter strips may be used in certain urban settings.
- Ideal for residential settings and to treat runoff from small parking lots and roads.
- Can be used as part of runoff conveyance system in combination with other BMPs
- Little or no entrapment hazard for amphibians or other small creatures
- Often a poor retrofit option due to large land requirements.
- Effective only on drainage areas with gentle slopes (less than 6 percent).

<sup>6</sup> Table 3-10: Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table, Attachment 3 of Appendix F of MA EPA MS4 General Permit Guidelines

**Table 3-4: Gravel Wetland BMP Performance Table<sup>7</sup>**

<b>Gravel Wetland BMP Performance Table: Long-Term phosphorus Load Reduction</b>								
<b>BMP Capacity: Depth of Runoff from Impervious Area (inches)</b>	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
<b>Cumulative Phosphorus Load Reduction</b>	19%	26%	41%	51%	57%	61%	65%	66%

### 3.5 Sediment Forebays

A sediment forebay is a post-construction practice consisting of an excavated pit, bermed area, or cast structure combined with a weir, designed to slow incoming stormwater runoff and facilitating the gravity separation of suspended solids. This BMP is designed as a pretreatment option before discharging into a dry extended detention basin, wet basin, infiltration basin, etc. where the runoff will be able to slowly infiltrate into the groundwater.

- Provides pretreatment of runoff before delivery to other BMPs.
- Slows velocities of incoming stormwater
- Easily accessed for sediment removal
- Longevity is high with proper maintenance
- Relatively inexpensive compared to other BMPs
- Greater detention time than proprietary separators
- No removal of soluble pollutants
- Provides no recharge to groundwater
- No control of the volume of runoff
- Frequent maintenance is essential

### 3.6 Bioretention Basin/Rain Garden

Bioretention is a technique that uses soils, plants, and microbes to treat stormwater before it is infiltrated and/or discharged. Bioretention cells (also called rain gardens in residential applications) are shallow depressions filled with sandy soil topped with a thick layer of mulch and planted with dense native vegetation. Stormwater runoff is directed into the cell via piped or sheet flow. The runoff percolates through the soil media that acts as a filter. There are two types of bioretention cells: those that are designed solely as an organic filter filtering bioretention areas and those configured to recharge groundwater in addition to acting as a filter exfiltrating bioretention areas. A filtering bioretention area

<sup>7</sup> Table 3-19: Gravel Wetland BMP performance Table, Attachment 3 of Appendix F of MA EPA MS4 General Permit Guidelines

includes an impermeable liner and underdrain that intercepts the runoff before it reaches the water table so that it may be conveyed to a discharge outlet, other best management practices, or the municipal storm drain system. An exfiltrating bioretention area has an underdrain that is designed to enhance exfiltration of runoff into the groundwater. Bioretention basins are typically 5-7% of the area that drains to them and remove 30% to 90% of Total phosphorus dependent on the size and filter media used.

- Can be designed to provide groundwater recharge and preserves the natural water balance of the site
- Can be designed to prevent recharge where appropriate
- Supplies shade, absorbs noise, and provides windbreaks
- Can remove other pollutants besides TSS including phosphorus, nitrogen and metals
- Can be used as a stormwater retrofit by modifying existing landscape or if a parking lot is being resurfaced
- Can be used on small lots with space constraints
- Small rain gardens are mosquito death traps
- Not suitable for large drainage areas

**Table 3-5: Surface Infiltration IR = 2.41 in/hr BMP performance Table<sup>8</sup>**

<b>Surface Infiltration (IR = 2.41 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction</b>								
<b>BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)</b>	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
<b>Runoff Volume Reduction</b>	32.8%	53.8%	77.8%	88.4%	93.4%	96%	98.8%	99.8%
<b>Cumulative Phosphorus Load Reduction</b>	46%	82%	95%	98%	99%	100%	100%	100%

### 3.7 Constructed Stormwater Wetlands

Constructed stormwater wetlands are stormwater wetland systems that maximize the removal of pollutants from stormwater runoff through wetland vegetation uptake, retention and settling. Constructed stormwater wetlands temporarily store runoff in shallow pools that support conditions suitable for the growth of wetland plants. Like extended dry detention basins and wet basins, constructed stormwater wetlands must be used with other BMPs, such as sediment forebays, filter

<sup>8</sup> Table 3-16: Surface Infiltration (2.41 in/hr) BMP Performance Table, Attachment 3 of Appendix F of MA EPA MS4 General Permit Guidelines

strips, or gravel wetlands. Constructed stormwater wetlands effectively remove 40% to 60% of total phosphorus.

- Relatively low maintenance costs.
- High pollutant removal efficiencies for soluble pollutants and particulates.
- Removes nitrogen, phosphorus, oil and grease
- Enhances the aesthetics of a site and provides recreational benefits.
- Provides wildlife habitat. Relatively high construction costs compared to other BMPs.
- May be difficult to maintain during extended dry periods
- Does not provide recharge
- Creates potential breeding habitat for mosquitoes

### 3.8 Wet Pond/ Wet Retention Basin

Wet basins use a permanent pool of water as the primary mechanism to treat stormwater for large areas of land, larger than 20 acres but less than 1 square mile. The pool allows sediments to settle (including fine sediments) and removes soluble pollutants. Wet basins must have additional dry storage capacity to control peak discharge rates and have a moderate to high capacity to remove most urban pollutants, depending on how large the volume of the permanent pool is in relation to the runoff from the surrounding watershed. The wet pond allows for an increased retention time allowing particulates to settle out of the water column, and can add recreational space, wildlife habitat, and aesthetic value to a property. This treatment option requires a larger amount of space, a sediment forebay, and a discharge outlet. Total phosphorus removal using a retention basin is between 30% to 70%.

**Table 3-6: Wet Pond BMP Performance Table<sup>9</sup>**

<b>Wet Pond BMP Performance Table: Long-Term phosphorus Load Reduction</b>								
<b>BMP Capacity: Depth of Runoff from Impervious Area (inches)</b>	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
<b>Cumulative Phosphorus Load Reduction</b>	14%	25%	37%	44%	48%	53%	58%	63%

### 3.9 Sand Filter

Sand filters are ideal treatment options for areas of 1 to 10 acres, that have limited treatment space. Sand filters work by treating stormwater runoff by filtration through various layers of media in an enclosed basin equipped with an overflow or discharge outlet. For a sand filter to act as a full treatment

<sup>9</sup> Table 3-23: Wet Pond BMP Performance Table, Attachment 3 of Appendix F of MA EPA MS4 General Permit Guidelines

option and not pretreatment, it must allow the water to recharge into the groundwater after treatment through the permeable sand filter media occurs. Pollutants and sediment will accumulate as a layer on top of the filter which can be scraped off, and finer particles will settle within the media which will require dewatering and sand replacement. phosphorus removal rates for sand filters are typically between 10% to 50% depending on filter size and materials. For instance, the use of steel wool in filters can increase P reduction rates to up to 80%.

**Table 3-7: Sand Filter Performance Table<sup>10</sup>**

<b>Sand Filter BMP Performance Table: Long-Term phosphorus Load Reduction</b>								
<b>BMP Capacity: Depth of Runoff from Impervious Area (inches)</b>	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
<b>Cumulative Phosphorus Load Reduction</b>	14%	25%	37%	44%	48%	53%	58%	63%

## 4 Sherborn Recommendations

Based on the P-reduction requirements set forth by the MS4 permit, it is recommended that Sherborn continue to discuss as a community how the P-reduction would be implemented – either community-wide or within the urban area.

It is recommended that Sherborn further investigate fertilizer by-laws. It is recommended that Sherborn consider implementation of all other non-structural BMPs discussed in the memorandum.

As part of the MS4 process, Sherborn should identify locations where structural BMPs could be installed on Town-owned property and evaluate P-reductions at these locations. There is nothing that would prevent Sherborn from implementing structural BMPs on Town property. If Town-owned structural BMPs do not achieve the P-reduction level of control, the next step would be to partner with local business/industries to install structural BMPs to meet the P-reduction goals. This would require additional legal reviews on private property/easements/ and by-laws to install structural BMPs.

Town of Sherborn should verify that all proposed non-structural BMPs (not including fertilizers) and structural BMPs on Town-owned property are within the Town’s jurisdiction to implement, without a regulation. Regulation of fertilizer would require additional by-laws. The Town of Sherborn should engage a lawyer to complete a legal review/ easement requirements of proposed structural BMPs located on private property.

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<sup>10</sup> Table 3-21: Sand Filter BMP Performance Table, Attachment 3 of Appendix F of MA EPA MS4 General Permit Guidelines

A final opportunity would be to partner with another community that has more opportunities for P-reduction, to combine efforts and share the credit.



**Attachment G- Tasks and Schedule Table**

**Sherborn, MA Compliance with US EPA/MassDEP 2016 MS4 Permit - October 2020**

**Minimum Control Measures (MCM) New Tasks and Implementation Schedule**

Tasks	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
	July 1, 2018 to June 30, 2019	July 1, 2019 to June 30, 2020	July 1, 2020 to June 30, 2021	July 1, 2021 to June 30, 2022	July 1, 2022 to June 30, 2023
<b>MCM 1: Education and Outreach (1 message per 5 year term required for each)</b>	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J
1.1 Interactive MS4 Map Posted Online and maintained	complete and ongoing				
1.2 Web Page for Businesses		revised to occur in FY 21			
1.3 Meetings with Developers and the Farm Pond Committee Liaison	complete and ongoing				
1.4 Web Page for Developers/BMP recommendations	complete and ongoing				
1.5 Post SWMP on Town website		complete and ongoing			
1.6 Brochures/Pamphlets for Businesses					
<b>MCM 2: Public Review of Stormwater Management Program</b>					
2.1 Make the updated SWMP available for review online and at Town Hall		complete and ongoing			
2.2 Participate in town shoreline clean ups	Efforts are ongoing				
<b>MCM 3: IDDE Program</b>					
3.3 MS4 mapping Phase I with catchment delineations and interconnections (Phase II due on Year 10)	complete	complete			--->
3.4 Create written IDDE Program	complete				
3.5 Train applicable employees on IDDE program implementation annually (time flexible)					
3.6 Implement Problem catchment investigation procedures on FY 2020 (due on FY 2025)		No Problem Catchments			--->
3.7 Dry weather outfall inspection (sample if flow present)	complete	complete	complete		
3.8 Wet weather sampling at outfalls of catchments with Vulnerability Factors	by June 30, 2028				--->
<b>MCM 4: Construction Site Runoff Control</b>					
4.2 Develop written procedure for site plan review and inspection/enforcement	complete				
4.3 Develop written procedure for construction sediment/erosion control site inspections/enforcement	complete				
4.4 Update regulations to include control of wastes	complete				
<b>MCM 5: Post Construction Stormwater Management</b>					
5.1 Update Stormwater Management Ordinance		complete			
5.2 Evaluate and report on street and parking design					
5.3 Evaluate and report on local regs for feasibility of Green Stormwater Infrastructure					
5.4 Identify 5 MS4-owned properties that could be retrofitted with BMPs					
5.5 Develop procedures to require submission of As-builts of BMPs and O&M Plans		complete			
<b>MCM 6: Good Housekeeping &amp; Pollution Prevention</b>					
6.1a, 6.2a, & 6.3a Inventory all Town owned facilities and equipment (parks, buildings, vehicles, etc.)		complete			
6.1b Prepare operation and maintenance (O&M) plans for parks and open space		complete			
6.2b Prepare O&M plans for Town owned buildings and facilities		complete			
6.3b Prepare O&M plans for Town vehicles and equipment		complete			
6.4 Prepare written procedures for O&M of stormwater infrastructure		complete			
6.5 Establish schedule for catch basin cleaning	complete				
6.6 Establish written procedures for street sweeping	complete				
6.7 Develop written procedures for winter road maintenance	complete				
6.8 Stormwater Treatment Structures Inspection and Maintenance Procedures	complete				
6.9 Develop SWPPP for DPW		complete			
<b>Charles River Phosphorus Control Plan- Phase I</b>					
Legal Analysis to evaluate if any ordinances could be created or modified for the PCP		complete			
Funding Source Analysis					
Define Scope of PCP					
Complete Phase I Report					
Annual Performance Evaluations and Implementations and Phase II & III (FY 2024 and beyond)					--->
<b>OTHER TASKS:</b>					
Complete Annual Reports Summarizing Progress; Submit by <b>Sept 30th</b> Each Year; Update SWMP	x	x			