Town of Hull, MA

Stormwater Management Program (SWMP): Volume 1

NPDES Phase II Small MS4 General Permit

June 2022

STORMWATER MANAGEMENT PLAN

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Stormwater Management Program (SWMP): Volume 1

Town of Hull, MA

NPDES Phase II Small MS4 General Permit

STORMWATER MANAGEMENT PLAN

Prepared by: BETA GROUP, INC.
Prepared for: Town of Hull

June 2022

Refer to **Appendix C** for Delegation of Authority Letter.

Contact Person:	**Chris Gardner**	Title:	**Director, Public Works**
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Hull, MA 02045

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

Signature: Chris Gardner Date: 9.20.22

Printed Name: Christopher Gardner Title: DPW Director

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Summary of Revisions

Revision #	Change	Date / Permit Year
0	SWMP Volumes 1 & 2 Issued (SWMP & IDDE)	June 2019 / Year 1
1	SWMP Volume 3 Issued (O&M)	June 2020 / Year 2
2	SWMP Volumes 1, 2, & 3 Updated. SWMP Volume 4 Added. Reflects completed BMPs, Self-Audit / Status, Personnel Changes, 2016 List of Impaired Waters, IDDE & O&M Progress	June 2021 / Year 3
3	SWMP Volumes 1, 2, 3, 4 Updated. Reflects 2018/2020 List of Impaired Waters, IDDE & O&M Progress Volume 3, SWPPP Update	June 2022 / Year 4

1.0 EXECUTIVE SUMMARY

Each community with a municipal separate storm sewer system (MS4) in designated urbanized areas must develop a Stormwater Management Program (SWMP) that will guide its activities under the 2016 MS4 general permit. This SWMP was developed by the Town of Hull to protect water quality and reduce the discharge of pollutants from the municipality's storm sewer system to the maximum extent practicable (MEP) as described herein.

The SWMP is comprised of four volumes. This report is Volume 1 of 4.

- SWMP Volume 1 – Stormwater Management Plan
- SWMP Volume 2 – Illicit Discharge Detection and Elimination (IDDE) Plan
- SWMP Volume 3 – Good Housekeeping and Pollution Prevention (O&M) Plan
- SWMP Volume 4 – Annual Reporting

Written plans for SWMP Volumes 1 and 2 are required to be completed by the end of Year 1 of the permit term (June 30, 2019). Written plan for Volume 3 is required to be completed by the end of Year 2 of the permit term (June 30, 2020). Volume 4 compiles the documentation required over each reporting period (July 1 to June 30) for assembly of annual reports due September 30th each year.

All documents are available for review and comment on the Town of Hull Stormwater Website as follows:

Stormwater Information Page is located here:
https://www.town.hull.ma.us/department-public-works/webforms/storm-water-management-information

Stormwater Bylaw and Regulations are located here:
https://ecode360.com/34084945

2.0 Introduction & Background

2.1 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 Areas are required to seek NPDES permit coverage for those stormwater discharges.

2.2 Permit Program Background

On May 1, 2003, EPA Region I issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4-2003 permit) consistent with the Phase II rule. The MS4-2003 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, hereinafter referred to as the Permit, which became effective on July 1, 2018.

2.3 Town Specific MS4 Background

Approximately 85% of the Town of Hull, and 100% of the mainland of Hull is designated as urbanized area by the 2010 census. This area regulated under the MS4 permit is highlighted on the MS4 Environmental Overview Map in Appendix A. Peddocks Island and Bumpkin Island, located off the west coast of Hull, are not identified as urbanized and therefore are not subject to the requirements of the permit. Additionally, there is no stormwater infrastructure on either island; for these reasons, the waterbody Hingham Bay (MA70-06) is not included in the list of waterbodies impacted by the Town.

Within the designated MS4 area, Hull has five water body segments that receive flow from the MS4, with four of those designated as Category 5 Waters in the Massachusetts 2018/2020 Integrated List of Waters. The fifth waterbody is the Massachusetts Bay which has yet to be categorized. These Integrated Waters Listings include impairments for Fecal Coliform in Boston Harbor, Hull Bay, Weir River, and Hingham Bay. Most of the Town also falls within the Weir River Watershed which has no additional impairments or required actions. Actions for each waterbody and impairment are described in detail in Section 5.0 of this report.

The Town of Hull's MS4 is composed of pipes, catch basins, manholes, culverts, swales and outfalls discharging to bays, ponds and rivers. A GIS database has been established which contains Town-wide information for all drainage structures including:

- 1628 Town-owned catch basins
  - 103 owned by private/other
  - 88 State-owned
- 126 outfalls (124 outfalls subject to MS4 Permit)
- 356 Town-owned storm drain manholes
  - 40 owned by private/other
  - 9 State-owned

A map with these elements is included in Appendix A. The map includes stormwater system structures and identifies the impaired water bodies and the MS4 areas tributary to each.

Massachusetts Department of Transportation (MassDOT) has one roadway within Hull's MS4 regulated area, Route 228 (Nantasket Avenue). MassDOT is required to have their own NPDES MS4 Permit for their properties, which are therefore not the responsibility of the Town. Additionally, there are two areas owned and operated by the DCR for which the Town is also not responsible: Nantasket Beach and Fort Revere Park.

2.4 Stormwater Management Program (SWMP)

The Town was previously authorized by the MS4-2003 permit which had established six minimum control measures, Best Management Practice (BMPs) and measurable goals to meet the terms and conditions of that permit. This SWMP is a modification and update to the previous plan and efforts.

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 Town's plans and activities. The document will 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 change public behavior causing stormwater pollution, (2) an opportunity for the public to participate in 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.

This document will be made available on the Town website, and at the Department of Public Works (DPW) Office. The Permit covers the following which are included in this SWMP Plan:

- Identification of Responsible Parties
- Endangered and Threatened Species and Historic Properties Protection
- Increased Discharges and Discharges to Waters with TMDLs or Subject to Additional Requirements
- Implementation of Six Minimum Control Measures
- Sanitary Sewer Overflow Inventory
- Surface Drinking Water Supply Protection
- Annual Program Evaluation

2.5 Implementation Schedule and Status

MS4 General Permit implementation timeline and current status is shown in Figure 2-1.

Figure 2-1: Town of Hull MS4 Permit Compliance Schedule

CM	Task	Date Required	Complete During/By Year (Yr 1 is July 2018- June 2019)									
			1	2	3	4	5	6	7	8	9	10
	Notice of Intent (NOI)	9/30/2018										
	Stormwater Management Plan - SWMP (update/develop)	6/30/2019										
	SWMP update	Annually										
MINIMUM CONTROL MEASURES												
1	**Public Education and Outreach Messages***											
	Residents - 2 messages	By yr 5, min. 1 year apart										
	Businesses & Institutions- 2 messages	By yr 5, min. 1 year apart										
	Developers - 2 messages	By yr 5, min. 1 year apart										
	Industrial Facilities - 2 messages	By yr 5, min. 1 year apart										
2	**Public Involvement and Participation**											
	Public Review of SWMP & Annual Report	Annually										
	Opportunities for Public Participation	Annually										
3	**Illicit Discharge Detection & Elimination (IDDE)***											
	Sanitary Sewer Overflows Inventory	6/30/2019										
	System Mapping - Phase 1, inc. catchment delineations	6/30/2020										
	System Mapping - Phase 2	Update Annually										
	Written IDDE Program	6/30/2019										
	Outfall/Interconnects Inventory & Initial Catchment Ranking*	6/30/2019										
	Outfall/Interconnects Catchment Ranking Updates	Update Annually										
	Dry Weather Screening & Sampling	By yr 3 & every 5 yrs										
	Catchment Investigations Procedures	12/30/2019										
	Catchment Investigations Problem Outfalls	6/30/2025										
	Catchment Investigations All Outfalls	6/30/2028										
	Wet Weather Sampling	part of catchment invest.										
	Illicit Discharge Elimination (Locate & Remove)	60 Days from source ID										
	Confirmatory Dry Weather Screening	1 yr after removal										
	Training	Annually										
4	**Construction Site Runoff Control**											
	Construction Site Inspections & Enforcement Proceedures	6/30/2019										
	Site Plan Review Procedures	6/30/2019										
	Requirement for Construction Site Erosion Controls	6/30/2019										
	Construction Site Waste Control Requirements	6/30/2019										
5	**New Development and Redevelopment***											
	Update Regulations - Retention/Treatment	6/30/2022										
	Assess Street Design & Parking Guidelines	6/30/2022										
	Assess Regulations to Allow Green Infrastructure	6/30/2022										
	Locate 5 Properties for Impervious Area Reduction	6/30/2022										
6	**Good Housekeeping***											
	Winter Road Maintenance Procedures	6/30/2019										
	O&M, SWPPP & Infrastructure Program	6/30/2020										
	Training for O&M and SWPPP Program Activities	Regularly/As Needed										
	Catchbasin Cleaning Schedule	6/30/2019										
	Catch Basin Cleaning	when 50% full										
	*Street Sweeping	Spring & Fall for Phosphorus										
	Inspections for SWPPP	Quarterly										
	Inspection of Structural BMPs	Annually										
	Maintenance of Structural BMPs	as needed										
Phosphorous Source Identification Report*												
	Report											
	Evaluate Properties for BMP retrofits, provide plan & schedule											
	Implement Plan											
Annual Reports		by 9/30 annually										

*Supplemental requirements for Phosphorus impairment to Neponset River Watershed and bacteria impariments in Ponkapoag Pond, Mary Lee Brook and Cochato River

Due 6/30/2023 | Future Yr Task | Complete

3.0 SMALL MS4 AUTHORIZATION

The Notice of Intent (NOI) containing the information in Appendix E of the Permit was submitted to EPA on or prior to September 27, 2018.

EPA has completed its initial review of the NOI and issued an authorization to discharge letter to the Town of Hull (dated May 30, 2019) both of which are posted on the following website: https://www.epa.gov/npdes-permits/regulated-ms4-massachusetts-communities.

4.0 Identification of Responsible Parties for Implementation of Program

The implementation and coordination of this program is the responsibility of Hull Public Works Department, specifically the Director of Public Works.

SWMP Team Coordinator

Name:	Chris Gardner	Title:	Director	Department:	Public Works
Phone:	781-925-0900	Email:	cgardner@town.hull.ma.us		
Responsibilities: MS4 Coordinator, IDDE Program, Good Housekeeping, Reporting & Record Keeping, Public Participation, IDDE - public Works and Sewer, O&M of facilities					

SWMP Team

Name:	Chris Krahforst	Title:	Agent	Department:	Conservation Commission
Phone:	781-925-8102	Email:	ckrahforst@town.hull.us		
Responsibilities: Stormwater Bylaw/Regulations, Post Construction SWM, Plan Review, Inspection					

Name:	Chris DiIorio	Title:	Planning Director	Department:	Community Development
Phone:	781-925-3595	Email:	cdiIorio@town.hull.ma.us		
Responsibilities: Public Education and Outreach, Post Construction SWM, Plan Review, Inspection					

Name:	Bartley Kelly	Title:	Commissioner	Department:	Building Department
Phone:	781-925-1330	Email:	bjkelly@town.hull.us		
Responsibilities: Construction Site SW Control					

Name:	John Struzziery	Title:	Director of Wastewater Operations	Department:	Sewer
		Title:	Assistant Director	Department:	Public Works
Phone:	781-925-1207	Email:	jstruzziery@town.hull.us		
Responsibilities: Good housekeeping, SWPPP, O&M of facilities, IDDE - Public Works and Sewer					

5.0 Resource Protection

5.1 Endangered and Threatened Species

The Permit requires applicants to assess the impacts of their stormwater discharges and discharge related activities on federally listed endangered and threatened species and designated critical habitat.

The NOI submitted in September of 2018 for coverage under the Permit identified two threatened species of concern. Threatened species included the Northern Long-eared Bat, a mammal and the Piping Plover, a bird. According to guidance provided in Appendix C of the Permit and the IPaC report, the project meets eligibility for Endangered Species Act (ESA) under U.S. Fish and Wildlife Service (USFWS) Criteria B. Based on correspondence with USFWS the determination of "no effect" was found to be appropriate for Hull given that all discharges identified in the NOI are an existing condition currently subject to 2003 MS4 General Permit; there are no new structural BMP's proposed at this time. A letter to this affect from USFWS was provided with the NOI to complete the ESA determination. As described in this SWMP, there is no reason to believe that the stormwater discharges, allowable non-stormwater discharges and discharge related activities will have any effect on the identified species or any other listed species or critical habitat. This is based on the following:

1. All stormwater discharges are pre-existing or previously permitted by EPA;
2. Any planned operations and maintenance work covered by this permit will only affect previously disturbed areas where stormwater controls are already installed. In these situations, the chance of encountering and of the subject species is discountable;
3. The project implements EPA MS4 Best Management Practices (BMPs) and meets Clean Water Act and Massachusetts Water Quality Standards. Although permitted discharges may reach the environment used by these species, BMPs reduce pollutants to the extent that discharges are not known to have measurable impacts on these species or their habitat;
4. No new construction or structural BMPs are proposed under this permit at this time; and
5. It is agreed that if, during the course of the permit term, it is planned to install a structural BMP not identified in the Notice of Intent (NOI), the Town will re-initiate with the U.S. Fish and Wildlife Services as necessary.

The aforementioned requirements are all met under this Permit and as such there is no reason to believe that the stormwater discharges, allowable non-stormwater discharges and discharge related activities will have any adverse effect on the aforementioned species or any other listed species or critical habitat. If any future stormwater projects or activities are proposed, the Town acknowledges that they will have to re-initiate either informal or formal consultation with USFWS as required under the MA MS4 General Permit Appendix C: Step 2(5).

The MS4 Environmental Overview Map in Appendix A includes Natural Heritage and Endangered Species Program (NHESP) estimated habitats of rare wildlife, priority habitats of rare species, certified vernal pools and wetlands. Future stormwater projects and activities proposed within these areas will require review for compliance with the Massachusetts ESA and the Wetlands Protection Act.

5.2 Historic Properties

The MS4 Permit requires applicants to take into account the effects of Federal undertakings on historical properties that are either listed on or eligible for listing on the National Register of Historic Places. The NOI identified eligibility for National Historic Preservation Act under Criteria A. The proposed BMPs

outlined in this program have no potential to affect any historic properties because no changes are proposed to the existing MS4 infrastructure.

The MS4 Environmental Overview Map in Appendix A includes the Massachusetts Historical Commission's (MHC) inventory of historic points and areas. Future stormwater projects and activities proposed in and around these properties should be referenced against this map as well as the state register. The state register provides an up-to-date comprehensive listing of buildings, structures objects and sites that have received local, state or national designations based on their historical or archaeological significance.

5.3 Summary of Receiving Waters and Impairments

Surface Water Quality Standards (SWQS) are provided by the Massachusetts Department of Environmental Protection (DEP). They are determined for a water body's designated use. The SWQS designate the uses that surface waters are protected for, and an assessment is performed to determine if the designated uses are met by the water bodies. The use is not assessed in instances when there is insufficient data or information. Assessment information is maintained by the DEP in the Water Body System (WBS) database, which is updated every two years. Designated uses include:

- Aquatic Life
- Fish Consumption
- Primary Contact Recreation (Swimming)
- Secondary Contact Recreation (Boating)
- Aesthetics

The aquatic life use is supported when suitable habitat is available in the water body to sustain a native and diverse aquatic environment. Impairments to the aquatic life use can result from anthropogenic sources of pollution. Organic enrichment, flow and habitat alteration, sedimentation (habitat destruction), and whole effluent toxicity are potential causes of water body impairment for this use.

The fish consumption use is met when pollutant concentrations are acceptable for edible marketable fish or shellfish or for the use of recreationally caught fish or other aquatic life for human ingestion.

The primary contact recreational use is any activity that involves prolonged contact with the water with a significant risk of ingestion. Activities include swimming, diving, water skiing, and wading, among others. The secondary contact recreational use includes any activity with incidental water contact including boating, fishing, and other activities.

The aesthetic use is supported when water bodies do not contain objectionable deposits, floating debris, scum, or other matter, which produces offensive odors, colors, taste or turbidity or produces noxious aquatic life.

Total Maximum Daily Loads (TMDLs) are the amount of a pollutant allowed to be discharged into a water body per day to assure attainment of the SWQS. The sum total of all pollutant load allocations cannot exceed the total maximum allowable pollutant load calculated for the water body.

Impaired water bodies are those that are not expected to meet the SWQS due to specific pollutants or stressors. However, numerical data is not available for every pollution indicator, so best available guidance in the literature may be applied. Not all water bodies are assessed; many small and/or unnamed water bodies are currently not assessed.

According to the Massachusetts Year 2018/2020 Integrated List of Waters, there are five categories for water quality assessment.

- Category 1 — Waters attaining all designated uses
- Category 2 — Attaining some uses; other uses not assessed
- Category 3 — No uses assessed
- Category 4A — TMDL is completed
- Category 4B — Impairment controlled by alternative pollution control requirements
- Category 4C — Impairment not caused by a pollutant – TMDL not required
- Category 5 — Waters requiring a TMDL

Within the designated MS4 area, Hull has five water body segments within the Town that receive flow from the MS4 with four designated as Category 5 Waters. Table 5-1 summarizes these water bodies and the associated impairments requiring action, as described in the Permit and this SWMP. Information found in this table is based on the Massachusetts Year 2018/2020 Integrated List of Waters.

These impaired water bodies and the MS4 areas tributary to them can be found on the MS4 Environmental Overview Map, which can be found in Appendix A.

Appendix H of the Permit identifies specific requirements for water bodies that are Water Quality Limited in five categories of impairments (Nitrogen, Phosphorus, Bacteria/Pathogens, Chloride and Solids, Metals or Oil and Grease). These requirements apply to water bodies and their tributaries that do not meet applicable water quality standards, including but not limited to waters listed in category 5 and waters without an EPA approved TMDL.

Hull WQLW Impairment(s)
Bacteria and Pathogens

Appendix F of the Permit identifies specific requirements for discharges to impaired waters or their tributaries with an approved TMDL. Hull does not currently have any TMDL's however it is anticipated that they will be developed for the Fecal Coliform impairment.

Hull TMDL(s)
None at this time

5.4 REQUIREMENTS TO ADDRESS IMPAIRMENTS

The requirements specific to impairments of Hull's receiving waters are summarized as follows:

Table 5-1: Town Water Bodies and Impairments

Water Bodies Receiving Flow from Hull MS4 Regulated Area			
NAME	**CATEGORY**	**SEGMENT ID**	**IMPAIRMENT CAUSE (EPA TMDL No.)**
Boston Harbor	5	MA70-01	Fecal Coliform PCBs in Fish Tissue Cause Unknown (Contaminants in Fish and/or Shellfish)
Hull Bay	5	MA70-09	Fecal Coliform PCBs in Fish Tissue Estuarine Bioassessments Cause Unknown (Contaminants in Fish and/or Shellfish)
Weir River	5	MA74-11	Fecal Coliform PCBs in Fish Tissue Cause Unknown (Contaminants in Fish and/or Shellfish)
Hingham Bay	5	MA70-07	Fecal Coliform PCBs in Fish Tissue Estuarine Bioassessments Cause Unknown (Contaminants in Fish and/or Shellfish)
Massachusetts Bay	-	-	Not yet designated in the Integrated Waters List, and therefore has no specific contaminants listed

Table 5-1 NOTE: Table Based on the Massachusetts Year 2018/2020 Integrated List of Waters. Certain Pollutants (in BOLD) result in Total Maximum Daily Load (TMDL) or Water Quality Limited Water Bodies (WQLW) requirements defined in Appendix H & F of the Permit.

Bacteria and Pathogen WQLW and TMDL Requirements – requirements are the same for WQLW and TMDL designation for this impairment

Applicable Hull Receiving Waters: Weir River (MA74-11), Hingham Bay (MA70-07), Hull Bay (MA70-09), Boston Harbor (MA70-01)

Requirement: Any catchment area that discharges to a water body impaired for bacteria or pathogens must comply with enhanced BMPs in addition to the requirements to reduce pollutants to the maximum extent practicable outlined in Section 2.3 of the Permit and covered in Section 7.0 of this report. Required enhancement of BMPs include:

> Public Education – Supplement residential program with an annual message encouraging proper management of pet waste, distribute education materials to dog owners at the time of licensing and provide information to owners of septic systems about proper maintenance.
>
> Illicit Discharge – Automatic designation of either "Problem" or "High Priority" in the implementation of the IDDE program.

Status: The Town has incorporated these enhancements into the BMPs in Section 7.0 of this report.

Relief of Requirements to Address Impairments

The permit states that at any time during the permit term the permittee may be relieved of additional requirements in Appendix F and H as follows:

TMDLs (Appendix F):

a. The permittee is relieved of its additional requirements as of the date when the following conditions are met:
    i. The applicable TMDL has been modified, revised or withdrawn and EPA has approved a new TMDL applicable for the receiving water that indicates that no additional stormwater controls for the control said pollutant are necessary for the permittee's discharge based on wasteload allocations in the newly approved TMDL.

b. In such a case, the permittee shall document the date of the approved TMDL in its SWMP and is relieved of any remaining requirements of Appendix F as of that date and the permittee shall comply with the following:
    i. The permittee shall identify in its SWMP all activities implemented in accordance with the requirements of Appendix F to date to reduce the pollutant load in their discharges including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs.
    ii. The permittee shall continue to implement all requirements of Appendix F required to be implemented prior to the date of the newly approved TMDL, including ongoing implementation of identified non-structural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

Water Quality Limited Waterbodies (Appendix H):

a. The permittee is relieved of its additional requirements as of the date when one of the following criteria are met:
    i. The receiving water and all downstream segments are determined to no longer be impaired due to the named pollutant by MassDEP and EPA concurs with such determination.
    ii. An EPA approved TMDL for the receiving water or downstream receiving water indicates that no additional stormwater controls for the control of said pollutant are necessary for the permittee's discharge based on waste load allocations as part of the approved TMDL.

b. In such a case, the permittee shall document the date of the determination provided for in the paragraph above or the approved TMDL date in its SWMP and is relieved of any additional requirements of Appendix H as of the applicable date and the permittee shall comply with the following:

i. The permittee shall identify in its SWMP all activities that have been implemented in accordance with the requirements of Appendix H. as of the applicable date to reduce the pollutant in its discharges, including implementation schedules for non-structural BMPs and any maintenance requirements for structural BMPs

ii. The permittee shall continue to implement all requirements of Appendix H required to be done prior to the date of determination or the date of the approved TMDL, including ongoing implementation of identified nonstructural BMPs and routine maintenance and replacement of all structural BMPs in accordance with manufacturer or design specifications.

6.0 DISCHARGES

EPA has written the Permit to meet Massachusetts state water quality standards. Antidegradation provisions at 314 CMR § 4.04 are part of the current EPA-approved water quality standards for Massachusetts. As such, the Permit requires compliance with 314 CMR § 4.04 and increased discharges from MS4s remain subject to 314 CMR § 4.04.

6.1 INCREASED DISCHARGES AUTHORIZATION

The Massachusetts Stormwater Management regulations and the Town's current site development review practices prohibit increased discharges. They all require that any new development or re-development (including new impervious area) is subject to the Post-Construction Stormwater Management requirements, which include infiltration standards that are intended to mimic pre-development conditions. New impervious areas require the implementation of best management practices (BMPs). In a case where these conditions cannot be met, authorization for an increased discharge may be required.

Multiple listed water bodies in Town are identified as impaired waters on the Massachusetts Year 2018/2020 Integrated List of Waters. As discussed in Section 5.4, this SWMP incorporates the required actions outlined in Appendix F and H of the Permit aimed at decreasing pollutants causing impairments to those water bodies. These actions combined with the implementation of post construction stormwater requirements will decrease the overall pollutant loading to all receiving waters over time. Town compliance with these requirements of the Permit, including all reporting and documentation, demonstrates no net increase in pollutant loading from the MS4.

6.2 DISCHARGES TO TMDL OR WATER QUALITY LIMITED WATERS

As previously noted, there are discharges in Town to waterbodies with either TMDL or Water Quality Limited impairments. Table 5-1 highlights the TMDL(s) and/or Water Quality Limitations for each of Hull's listed water bodies. The MS4 area tributary to each water body is subject to the TMDL and/or Water Quality Limited Waters requirements (described in Section 5.4). A map of the MS4 discharge locations (i.e. outfalls and interconnections), the MS4 area tributary to each receiving water and the TMDL and/or Water Quality Limitation triggering additional requirements to reduce pollutant loading and protect water quality can be found in the IDDE report, which is located in SWMP Volume 2.

7.0 Implementation of Minimum Control Measures

The 2016 MS4 Permit states that the permittee shall continue to implement their 2003 MS4 SWMP while updating it pursuant to meet the requirements of the new permit. Upon adoption, this new SWMP supersedes the 2003 SWMP and all related deadlines and expectations. As indicated in the 2003 and 2016 MS4 permits, the permittee shall reduce the discharge of pollutants from the MS4 to the maximum extent practicable (MEP) using these 6 minimum control measures (MCM):

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination (IDDE) Program
4. Construction Site Stormwater Runoff Control
5. Stormwater Management in New Development and Redevelopment (Post-Construction Stormwater Management)
6. Good House Keeping and Pollution Prevention for Permittee Owned Operations

7.1 Public Education and Outreach (MCM 1)

The SWMP Team is responsible for ensuring the implementation of the public education and outreach program including measurable goals and reporting. Assisting departments for particular BMPs are listed below.

The Town is a member of the North South River Watershed Association (NSRWA) who helps communities meet both the MS4 and Water Management Act education requirements through their WaterSmart program. The Town is working with NSRWA to meet the public education and outreach requirements of the Permit. Public education and outreach materials can be found on the Town's website and at Town Hall. Web Links are listed in the Executive Summary of this document.

Reporting forms and logs to document public education and outreach efforts can be found in Appendix B. Requirements and documentation measures for specific BMPs are identified below and annual reporting requirements are described in Section 10.

Objective and Requirements

The main objective of this control measure is to implement an education program that includes education goals based on stormwater issues of significance within the MS4 area. The ultimate objective of a public education program is to increase knowledge and change behavior of the public so that pollutants in stormwater are reduced.

The minimum requirements specified in section 2.3.2 of the Permit are as follows:

1. Distribute at a minimum two (2) educational messages over the five (5) year Permit term to each of the following audiences: (1) residents, (2) businesses, institutions (churches, hospitals), and commercial facilities, (3) developers (construction), and (4) industrial facilities. Message shall focus on topics most relevant to the community.
2. Document in each annual report the message for each audience, method of distribution, the measures/methods used to assess the effectiveness of the messages, and the method/measures used to assess the overall effectiveness of the education program.
3. Comply with enhanced requirements related to approved TMDL for bacteria and pathogens which include:
    - Supplementing residential education program with an annual message encouraging proper management of pet waste.

- Distributing education materials to dog owners at the time of licensing.
- Providing information to owners of septic systems about proper maintenance.

In Hull, this includes Weir River (MA74-11), Hull Bay (MA70-09), Boston Harbor (MA70-01), and Hingham Bay (MA70-07).

Best Management Practices and Measurable Goals

BMP-1.1. Educate Residents I

Distribute first education message targeted to residents within the Town's MS4 area.

Media/Location:	Press release, social media post, website and/or brochure
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distributed message to all residents within the Town's MS4 area. • Recorded number of hard copies distributed, locations posted, attendance, webpage hits, etc. as applicable. • Completed within 1 years of effective date of Permit.

BMP-1.2. Educate Businesses, Institutions, and Commercial Facilities I

Distribute first education message targeted to business, institution, and commercial facility property owners within the Town's MS4 area.

Media/Location:	Press release, social media post, website and/or brochure
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distribute message to all business, institution, and commercial facility property owners within the Town's MS4 area. • Record number of hard copies distributed, locations posted, attendance, webpage hits, etc. as applicable. • Complete within 4 years of effective date of Permit.

BMP-1.3. Educate Developers and Contractors I

Distribute first education message targeted to developers and contractors within the Town's MS4 area.

Media/Location:	Press release, social media post, website and/or brochure
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distributed message to all developers and contractors with active projects within the Town's MS4 area. • Recorded number of hard copies distributed, locations posted, attendance, webpage hits, etc. as applicable. • Completed within 2 years of effective date of Permit.

BMP-1.4. Educate Industrial Facility Owners I

Distribute first education message targeted to industrial property owners within the Town's MS4 area.

Media/Location:	Press release, social media post, website and/or brochure
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distribute message to all industrial property owners within the Town's MS4 area. • Record number of hard copies distributed, locations posted, attendance, webpage hits, etc. as applicable. • Complete within 4 years of effective date of Permit.

BMP-1.5. Educate Residents II

Distribute second education message targeted to residents within the Town's MS4 area.

Media/Location:	Press release, social media post, website and/or brochure
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distributed message to all residents within the Town's MS4 area. • Recorded number of hard copies distributed, locations posted, attendance, webpage hits, etc. as applicable. • Completed within 2 years of effective date of Permit.

BMP-1.6. Educate Businesses, Institutions, and Commercial Facilities II

Distribute second education message targeted to business, institution, and commercial facility property owners within the Town's MS4 area.

Media/Location:	Press release, social media post, website and/or brochure
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distribute message to all business, institution, and commercial facility property owners within the Town's MS4 area. • Record number of hard copies distributed, locations posted, attendance, webpage hits, etc. as applicable. • Complete within 5 years of effective date of Permit.

BMP-1.7. Educate Developers and Contractors II

Distribute second education message targeted to developers and contractors within the Town's MS4 area.

Media/Location:	Press release, social media post, website and/or brochure
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distribute message to all developers and contractors with active projects within the Town's MS4 area. • Record number of hard copies distributed, locations posted, attendance, webpage hits, etc. as applicable. • Complete within 5 years of effective date of Permit.

BMP-1.8. Educate Industrial Facility Owners II

Distribute second education message targeted to industrial property owners within the Town's MS4 area.

Media/Location:	Press release, social media post, website and/or brochure
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distribute message to all industrial property owners within the Town's MS4 area. • Record number of hard copies distributed, locations posted, attendance, webpage hits, etc. as applicable. • Complete within 5 years of effective date of Permit.

Appendix H of the Permit requires implementation of the following BMPs due to Bacteria and Pathogen WQLW Requirements:

BMP-1.9. Educate Residents Annually on Proper Management of Pet Waste with Dog License Applications

Distribute annual education message targeted to pet owners in watershed areas with bacteria/pathogens TMDL or impairments.

Media/Location:	Brochures or pamphlets distributed with dog license
Responsible Party:	Town Clerk & SWMP Team
Measurable Goal(s):	• Distributed message to all residents when they (re)apply for a dog license. • Recorded number of hard copies distributed, and locations posted. • Complete annually.

BMP-1.10. Educate Residents Annually on Proper Management of Septic Systems
Distribute annual education message targeted to septic system owners in watershed areas with bacteria/pathogens TMDL or impairments.

Media/Location:	Brochures or pamphlets by mail and/or posted to website
Responsible Party:	SWMP Team with NSRWA WaterSmart Regional Program
Measurable Goal(s):	• Distributed message to all residents who have septic systems. • Recorded number of hard copies distributed, and locations posted. • Complete annually.

7.2 PUBLIC INVOLVEMENT AND PARTICIPATION (MCM 2)

The Town Director of Public Works is responsible for ensuring the implementation of proposed BMPs including measurable goals and reporting. Assisting departments for particular BMPs are listed below.

Reporting forms and logs to document public involvement and participation efforts can be found in Appendix B. Web Links and locations for specific BMPs identified below are listed in the Executive Summary and annual reporting requirements are described in Section 10.

Objective and Requirements

The main objective of this control measure is for the Town to provide opportunities to engage the public to participate in the review and implementation of the Town's Stormwater Management Program (SWMP).

The minimum requirements specified in section 2.3.3 of the Permit are as follows:

1. Public involvement activities shall comply with state notice requirements (MGL Chapter 30A, Section 18-25 effective 7/10/2010). The SWMP and all annual reports shall be available to the public.
2. Annually provide the public an opportunity to participate in the review and implementation of the SWMP. Public participation opportunities may include, but are not limited to, websites; hotlines; clean-up teams; monitoring teams; or an advisory committee.
3. Report on the activities undertaken to provide public participation opportunities including compliance with state public notice requirements referenced above.

Best Management Practices and Measurable Goals

BMP-2.1. Public Review of Stormwater Management Program
Make SWMP available to review by Town residents.

Media/Location:	Website & DPW Office
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Provided opportunity for residents to view the SWMP online and provide public access to the printed document. • Record website hits and requests to view printed document. • Update posted plan annually.

BMP-2.2. Public Participation and Comment of Stormwater Management Program
Record and review comments received by residents upon review of SWMP.

Media/Location:	Website & DPW Office
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Keep a log of comments for review and consideration when annually updating the SWMP. • Include comment log in the annual report.

BMP-2.3. Public Participation Activities
Public participation activities may include meetings, cleanup teams, monitoring teams, hazmat drop off events, watershed organization events, hotlines, or an advisory committee.

Media/Location:	Website, Town Hall, DPW Office and at Hull Public Library
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Advertise at least one activity per year. • Record method of advertising. Record the number of attendees and/or quantity of cleanup achieved. • Record compliance with state public notice requirements where applicable.

7.3 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM (MCM 3)

The Department of Public Works is responsible for ensuring the implementation of proposed BMPs including measurable goals and reporting. Assisting departments for particular BMPs are listed below.

Reporting forms and logs to document IDDE efforts can be found in Appendix B and are expanded on in SWMP Volume 2. Requirements and documentation measures for specific BMPs are identified below and annual reporting requirements are described in Section 10.

Objective and Requirements

The main objective of this control measure is to systematically find and eliminate illicit sources of non-stormwater discharge to its municipal storm sewer system and implement procedures to prevent such discharges.

The minimum requirements specified in section 2.3.4 of the Permit are as follows:

1. Develop and implement a regulatory mechanism to provide adequate legal authority to the Town to implement and enforce the Illicit Discharge Detection and Elimination (IDDE) Program.
2. Develop an SSO inventory covering the previous five (5) years within one (1) year of the effective date of the Permit.
3. Update storm sewer system map for Phase I mapping requirements within two (2) years of the effective date of the Permit, annually update the mapping as new information is discovered, and develop a system wide storm sewer system map for Phase II mapping requirements within ten (10) years of Permit effective date.
4. Develop an IDDE Program within one (1) year of the effective date of the Permit.
5. Develop an initial inventory and a priority ranking of outfalls/interconnections within one (1) year of the effective date of the Permit and update annually.
6. Develop a catchment investigation program within 18 months of the effective date of the Permit and implement according to the IDDE program.
7. Record and report in each annual report about the IDDE program progress and overall effectiveness.
8. Ongoing screening plan of outfalls once every five years.
9. Provide training to employees involved in the IDDE program annually. The training frequency and type shall be reported in the annual report.
10. Comply with enhanced requirements as specified in the appendix H of the Permit regarding Impaired Waters requirements as follows:
    - Automatic designation of either “Problem Catchment” or “High Priority” in the implementation of the IDDE program for catchments discharging to waters where illicit discharges have potential to contain pollutant identified as the cause of the water quality impairment.

    In Hull, this includes Weir River (MA74-11), Hull Bay (MA70-09), Boston Harbor (MA70-01), and Hingham Bay (MA70-07).

Best Management Practices and Measurable Goals

BMP-3.1. IDDE Legal Authority

An IDDE Legal Authority must be adopted with the authorized enforcement agency identified.

Media/Location:	Bylaw and Regulations on Website
Responsible Party:	SWMP Team
Measurable Goal(s):	• Regulation adopted June 23, 2021 by the Board of Selectmen

BMP-3.2. Sanitary Sewer Overflow (SSO) Inventory

Develop and maintain an SSO inventory that covers the previous five years in accordance of Permit conditions.

Media/Location:	The inventory is included as Appendix G of the SWMP Volume 2: IDDE Plan.
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Inventory completed (by Year 1). • In the event of an overflow or bypass, provide notification with 24 hrs to MassDEP & EPA followed by a written report within 5 calendar days. • Update annually if becomes applicable.

BMP-3.3. Storm Sewer System Map

Update storm sewer system map in accordance with Permit mapping requirements.

Media/Location:	The map is included as Appendix A of the SWMP Volume 2: IDDE Plan.
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Updated map within 3 years of effective date of Permit for Phase 1 mapping. • Update annually as new/corrected information is discovered. • Complete full system map (Phase 2) within 10 years of effective date of Permit

BMP-3.4. Written IDDE program

Develop/update written IDDE program.

Media/Location:	SWMP Volume 2: IDDE Plan. Website & DPW Office
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Written program completed (by year 1). • Update as required.

BMP-3.5. Implement IDDE Program

Implement catchment investigations according to IDDE program and Permit conditions and based on the outfall/interconnection inventory, initial ranking and dry weather outfall and interconnection screening and sampling results.

Media/Location:	SWMP Volume 2: IDDE Plan. Website & DPW Office
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Conduct 100% of catchment investigations for "Problem" outfalls within 7 years of effective date of Permit • Conduct 100% of catchment investigations for all outfalls within 10 years of effective date of Permit. • Report results and progress in annual report.

BMP-3.6. Employee Training

Provide annual training on IDDE implementation in accordance with IDDE program.

Media/Location:	SWMP Volume 2: IDDE Plan. Website & DPW Office
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Conduct annual IDDE training (Year 1 Complete; Year 2 COVID-19 postponement). • Provide record of training and attendance in annual report.

BMP-3.7. Dry Weather Screening and Sampling

Conduct dry outfall screening and sampling of outfalls/interconnections in MS4 area in accordance IDDE program

Media/Location:	SWMP Volume 2: IDDE Plan. Website & DPW Office
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Completed dry outfall screening and sampling within 3 years of effective date of Permit. • Reported results and progress in annual report.

BMP-3.8. Wet Weather Sampling of Outfalls

Conduct wet weather outfall sampling in accordance with IDDE program. This sampling can be done upon completion of any dry weather investigation but must be completed before the catchment investigation is marked as complete.

Media/Location:	SWMP Volume 2: IDDE Plan. Website & DPW Office
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Complete wet weather outfall sampling of "Problem" outfalls within 7 years of effective date of Permit • Complete wet weather outfall sampling of all outfalls within 10 years of effective date of Permit. • Report results and progress in annual report.

BMP-3.9. Ongoing Screening

Conduct ongoing dry weather and wet weather screening and sampling (as necessary) of outfalls in accordance with IDDE program.

Media/Location:	SWMP Volume 2: IDDE Plan. Website & DPW Office
Responsible Party:	Director of Public Works
Measurable Goal(s):	• Complete ongoing outfall screening within 5 years of completing catchment investigations. • Report results and progress in annual report.

7.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL (MCM 4)

The Conservation Commission is responsible for ensuring the implementation of proposed BMPs and measurable goals. Assisting departments for particular BMPs are listed below.

Regulations, requirements and guidance on construction site stormwater runoff control can be found on the Town's Website and at the Conservation Commission Office. Web Links and locations for specific BMPs identified below are listed in the Executive Summary.

Reporting forms and logs to document these efforts can be found in Appendix B. Reporting measures for specific BMPs are identified below and reporting requirements are described in Section 10.

Objective and Requirements

The objective of this construction stormwater runoff control program is to minimize or eliminate erosion and maintain sediments on site so that it is not transported in stormwater and allowed to discharge to a water of the U.S through the Town's MS4.

The minimum Permit requirements in accordance with MS4-2016 section 2.3.5 are as follows:

1. Implement and enforce a program to reduce pollutants in stormwater runoff discharge to the MS4 from all construction activities that result in land disturbance greater than or equal to one acre within regulated area.
2. Develop and implement a construction site runoff control program with written procedures and a regulatory mechanism for site plan review and enforcement within one (1) year from effective date of the Permit. Program must include the following elements for sediment and erosion control:
    a. Regulatory mechanism that requires the use of sediment and erosion control practices at construction sites including controls for other wastes on construction sites
    b. Written procedures for site inspection and enforcement
    c. Sediment and erosion control requirements for construction site operators performing land disturbance activities
    d. Requirements to control waste from construction sites
    e. Written procedures for site plan review and inspection and enforcement

Best Management Practices and Measurable Goals

BMP-4.1. Sediment and Erosion Control Regulation
Bylaws/regulations are necessary to meet Permit requirements for sediment and erosion control practices

Media/Location:	Bylaw on Website
Responsible Party:	Conservation Commission
Measurable Goal(s):	• Regulation Update (June 23, 2021) • Implement for 100% of applicable projects

BMP-4.2. Site Inspections and Enforcement of Erosion and Sediment Control Measures.
Provide/update written requirements for site inspections and enforcement procedures.

Media/Location:	SWMP Volume 1: Appendix B. Website & DPW Office
Responsible Party:	Conservation Commission
Measurable Goal(s):	• Written procedures completed (by Year 1) • Implemented for 100% of applicable projects. • Conducted construction site inspections consistent with the written procedures. Keep records of inspections.

BMP-4.3. Site Plan Review
Provide/update written procedures for site plan review and begin implementation.

Media/Location:	SWMP Volume 1: Appendix B. Website & DPW Office
Responsible Party:	Conservation Commission
Measurable Goal(s):	• Written procedures completed (by Year 1) • Implemented for 100% of applicable projects. • Keep records of projects submitted for site plan review.

BMP-4.4. Construction Site Operators Erosion and Sediment Control Program
Provide/update written requirements for construction operators to implement a sediment and erosion control program.

Media/Location:	SWMP Volume 1: Appendix B. Website & DPW Office
Responsible Party:	Conservation Commission
Measurable Goal(s):	• Written procedures completed (by Year 1) • Implemented for 100% of applicable projects. • During construction site inspections review for erosion controls and make note of compliance status. Keep records of inspections.

BMP-4.5. Construction Waste Control

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

Media/Location:	SWMP Volume 1: Appendix B. Website & DPW Office
Responsible Party:	Conservation Commission
Measurable Goal(s):	• Written procedures completed (by Year 1) • Implemented for 100% of applicable projects. • During construction site inspections review for waste control and make note of compliance status. Keep records of inspections.

7.5 Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management) (MCM 5)

The Conservation Commission is responsible for ensuring the implementation of proposed BMPs and measurable goals. Assisting departments for particular BMPs are listed below.

Regulations, requirements, and guidance on post construction stormwater management can be found on the Town's website & Conservation Commission office. Web Links and locations for specific BMPs are listed in the executive summary of this document.

Reporting forms and logs to document these efforts can be found in Appendix B. Reporting measures for specific BMPs are identified below and reporting requirements are described in Section 10. As part of the MS4 Permit Year 4 requirements, an assessment of current regulations for the Town of Hull was completed and is provided in Appendix D.

Objective and Requirements

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.

The minimum Permit requirements in accordance with MS4-2016 section 2.3.6 are as follows:

1. Develop, implement, and enforce a program to address post-construction stormwater runoff from all new development and redevelopment sites that disturb one or more acres and discharge into the permittees MS4 at a minimum.
    - Update Permit requirement and regulations to require for development projects the use of LID techniques to the maximum extent feasible
    - Develop/update Permit requirements and stormwater regulations to meet new development and redevelopment design requirements of Permit
    - Update Permit requirement and regulations to require submission of as-built drawings and ensure long term operation and maintenance will be a part of the SWMP
2. Develop a report assessing current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover within four (4) years from effective date of the Permit.
3. Develop a report assessing existing local regulation to determine if green infrastructures are allowable when appropriate site conditions exist. This report shall be completed within four (4) years from the effective date of the Permit.
4. Identify within four (4) years from the effective date of the Permit a minimum of 5 permittee-owned properties that could potentially be modify or retrofitted with BMPs.

Best Management Practices and Measurable Goals

BMP-5.1. Low Impact Development (LID) Techniques
Update Permit requirement and regulations to require for development projects the use of LID techniques to the maximum extent feasible.

Media/Location:	Bylaw and Regulations on Website
Responsible Party:	Conservation Commission
Measurable Goal(s):	• Complete within 4 years of the effective date of Permit. • Implement for 100% of applicable projects. • Keep records of development projects approved with LIDs.

BMP-5.2. New Development and Redevelopment (Post-Construction) Design Regulations
Develop/update Permit requirements and stormwater regulations to meet new development and redevelopment design requirements of Permit

Media/Location:	Bylaw and Regulations on Website
Responsible Party:	Conservation Commission
Measurable Goal(s):	• Completed within 3 years of the effective date of Permit. • Implement for 100% of applicable projects. • Keep records of development projects approved to meet regulations.

BMP-5.3. As-Built Plans
Update Permit requirement and regulations to require submission of as-built drawings and ensure long term operation and maintenance will be a part of the SWMP

Media/Location:	Bylaw and Regulations on Website
Responsible Party:	Conservation Commission
Measurable Goal(s):	• Completed within 2 years of the effective date of Permit. • Implemented for 100% of applicable projects. • Keep records of projects requiring and fulfilling as-built and O&M requirements.

BMP-5.4. Street Design and Parking Lot Guidelines Report

Develop a report assessing requirements that affect the creation of impervious cover. The assessment will help determine if changes to design standards for streets and parking lots can be modified to support low impact design options.

Media/Location:	Website & DPW Office
Responsible Party:	DPW and Conservation Commission
Measurable Goal(s):	• Complete within 4 years of the effective date of Permit. • Implement recommendations of the report. • Report progress of implementation annually.

BMP-5.5. Green Infrastructure Report

Develop a report assessing local regulations to determine feasibility of allowing green roofs, raingardens, water harvesting and other similar practices.

Media/Location:	Website & DPW Office
Responsible Party:	DPW and Conservation Commission
Measurable Goal(s):	• Complete within 4 years of the effective date of Permit. • Implement recommendations of the report. • Report progress of implementation annually.

BMP-5.6. List of 5 properties to Provide (effective) Reduction of Impervious area

Identify and maintain a list of at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually

Media/Location:	Department of Public Works
Responsible Party:	DPW
Measurable Goal(s):	• Complete within 4 years of the effective date of Permit. • Update as needed and report annually on retrofitted properties.

7.6 Good Housekeeping and Pollution Prevention for Permittee Owned Operations (MCM 6)

The Department of Public Works is responsible for ensuring the implementation of proposed BMPs and measurable goals. Assisting departments for particular BMPs are listed below.

Reporting forms and logs to document these efforts can be found in Appendix B and are to be expanded upon in SWMP Volume 3. Reporting measures for specific BMPs are identified below and reporting requirements are described in Section 10. As part of the Nutrient Source Identification Report (NSIR) completed for MS4 Permit Year 4, BMP retrofit locations were developed. A table of these findings is included in Appendix H – BMP Retrofit Matrix of SWMP Volume 3.

Objective and Requirements

The Town will 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 Town-owned operations.

The minimum Permit requirements in accordance with MS4-2016 section 2.3.7 are as follows:

1. Develop an Operations and Maintenance (O&M) Program for Town-owned facilities within three (3) years from effective date of the Permit.
2. Inventory of all Town owned facilities within three (3) years from the effective date of the Permit.
3. Develop an Infrastructure Operations and Maintenance Program within three (3) years from the effective date of the Permit.
4. Optimize routine inspections, cleaning and maintenance of catch basins.
5. Establish and implement procedures for sweeping and/or cleaning streets and Town-owned parking lots.
6. Ensure proper storage of catch basins cleanings and street sweepings prior to disposal.
7. Establish and implement procedures for winter road maintenance.
8. Establish and implement inspections and maintenance of stormwater treatment structures.
9. Develop Stormwater Pollution Prevention Plans (SWPPPs) for Town-owned or -operated facilities within two (2) years from effective date of the Permit.

Best Management Practices and Measurable Goals

BMP-6.1. Parks and Open Space Operations and Maintenance Procedures
Create written O&M procedures including all requirements of the Permit for Town owned parks and open spaces.

Media/Location:	SWMP Volume 3: O&M Plan. DPW Office
Responsible Party:	Department of Public Works
Measurable Goal(s):	• Completed within 3 years of effective date of Permit. • Implement on 100% of Town owned parks and open spaces. • Keep records of O&M performed and report annually.

BMP-6.2. Buildings and Facilities Operations and Maintenance Procedures
Create written O&M procedures including all requirements of the Permit for Town owned buildings and facilities.

Media/Location:	SWMP Volume 3: O&M Plan. DPW Office
Responsible Parties:	Department of Public Works with assistance from Schools & Facilities
Measurable Goal(s):	• Completed within 3 years of effective date of Permit. • Implement on 100% of Town owned buildings and facilities. • Keep records of O&M performed and report annually.

BMP-6.3. Vehicles and Equipment Operations and Maintenance Procedures
Create written O&M procedures including all requirements of the Permit for Town owned vehicles and equipment.

Media/Location:	SWMP Volume 3: O&M Plan. DPW Office
Responsible Parties:	Department of Public Works, Police, Fire
Measurable Goal(s):	• Completed within 3 years of effective date of Permit. • Implement on 100% of Town owned vehicles and equipment. • Keep records of O&M performed and report annually.

BMP-6.4. Inventory all Permittee-Owned Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment

Create an inventory of Town owned parks and open spaces, buildings and facilities, and vehicles and equipment facilities for implementation of O&M Plan.

Media/Location:	SWMP Volume 3: O&M Plan. DPW Office
Responsible Parties:	Department of Public Works
Measurable Goal(s):	• Completed within 3 years of effective date of Permit. • Update inventory annually.

BMP-6.5. Municipal Infrastructure Operation and Maintenance Program

Develop and implement program to ensure proper function of the MS4 stormwater infrastructure.

Media/Location:	SWMP Volume 3: O&M Plan. DPW Office
Responsible Party:	Department of Public Works
Measurable Goal(s):	• Completed within 3 years of effective date of Permit. • Implement so that 100% of infrastructure is maintained and functioning properly. • Keep records of O&M performed and report annually.

BMP-6.6. Catch Basin Cleaning Program

Develop written program for catch basin cleaning with a goal that each catch basin is no more than 50% full at any given time.

Media/Location:	SWMP Volume 1: Appendix B. Website & DPW Office
Responsible Party:	Department of Public Works
Measurable Goal(s):	• Written program completed (by Year 1). • Cleaned catch basins on established schedule. • Reported number of catch basins cleaned, and volume of material moved annually.

BMP-6.7. Street Sweeping Program

Develop and implement a street sweeping program so that all streets and municipal parking lots are swept in accordance with Permit conditions.

Media/Location:	SWMP Volume 1: Appendix B. Website & DPW Office
Responsible Party:	Department of Public Works
Measurable Goal(s):	• Written program completed (by Year 1). • Annually swept all streets and municipal parking lots in accordance with established schedule. • Keep records of sweeping and report annually.

BMP-6.8. Winter Road Maintenance Program

Develop and implement a program to manage storage and use of road salt.

Media/Location:	SWMP Volume 1: Appendix B. Website & DPW Office
Responsible Party:	Department of Public Works
Measurable Goal(s):	• Written program completed (by Year 1). • Implement program as necessary. • Evaluate at least one salt/chloride alternative

BMP-6.9. Stormwater Treatment Structures Inspections and Maintenance Procedures

Develop and implement inspection and maintenance procedures and frequencies for Town-owner stormwater BMPs (excluding catch basins).

Media/Location:	SWMP Volume 1: Appendix B. Website & DPW Office
Responsible Party:	Department of Public Works
Measurable Goal(s):	• Written procedures completed (by Year 1). • Inspected and maintained 100% of BMPs treatment structures at least annually. • Keep records of inspection and maintenance performed and report annually.

BMP-6.10. Stormwater pollution prevention plan (SWPPP)

Develop and implement SWPPPs for facility maintenance garages, transfer stations, and other waste-handling facilities.

Media/Location:	SWMP Volume 3: O&M Plan. DPW Office
Responsible Party:	Department of Public Works
Measurable Goal(s):	• Developed and implemented SWPPPs within 2 years of effective date of Permit. • Keep records of inspection and maintenance performed and report as required in the SWPPPs.

8.0 Sanitary Sewer Overflows Inventory

The Town has identified and inventoried all known locations where SSOs have discharged to the MS4 within the previous five (5) years. This inventory is provided and maintained as part of SWMP Volume 2: IDDE Plan.

9.0 Surface Drinking Water Supply Sources

Section 3.0 of the Permit addresses requirements for MS4 systems that discharge to public surface drinking water supply sources (Class A and Class B surface waters used for drinking water) or their tributaries. According to 314 CMR 4.00, Massachusetts Surface Water Quality Standards, 4.05: Classes and Criteria and 4.06: Basin Classification and Maps, Hull does not include any watershed tributary to reservoirs or surface waters which are drinking water supplies.

10.0 Annual Program Evaluation

Program evaluation, record keeping, and reporting are required annually to document what the Town has done during the previous reporting period, judge compliance with Permit provisions, and to verify that efforts are resulting in an improvement to the stormwater, and ultimately the receiving water's quality.

The Town is required to submit annual reports each year of the Permit term. The reporting period is a one-year period commencing on the Permit effective date (July 1, 2018) and each anniversary thereafter. The exception is that the first annual report will also include the period from May 1, 2018 to June 30, 2019. Annual reports are due ninety days from the close of the reporting period (September 30). The annual reports will review compliance with the Permit terms and conditions including assessment of selected BMPs, status and progress assessment of planned activities, description of IDDE and O&M program activities, evaluation of construction and post construction stormwater management, and the method/measures used to assess the overall effectiveness of the education program. Description of activities for the next reporting cycle and any changes in identified BMPs or measurable goals will be included. The following data will be collected and reported by the Town using the reporting forms in Appendix B to support the ongoing efforts mandated by the Permit:

- Public education and outreach materials with dated distribution/attendance list(s)
- Public involvement and participation materials with dated distribution/attendance list(s)
- Data related to Implementation of the IDDE Program including:
  - SSO reporting forms and updated inventory table
  - Illicit discharge reporting forms and inventory table
  - Outfall screening and sampling data
  - Record of mapping updates
  - Inventory of catchment investigations, data collected, and illicit connections removed
  - Outfall and catchment ranking and assessment updates (Updated Matrix)
  - IDDE program training attendance log
- Inventory of construction runoff management including number of projects reviewed, inspected and enforcement actions
- Inventory of site plan review and BMP implementation for new/re-development projects
- O&M inspection and maintenance forms and logs including:
  - Catch basin cleaning and activities
  - Street sweeping and parking lot sweeping logs
  - MS4 infrastructure BMP inspection forms and logs
  - Town facilities inspection forms and logs
  - SWPPP inspection reports

EPA has developed an annual report template for MS4s which will populate information from the NOI and be in the form of an electronic fillable PDF. The Town plans to use this template and will review the annual report template to determine the best method for data management to be compatible.

APPENDIX A

- Environmental Overview Map

Town of Hull, Massachusetts

Environmental Overview Map

Map Legend

Stormwater Structures
- BMP
- Leaching Catch Basin
- Town Owned Catch Basin
- State Owned Catch Basin
- Town Owned Manhole
- State Owned Manhole
- Inlet

Conveyance
- Pipe
- Culvert
- Swale/Channel

Regulated Areas
- MA MS4 Urban Area

Outfall Categories
- Very High Priority
- High Priority
- Low Priority
- Non-MS4 Outfall

Interconnection Categories
- Very High Priority
- High Priority
- Low Priority

Historic Data
- Historic - Point
- Historic - Area

Conservation
- NHESP Certified Vernal Pools
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- DCR Owned Area

***MassDEP 2018/2020 Integrated List of Waters**
- Rivers: Category 4A
- Lakes, Estuaries: Category 4A
- Rivers: Category 4C
- Lakes, Estuaries: Category 4C
- Rivers: Category 5
- Lakes, Estuaries: Category 5

Hydrography
- Potential Hydrologic Connection
- Open Water
- Wetland
- Major Watershed Boundary

Roadway Owner
- State
- Town
- Other

Category 1: Attaining all designated uses.
Category 2: Attaining some of the designated uses and insufficient or no data and information is available to determine if the remaining uses are attained.
Category 3: Insufficient or no data and information to determine if any designated uses are attained.
Category 4A: Impaired for one or more designated uses but does not require the development of a TMDL: TMDL has been completed.
Category 4B: Impaired for one or more designated uses but does not require the development of a TMDL: Other pollution control requirements are reasonably expected to result in the attainment of designated uses.
Category 4C: Impaired for one or more designated uses but does not require the development of a TMDL: Impairment is not caused by a pollutant.
Category 5: Impaired for one or more designated uses, requires the development of a TMDL: Impairment is caused by a pollutant.

Data Source:
MassGIS
Town of Hull
Updated by BETA June 2022

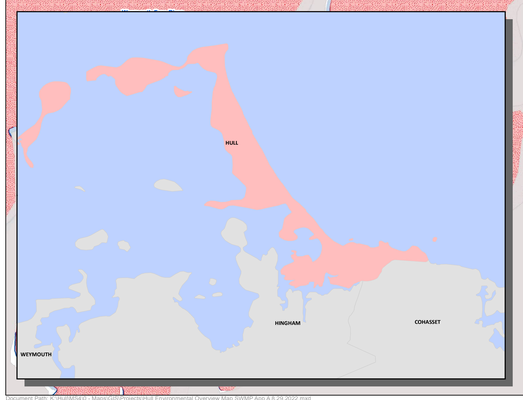
MASSACHUSETTS BAY

Boston Harbor
Hull Bay
Hingham Bay
Hingham Harbor
Weir River

Weir Watershed
South Coastal Watershed

HINGHAM
COHASSET

HARBOR VIEW ST
CHANNEL STREET
MAIN ST
ANDREW AVE
DUCK LN
SPRING ST
SPINNAKER ISLAND CAUSEWAY
NANTASKET AVE
POINT ALLERTON AVE
KENTON AVE
TIERNEY AVE
PITCAIRN TERRACE
BRADFORD AVE
Y ST
U ST
CADISH AVENUE
NANTASKET AVE
O STREET
L STREET
SUNSET AVE
F STREET
CENTRAL AVE
A STREET
BEACH AVE
MILFORD ST
PROSPECT AVENUE
MANOMET AVE
WARREN ST
PACKARD AVE
NANTASKET AVE
SAMOSET AVE
KENBERMA ST
BATES ST
REVERE ST
NANTASKET RD
THIRD ST
EDGEWATER RD
HULL SHORE DR
NANTASKET AVE
MASCONOMA RD
BAY ST
HAMPTON CIRCLE
WILBUR AVE
BURR ROAD
ATLANTIC AVENUE
PARK AVENUE
ROWLEY STREET
CHATHAM STREET
GEORGE WASHINGTON BOULEVARD
NANTASKET AVE (R 228)



Issue Date: June 2022

This Map is Intended for Planning Purposes Only

0 0.25 0.5 Miles

BETA
IMPROVING COMMUNITIES TOGETHER

APPENDIX B

- Reporting Forms

MCM 1: PUBLIC EDUCATION AND OUTREACH LOG

Reporting Period: _____ – _____

BMP #	Title/Description	Audience	Responsible Party	Method of Delivery	Date	Record of Measurable Goal*
1.9	Management of Pet Waste: Dog License	Residents	SWMP Team with NSRWA	Distributed with Dog Licenses		

*May include: # distributed, attendees, web page hits, social media likes, etc.

Note: See section 7.1 of SWMP for BMP reporting descriptions and requirements.

MCM 2: Public Involvement & Participation Log

Reporting Period: _____ – _____

Record of SWMP and Annual Report posting for Public Review

Date	Responsible Party	Public Notice Provided	Location of Posting	Record of Measurable Goal*

*May include: web page hits, requests to view printed document, # of comments received

Record of Public Comments

Date	Comment From	Received Via	Comment

Record of Public Participation Activities

Date	Responsible Party	Public Notice Provided	Activity	Record of Measurable Goal*

*May include: # of participants, attendees, and/or quantity of cleanup achieved

Note: See section 7.2 of SWMP for BMP reporting descriptions and requirements.

MCM 3: IDDE Program Reporting Summary Log

The Town has completed a written IDDE Plan which includes detailed reporting forms to document IDDE efforts. These can be found in Storm Water Management Plan Volume 2. The Town will keep a summary log for annual reporting as follows:

Reporting Period: _____ – _____

Employee Training

Date	# of Attendees	Location	Presenter	Topic/Discussion Items

SSO Inventory

Report #	Date	Reporter	Location	Status & Comments

Illicit Discharge Inventory

Report #	Date	Reporter	Location	Status & Comments

Storm Sewer Mapping Updates

Type	Date	Updated by	Location	Description

Outfall Screening and Sampling

Dry/Wet	Date(s)	Inspector	Location(s)	Comments

Catchment Investigations

Category	Date(s)	Inspector	Location	Description/Results

Note: See section 7.3 of SWMP for BMP reporting descriptions and requirements.

MCM 4: CONSTRUCTION SITE RUNOFF CONTROL - INSPECTION

The Town has a Stormwater Management Bylaw (Chapter 354) and permits through various Town Boards to address post-construction stormwater runoff. Inspections will be recorded using the Construction Site Inspection Form (attached). The Town will keep a log of all inspections and enforcement actions for annual reporting as follows:

CONSTRUCTION SITE INSPECTION LOG

Reporting Period: _____ – _____

Report #	Date	Inspector	Project/Location	Status & Comments

Note: See section 7.4 of SWMP for BMP reporting descriptions and requirements.

CONSTRUCTION SITE ENFORCEMENT ACTION LOG

Reporting Period: _____ – _____

Project/Location	Date	Action Taken	Status & Comments

Note: See section 7.4 of SWMP for BMP reporting descriptions and requirements.

Report No. _____

MCM 4: CONSTRUCTION SITE INSPECTION FORM

The Town has a Stormwater Management Bylaw (Chapter 354) and permits through various Town Boards to address post-construction stormwater runoff. Record all inspections using this form and provide an entry in site inspection log (and enforcement action log if applicable) for annual reporting.

Project:			Date:		Last Insp:	
Location:			Arrive:		Leave:	
Operator:			Site Rep:			
Inspector:						
Type	☐ Regular	☐ Pre-Storm	☐ During Storm		☐ Post Storm	
Recent Rainfall:			Current Weather:			
Description of Current Site Work:						
Add. Info:						

EROSION AND SEDIMENT CONTROL MAINTENANCE/ACTION REQUIRED: ☐ YES ☐ NO

(Inspect for all applicable controls listed – ECB = Erosion Control Barrier)

Control	Condition	Required Action	Completed (by)	Date
☐ SWPPP Report(s)			☐	
☐ Adjacent Street			☐	
☐ Const. Access Dr.			☐	
☐ Perimeter ECB			☐	
☐ Outside ECB			☐	
☐ Sediment Basin(s)			☐	
☐ CB Protection			☐	
☐ Stockpiles			☐	
☐ Exposed Soils			☐	
☐ Exposed Slopes			☐	
☐ Outlet(s)			☐	
☐ Receiving Waters			☐	
☐ Other			☐	

CONSTRUCTION WASTE CONTROL MAINTENANCE/ACTION REQUIRED: ☐ YES ☐ NO

(Inspect for all applicable controls listed)

Control	Condition	Required Action	Completed (by)	Date
☐ Trash/Litter			☐	
☐ Dumpsters			☐	
☐ Fueling Areas			☐	
☐ Sanitary Facilities			☐	
☐ Dewatering			☐	
☐ Haz Mat Storage			☐	

SITE PHOTOS

MCM 4: Construction Site Runoff Control - Stormwater Site Plan Review

The Town has a Stormwater Management Bylaw (Chapter 354) and permits through various Town Boards to address post-construction stormwater runoff. Site plans will be reviewed for compliance with the Ordinance and regulations based on the attached checklist. The Town will keep record of site plan reviews in each annual report as follows:

Site Plan Review Log

Reporting Period: ____________________ – ____________________

Project/Location	Filing Date	Reviewer	Requirements Met	Project Status
			☐ LIDs ☐ SW Design Regs ☐ As-built ☐ Long-term O&M	
Description/Comments:				
			☐ LIDs ☐ SW Design Regs ☐ As-built ☐ Long-term O&M	
Description/Comments:				
			☐ LIDs ☐ SW Design Regs ☐ As-built ☐ Long-term O&M	
Description/Comments:				
			☐ LIDs ☐ SW Design Regs ☐ As-built ☐ Long-term O&M	
Description/Comments:				
			☐ LIDs ☐ SW Design Regs ☐ As-built ☐ Long-term O&M	
Description/Comments:				
			☐ LIDs ☐ SW Design Regs ☐ As-built ☐ Long-term O&M	
Description/Comments:				

Note: See section 7.4 of SWMP for BMP reporting descriptions and requirements

STORMWATER SITE PLAN REVIEW CHECKLIST

SUBMISSION REQUIREMENTS LAND DISTURBANCE REVIEW

- ☐ Completed application form with original signature of all owners
- ☐ Narrative describing proposed work including existing site conditions, proposed work, and methods to mitigate stormwater impacts
- ☐ Payment of application and review fees
- ☐ One 24x36, one half size, and electronic PDF of plans including:
  - Existing features
  - Proposed work & limits of disturbance
  - Erosion & sediment controls
  - Illicit discharge compliance statement

SUBMISSION REQUIREMENTS LAND DISTURBANCE PERMIT OR HIGHER POTENTIAL POLLUTANT LOAD

- ☐ Complete application with owners signature
- ☐ List of Abutters within 300' certified by the Assessor's Office
- ☐ Narrative describing proposed work including existing site conditions, proposed work, and methods to mitigate stormwater impacts
- ☐ Generic legal ad (in Word format) soliciting public comments with instructions
- ☐ Payment of application and review fees
- ☐ One (1) copy of each application form and the list of abutters filed with the Town Clerk
- ☐ One 24x36, one half size, and electronic PDF of:
  - Existing features
  - Proposed work & limits of disturbance
  - Stormwater Management Plan
  - Erosion & sediment control plan (3 copies)
  - Operation & maintenance plan
  - Illicit discharge compliance statement

STORMWATER MANAGEMENT PLAN

- ☐ MassDEP Stormwater checklist with supporting calculations meeting standards
- ☐ Stamped and Signed by MA P.E.
- ☐ Identify TMDLs/ Impairments
- ☐ Soil mapping and test data
- ☐ Existing & proposed uses and conditions
- ☐ Wetland resources/proposed impervious area/aquifer protection zones/earthwork within 4' of seasonal high groundwater
- ☐ Drain pipes/catch basins/easements
- ☐ LID/BMP techniques
- ☐ No adverse downgradient impacts

EROSION & SEDIMENT CONTROL PLAN

- ☐ Minimize/phase clearing
- ☐ Perimeter barrier controls
- ☐ Slope controls as necessary
- ☐ Stone construction entrance
- ☐ Stockpile areas
- ☐ Protection of infiltration basins/systems
- ☐ Catch basin protection
- ☐ List of easements
- ☐ SWPPP if > 1 acres

OPERATION & MAINTENANCE PLAN

- ☐ Follows MassDEP Stormwater checklist & standard

PERFORMANCE & DESIGN STANDARDS

- ☐ 1" (.8" Redevelopment) runoff retained and/or;
- ☐ 90% (80% Redevelopment) TSS removal
- ☐ 60% (50% Redevelopment) Phosphorus removal
- ☐ Offsite Mitigation (if necessary)
- ☐ Hydraulic calculations TR-55 and TR-20
- ☐ 24 hour rainfall from NRCS
- ☐ Drain pipes to accommodate 25 year storm
- ☐ Pipe velocities 3-10 ft/sec
- ☐ Culverts 50-year storm
- ☐ Deep sump/offline catch basins
- ☐ Stormwater basins to accommodate 100 year storm w/ 1' freeboard
- ☐ Swale velocities < 5fps
- ☐ Access for maintenance
- ☐ Minimize area of disturbance

MCM 6: GOOD HOUSEKEEPING - CATCH BASIN CLEANING

Purpose

The purpose of this this procedure to optimize routine inspections, cleaning and maintenance of catch basins with a goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50 percent full.

According to the Permit an excessive sediment or debris loading is a catch basin sump more than 50 percent full. A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.

Procedure:

As part of routine inspections/cleaning events, debris levels in catch basins will be recorded if the basin is found to be more than 50% full– See tracking form on page 2.

Records from consecutive inspections/cleaning events will be compared to identify basins that may need to be cleaned more or less frequently than once per year.

Inspection and maintenance for catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment) will be prioritized. Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.

If a catch basin sump is more than 50 percent full during two consecutive cleanings the Town will investigate the contributing drainage area for sources of excessive sediment loading and address the source or clean the catch basin more frequently. Actions taken will be described in the annual report.

In cases where a catch basin inspection or cleaning reveals abnormal, non-natural discoloration or detection of petroleum and/or chemical odors, the crew performing the inspection and cleaning shall notify supervisors for proper handling of hazardous materials and the Town should implement protocols outlined in their Illicit Discharge Detection & Elimination (IDDE) Plan.

The Town will ensure proper storage of catch basin cleanings prior to disposal or reuse such that they do not discharge to receiving waters. These materials should be managed in compliance with current MassDEP policies: http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html

Record Keeping

The Town keeps records of catch basin cleaning performed and report annually as follows:

CATCH BASIN CLEANING LOG

Reporting Period: _____ – _____

Date Range	Location(s)	# CBs Cleaned	Volume of Cleaning

RECORD OF CATCH BASINS FOUND TO BE MORE THAN 50% FULL AT CLEANING

Reporting Period: _____ – _____

Inspector: _____ Sheet _____of _____

CB ID	Date	Address	Location Description

MCM 6: GOOD HOUSEKEEPING - STREET AND PARKING LOT SWEEPING

Purpose

The purpose of this procedure is to ensure that all municipal streets and parking lots are swept in accordance with Permit conditions.

Procedure

All streets with the exception of rural uncurbed roads with no catch basins or high speed limited access highways shall be swept and/or cleaned a minimum of once per year in the spring (following winter activities such as sanding). Sweeping frequency is to be increased as necessary to target areas with potential for high pollutant loads for solids, oil and grease, and metals.

The Town of Hull does not have nutrient-impaired waters and therefore is required to sweep all municipal streets and lots the minimum once per year in the spring (following winter activities such as sanding).

The Town will ensure proper storage of street sweepings prior to disposal or reuse such that they do not discharge to receiving waters. These materials should be managed in compliance with current MassDEP policies: http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html

Record Keeping

The Town keeps records of sweeping performed and reports annually as follows:

Date Range	Area	Volume of Cleaning	# lots

MCM 6: Good Housekeeping - Winter Road Maintenance Procedure

Purpose

The purpose of this policy is to provide information to meet MS4 Permit requirements on the procedures followed by the Department of Public Works (DPW) during any snow or ice event throughout the winter season on approximately 55 miles of Town owned roads. The DPW reserves the right to modify any plan as needed to adjust to various circumstances that a storm might present and provides detailed winter road maintenance and snowstorm procedures on their website. The DPW Director will be responsible for carrying out this policy to satisfy the Permit. Parking during snow removal shall comply with Town By-Laws and as referenced on the Snow and Ice Policy on the DPW website.

Priorities

1. The first priority is to ensure that police, fire and medical emergency equipment can move safely on streets.
2. The second priority is to open main and secondary roads for use by the public.
3. The third priority is to open residential streets.
4. The fourth priority is to open all schools, public facilities, and clear sidewalks used to walk to schools/businesses/public transportation.

Materials Used

With safety as the priority, the Town's goal is to minimize the use of salt and sand through optimization of application. This is achieved through the use, where practicable, of automated application equipment, anti-icing and pre-wetting techniques, implementation of pavement management systems, and alternate chemicals. The types of materials used by the Department of Public Works are detailed below.

- Rock Salt (Sodium Chloride): Salt is used to expedite the melting of snow and ice from the street surface and also to keep the ice from forming a bond to the street surface.
- Sand: Sand is used as an abrasive for traction on slick roadways.
- Other Materials: The Town may choose to use alternative chloride-containing materials used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

Materials Storage

All salt, sand and deicing compounds are properly stored under cover to ensure they are not exposed to precipitation or otherwise carried to a catch basin, resource area or waterbodies. Diversion berms and good housekeeping practices shall be used to minimize runoff from storage areas.

Application and Equipment Calibration

Each piece of application equipment owned by the Town is calibrated prior to the winter season. Salt application shall be calibrated to dispense at minimum rates while maintaining safety rates (EPA guidance recommends 200 pounds per mile lane). Trucks equipped with pre-wetting brine tanks are calibrated to dispense at minimum rates while maintaining safety rates (EPA guidance recommends 8 gallons of pre-wet liquid to 1 ton of salt, to be varied based on temperature).

Snow Disposal

The MS4 Permit prohibits snow disposal into waters of the United States. Snow disposal activities, including selection of appropriate snow disposal sites, will adhere to the Massachusetts Department of Environmental Protection Snow Disposal Guidance, Guideline No. BWR G2015-01 (Effective Date: December 21, 2015).

Record Keeping

The Town maintains records of prioritized plow routes, miles of roads plowed annually, the quantity of salt and other materials used annually, and equipment calibration records.

MCM 6: Good Housekeeping - Stormwater Treatment Structures Inspection & Maintenance

Purpose

The following establishes inspection and maintenance frequencies and actions for permittee-owned stormwater treatment structures (excluding catch basins) which shall be inspected annually at a minimum.

Procedure

BMP Description	Required Action
Water Quality Unit (Oil/Grit Separator)	Remove accumulated oils, grease and sediments
Proprietary Separator	Inspect and clean units according to manufacturers' recommendations
	Remove sediments & debris
Leaching Catch Basin	Remove sediments & debris
	Rehabilitate the basin if it fails due to clogging
Bio-retention Areas & Rain Garden	Remove sediments & debris
	Mow and/or mulch
	Replace vegetation if needed
	Remove Invasive species as needed
Extended Dry Detention Basin	Inspect outlets
	Mow upper stage, sides slopes, embankment & spillway
	Remove trash and debris
	Remove sediments from basin
Water Quality Swale	Make sure vegetation is adequate and slopes are not eroding, check for rilling and gullying, ponding and sedimentation
	Mow 3"-6"
	Remove sediments & debris
	Repair eroded areas if needed
	Re-seed as necessary
Infiltration Basin	Inspection for settlement, erosion, tree growth on embankments, condition of riprap and turf, ponding and sedimentation
	Mow the buffer area, side slopes, and basin bottom if grassed floor
	Inspect and clean pretreatment devices associated with the basin
	Remove sediments & debris
Infiltration Trench	Inspect the trench 24 hours or several days after a rain event
	Mow top of trench if is grassed
	Inspect and clean pretreatment BMPs, check inlets and outlets for clogging
	Remove sediments & debris
Infiltration Chamber	Inspect Inlets
	Remove sediment from pretreatment BMPs
	Remove sediments & debris
Porous Pavement	Vacuum sweep or Power wash surface

Record Keeping

Inspection and maintenance of municipal stormwater structures will be recorded using the Stormwater BMP Inspection Form (attached). The Town will keep a log of inspects and report on the condition and maintenance performed in each annual report as follows:

STORMWATER TREATMENT STRUCTURE (BMP) INSPECTION LOG

Reporting Period: _____ – _____

Report #	Date	Inspector	BMP/Location	Status & Comments

STORMWATER BMP INSPECTION FORM – SURFACE STRUCTURES

BMP ID:					
Location:		Length	**±ft.**	Depth	**±ft.**
Description:		Top Width	**±ft.**	Bot Width	**±ft.**
Type:	☐ **Detention**	☐ **Retention**	☐ **Infiltration**	☐ **Bioretention**	
	☐ **Swale**	☐ **Infiltration Trench**	☐ **Other**		
Inspector:			Date:		
Recent Rainfall:					
Notes:					

LOCATION MAP

MAINTENANCE REQUIRED: ☐ YES ☐ NO

(Inspect for all problems listed – provide information for required maintenance only)

Problem	Description	Quantity (±)	Completed (personnel)	Date
☐ Sediment/Debris			☐	
☐ Vegetation			☐	
☐ Erosion			☐	
☐ Water Pond			☐	
☐ Sediment Forebay			☐	
☐ Outlet Struct			☐	
☐ Inlet			☐	
☐ Outlet			☐	
☐ Riprap			☐	
☐ Check Dam			☐	
☐ Access			☐	
☐ Fence			☐	
☐ Other			☐	

BMP PHOTOS

STORMWATER BMP INSPECTION FORM – SUBSURFACE STRUCTURES

BMP ID:					
Location:		Cover/Grate size	**±ft.**	Cover/Grate shape	**±ft.**
Description:		Structure Diameter	**±ft.**	Depth	**±ft.**
		Structure Material			
Type:	☐ **Oil-Grit Separator**	☐ **Proprietary Structure**	☐ **Leaching CB**		
	☐ **Infiltration Chamber/Pipe**	☐ **Sand Filter**	☐ **Other**		
Inspector:			Date:		
Recent Rainfall:					
Add. Info:					

LOCATION MAP

MAINTENANCE REQUIRED: ☐ YES ☐ NO
(Inspect for all problems listed – provide information for required maintenance only)

Problem	Description	Quantity (±)	Completed (personnel)	Date
☐ Grate/Cover			☐	
☐ Structure			☐	
☐ Hood/Trap/Insert			☐	
☐ Pipes & Joints			☐	
☐ Ladder			☐	
☐ Sediment/Debris			☐	
☐ Vegetation/Roots			☐	
☐ Contaminants/Pollution			☐	
☐ Infiltration Capability			☐	
☐ Discharge			☐	
☐ Fence			☐	
☐ Access			☐	
☐ Other			☐	

BMP PHOTOS

APPENDIX C

- **Delegation of Authority Letter**

TOWN OF HULL
Town Manager's Office

253 Atlantic Avenue **781-925-2000**
Hull, Massachusetts 02045 **Fax: 781-925-0224**

June 21, 2021

MEMO TO FILE

Re: Documentation for delegation of "Authorized Representative" for NPDES 2016 Massachusetts Small Municipal Separate Storm Sewer System (MS4) General Permit

This document serves to affirm that Christopher Gardner, Director of the Department of Public Works has the responsibility for the operation of the MS4 Plan and is hereby designated as an authorized person for signing all reports including but not limited to the Stormwater Management Plan (SWMP), Stormwater Pollution Prevention Plans (SWPPPs), inspection reports, annual reports, monitoring reports, reports on training, and other information required by the General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts for the Town of Hull. This authorization cannot be used for signing a NPDES permit application (e.g., Notice of Intent (NOI)) in accordance with 40 CFR 122.22).

By signing this authorization, I confirm that I meet the following requirements to make such a designation as set forth in Part B.11 of Appendix B of the Small MS4 General Permit:

> *For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official.*

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

Philip E. Lemnios — June 21, 2021

Philip E. Lemnios
Town Manager

Date

APPENDIX D

- Assessment of Current Regulations

Hull, MA

ASSESSMENT OF CURRENT REGULATIONS

NPDES Phase II Small MS4 General Permit

June 2022

LID & GREEN INFRASTRUCTURE

BETA
315 Norwood Park South
2nd Floor
Norwood, Massachusetts 02062
781.255.1982
www.BETA-Inc.com

ASSESSMENT OF CURRENT REGULATIONS
Hull, MA
NPDES Phase II Small MS4 General Permit

LID & GREEN INFRASTRUCTURE

Prepared by: BETA GROUP, INC.
Prepared for: Town of Hull, Massachusetts

June 2022

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 INTRODUCTION

This assessment has been developed by the Town of Hull (the Town) to assess local requirements in relation to the creation of impervious cover and the feasibility allowing the use of low-impact-design (LID) and green infrastructure. This is done in accordance with the 2016 MS4 General Permit (the Permit) Stormwater Management in New Development and Redevelopment Section 2.3.6.b & c requirements and shall be part of the Town's Stormwater Management Plan (SWMP).

OBJECTIVE

The objective is to identify opportunities to revise municipal regulations to better support LID and green infrastructure options. As stated in the Mass Audubon tool, the key areas of analysis include:

1. Overall site design: Open Space Conservation Development (OSCD) vs. conventional subdivisions
2. Project design and layout standards in relation to LID: road layout and width, curbing, drainage, sidewalks, parking, landscaping
3. Maintenance and operations, mechanisms for enforcement: Who is responsible for maintaining drainage/LID (municipal or homeowner); easements, homeowner association option; municipal inspection and administration systems.

The following report sections summarize the current regulations and includes recommendations to update those regulations.

2.0 CURRENT REGULATIONS

The General Code for the Town is available to view here: https://ecode360.com/HU1183.

Regulations review as part of this task include:

- Chapter 410 Zoning Bylaws (2021)
- Chapter 530 Subdivision Regulations (2017)
- Chapter 354 Stormwater Management (2020)
- Stormwater Management Regulations DRAFT (2021)

3.0 REVIEW STANDARDS AND METHODOLOGY

The analysis compares the existing regulations to the state's recommended best practices within the Smart Growth/Smart Energy Toolkit. This was completed using the tool developed by Mass Audubon: Bylaw Review for LID & Climate Smart, Nature-Based Solutions. The Excel tool provides a structured evaluation of the existing town regulations in a "Conventional", "Better" and "Best Practice" format in relation to over 30 best practice considerations. The tool can be downloaded from the following webpage:

https://www.massaudubon.org/our-conservation-work/policy-advocacy/shaping-climate-resilient-communities/publications-community-resources/bylaw-review

The tool includes a description of the assessment standards as follows.

OPEN SPACE RESIDENTIAL DESIGN (OSRD) OVERVIEW

This section reviews how local bylaws for cluster, Open Space Residential Design (OSRD), or Natural Resource Protection Zoning (NRPZ) compared to the state's recommended best practices. Communities may currently have multiple bylaws that cover this in different residential areas, in which case they can each be compared to the model regulations. However, in most cases, we would encourage simplification and the use of a single OSRD bylaw with local priorities clearly defined.

Communities may also have no cluster, OSRD, or NRPZ bylaws on the books. In this case, the state's best practice model can be used to create one. If the community closely follows the model, they'll meet the characteristics described within the analysis. However, the analysis still provides a quick checklist.

Some of the most important aspects of OSRD in any community include: the four-step review process that carefully considers the natural landscape before drawing lot lines; the minimum amount of open space protected; the incorporation of LID practices; and allowing this type of development by right instead of special permit.

ZONING, SUBDIVISION, SITE PLAN REVIEW, AND STORMWATER OVERVIEW

This section reviews not only the individual bylaws and regulations, but also how they work together and how consistent they are. Communities often update portions of bylaws or regulations in a piecemeal way over decades, leading to inconsistencies among various provisions. This color-coded analysis provides a quick overview of not only which rules are out of date and not meeting best practices for LID and preservation of Green Infrastructure, but also how certain topics (such as siting of LID) may be inconsistent between different parts of land use rules.

Not all factors (such as road width, siting of LID, limits on clearing and grading, or allowing common drives) may be addressed in each of the sections considered (Zoning bylaws, Subdivision Rules and Regulations, Site Plan Review (SPR), and Stormwater/LID bylaw). Where that factor is not usually included within a regulation or bylaw, you'll notice that "(Not Applicable)" will appear in that box. For example, setbacks and frontage requirements are addressed under Zoning, but often not under other bylaws or regulations.

This review may also help towns identify best practices that comply with MS4 permit requirements, issued by EPA and Mass DEP, though it is not comprehensive in relation to the permit requirements and additional actions may be needed. Consultation with EPA and/or DEP is strongly recommended. Visit www.mass.gov/guides/municipal-compliance-fact-sheet-stormwater for more info.

The analysis is broken into five goals, each with factors that address the goal:

Goal 1: Protect Natural Resources and Open Space

The focus of this section is to limit clearing and grading and encourage soil management, the use of native species, and revegetation of disturbed areas. Often, communities have language such as "due regard shall be shown for natural features" without any specific limitations or guidelines that can be used by local boards to ensure developers are following the true intent of the community. The retention of natural vegetation and soils is the single most efficient means of reducing development impacts on water resources, avoiding costs associated with piping and other "grey" stormwater management features as well as the need for irrigation. There are also many other benefits – including habitat for birds and

pollinators, trees for shade and clean air, and protection of natural scenery that contributes to property values and a high quality of life.

Goal 2: Promote Efficient, Compact Development Patterns and Infill

Often, making dimensional requirements such as setbacks, lot size, and frontage more flexible as well as allowing common drives will help allow the community to encourage efficient, compact designs. These help to decrease the amount of impervious surfaces and increase infiltration, while still supporting new development.

Goal 3: Smart Designs that Reduce Overall Imperviousness

This section reviews site design such as street location, road width, cul-de-sac design, curbing, roadside swales, and sidewalk design and location. There are many opportunities for communities to minimize impervious surfaces and allow for infiltration through curb cuts, swales, and cul-de-sacs with bioretention, among other things.

Goal 4: Adopt Green Infrastructure Stormwater Management Provisions

This section looks to explicitly discuss LID as a preferred method, such as requiring roof runoff to be directed into vegetated areas, and a preference for infiltration wherever soils allow or can be amended. Bylaws and/or regulations should clearly specify what LID is and which BMPs are preferred or required. Communities should also require an operations and maintenance plan to encourage effective use of LID methods. Adopting a specific LID bylaw can help clearly define and incorporate LID as a preferential stormwater management technique. Defining LID within this bylaw also decreases the need to explain LID throughout each of the Zoning bylaws, SPR, and subdivision rules and regulations and reduce the potential for any conflict between regulations and bylaws. This section also includes additional stormwater management considerations relevant to the MS4 permit.

Goal 5: Encourage Efficient Parking

Parking accounts for a large amount of impervious surface within new and redevelopment projects and offers an enormous opportunity for using LID. By reducing the amount of required parking - or even including parking maximums instead of minimums, communities can drastically reduce their impervious surfaces and runoff. Many communities already require landscaping in parking areas, which also offers an opportunity to allow curb cuts and infiltration in these areas - improving water quality and reducing the need for irrigation.

4.0 Open Space Development Assessment

The Town regulates their open space with residential design through Residential Cluster Development in §500-22 of the Zoning Bylaws. For the purpose of promoting the more efficient use of land in harmony with its natural features and in furtherance of the general intent of this bylaw to protect and promote the health, safety, convenience and general welfare of the inhabitants of the town, the Board of Appeals may grant a special permit for a Flexible Plan Development subject to the regulations and conditions contained in this section.

These flexible developments are an opportunity for towns to protect open space and incorporate LID practices in consideration of the natural landscape.

The Flexible Plan Development Analysis in Appendix A compares the Flexible Plan Development requirement to MA Best Practice Factors based on various qualities that make the factor "Conventional," "Better" or "Best Practice." The rules included in the Town bylaw are color coded to match "Conventional," "Better" and "Best Practice" (orange, yellow, green, respectively) which correspond to the categories explained in Mass Audubon's tool. In addition to those colors, some items are highlighted in red. This indicates the existing bylaw falls below the conventional regulations.

As shown in Appendix A, 5 of the 18 factors are currently at best practices for open space residential design.

The bylaw exercises conventional practices in 13 factors:

1. Special permit required, where better practice is by right and best practice is mandatory
2. Minimum parcel size is greater than 10 acres, where better practice is between 5-10 acres and better practice is no size requirement
3. Ownership in relationship with the resources present not addressed, when best practice includes providing open space in association with site resources
4. Review process requires no detailed analysis of site characteristics in relation to design, where better practice is a cluster layout and best practice is flexible "OSRD" 4 step
5. Dimensional standards include minimums less than conventional, where better practices include formulas with specified minimums and best practice includes no or very small minimums
6. Quality of open space has no indication of local conservation priorities, where better practice includes some reference to local conservation priorities with no specifics, and best practice includes mapped priority areas for site design
7. Contiguity of open space to previously protected open space is not addressed, where better practice requires contiguity within the development, and best practice requires contiguity within development and adjacent open space parcels
8. Open space uses not addressed, where better practice includes encouraged uses, and best practice includes a specific list of allowed uses consistent with conservation and recreation goals
9. Quality of open space conserved requires little to no documentation, where better practice requires some but not comprehensive mapping and documentation, and best practice requires specific plans, maps and comprehensive documents be included in the submission
10. Relationship to open space or master plan goals is not discussed, where better practices include optional considerations and best practices require these considerations
11. Inclusion of low impact design (LID) is not addressed, where better practice encourages LID, and best practices require LID be used
12. Flexibility of open space to facilitate wastewater treatment facilities is not provided, where better practice allows aggregated calculation by Board of Health, and best practice allows for the reduction of open space by up to 10% to accommodate sewer disposal with deed restriction and aggregate calculation

13. Monitoring of open space is not specified, where best practice provides loose or nonspecific monitoring provisions, and best practice requires specific monitoring requirements at stated intervals

The bylaw exercised below conventional practices in 1 factor:

- Minimum open space requires 25% open space, where convention practice is 50-65%, better practice is 65-75% and best practice is greater than 75%

5.0 Bylaws and Regulations Assessment

Appendix B outlines the regulations in a similar format ("Conventional", "Better", and "Best Practice") against sets of factors that address 5 goals. Findings for each regulation are color coded to match "Conventional", "Better" and "Best Practice" factors. The 5 goals are:

1. Protect Natural Resources and Open Space
2. Promote Efficient, Compact Development Patterns and Infill
3. Smart Designs that Reduce Overall Imperviousness
4. Adopt Green Infrastructure Stormwater Management Provisions
5. Encourage Efficient Parking

This analysis indicates where specific requirements rate relative to best practices for LID and green infrastructure.

Conflicts and inconsistencies in the regulations were not noted in the areas identified between different parts of Town regulations. Each bylaw may cover different parts of each goal, so the analysis compared any differences between regulations as well.

6.0 Recommendations

As shown in Appendices A and B, there is room for improvement to better promote LID and green infrastructure within the Zoning Bylaws (2021), Subdivision Regulations (2017), Stormwater Management Regulations DRAFT (2021), and the Stormwater Management (2020).

More acknowledgement and emphasis of the importance of natural green infrastructure will help limit stormwater impacts. This can be accomplished by implementing some or all of the recommendations included below. Reference should be made to Appendices A and B for a complete analysis of areas that need improvement.

General Coordination of Bylaws and Regulations

To avoid current or potential conflicts and facilitate a consistent review of all projects to meet the best practices as it relates to stormwater management and low impact development (LID) techniques, it is recommended that the Stormwater Management Regulations be updated as outlined below and the Zoning Bylaw and Subdivision remove stormwater management design standards and provide a reference in other bylaws requiring compliance with the Town's Stormwater Management Regulations.

Goal 1: Protect Natural Resources and Open Space

The following are factors the Town may want to consider to provide increase protection of natural resources and open space:

1. 1. Consider updating §500-22 Residential Cluster Development regulations to include more "better" and "best" practices outlined in Section 3.0 Open Space Development
1. 2. Require soil management plan as part of large developments
1. 3. Limit clearing, lawn size and require retention of vegetation
1. 4. Require at least 75% native plantings

GOAL 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL

The following are factors the Town may want to consider to promote efficient, compact development patterns and infiltration:

2. 1. Allow lot size, frontage and setbacks be set through OSCD process by right
2. 2. Allow multifamily housing by right in most residential areas, cluster developments encouraged with density bonuses for LID features and no maximum lot coverage
2. 3. Allow common driveways in residential districts

GOAL 3: SMART DESIGNS THAT REDUCE OVERALL IMPERVIOUSNESS

The following are factors the Town may want to consider to promote smart designs that reduce overall imperviousness:

3. 1. Set impervious cover limits based on zoning district and use
3. 2. Allow street location and right-of-way and roadway widths set through Flexible Plan Development process by right
3. 3. Allow one-way loops with lower right of way width
3. 4. Allow hammerhead turn around, minimize turn around radius
3. 5. Allow common driveways in residential districts
3. 6. Require bioretention at cul-de-sac islands
3. 7. Allow country drainage and or opening in curbing to all roadside swales/bioretention
3. 8. Allow flexibility on pedestrian sidewalk locations
3. 9. Allow and encourage permeable sidewalks or slope sidewalks to drain to lots

GOAL 4: ADOPT GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS

The following are factors the Town may want to consider to including provision to promote green infrastructure stormwater management:

4.1. Require minimum recharge of 1 inch of all roof runoff except in soil with a hydrologic soil group rating of D
4.2. Develop the site design checklist to review project site constraints and require inclusion of LID techniques and/or infiltration
4.3. Allow pervious pavements in select conditions

GOAL 5: ENCOURAGE EFFICIENT PARKING

The following are factors the Town may want to consider to encourage efficient parking:

5.1. Provide provisions to reduce parking space numbers based on need and/or allow portions of required parking areas to remain lawn area and not be constructed until needed

5.2. Restrict parking space size to (9 ft x 18 ft) and allow a percentage of smaller size (compact) spaces

5.3. Allow shared parking in where demand time for uses differ

The Town can further help encourage better practices by addressing the items in Appendices A and B during their Site Plan Review Process.

7.0 IMPLEMENTATION

It is encouraged that when changes are being made to any of the analyzed bylaws and/or regulations, the Town will consult this report to incorporate open space, green infrastructure, and reduction in impervious cover.

APPENDIX A

- Open Space Design Review Matrix

Best Practices Factors	Conventional	Better	Best Practice	§410-4.3. Flexible Plan Development
Permit Type	Special Permit	By Right	Mandatory	§410-4.3.A. Special Permit
Land area to which the zoning is applicable	Only a small amount of developable land	Land of particular environmental sensitivity	All developable land zoned residential	Not addressed - assumed all developable land
Minimum Open Space	50-65%	65-75%	≥ 75%	§410-4.3.G.(1) 25%
Yield Calculation	Full plan with full percolation tests	Sketch plan with selected percolation test(s)	By formula	§410-4.3.G.(1) By formula
Minimum parcel size	≥ 10 acres	5-10 acres	None	§410-4.3.G.(1) 10 acres
Review Process	No detailed analysis of site characteristics in relation to design	Cluster layout	Flexible "OSRD" 4 Step	No detailed analysis of site characteristics in relation to design
Ownership of Open Space	Appropriate to the resources present. For example, agricultural land by the farmer, watershed land by a water dept. or district, habitat land by the conservation commission, or recreational open space by a parks and recreation commission or homeowners association.			Not addressed
Dimensional Standards; area, frontage, etc.	Specified, < than for standard subdivision	Formulaic reduction with specified minimums	None set or small minimums	§410-4.3.G.(5) Flexible requirements
Quality of open space conserved: Specificity of local priorities for natural, cultural, and historic resource conservation	No indication of local conservation priorities, or language that refers only to regulated resource areas.	Lack of specificity regarding local conservation priorities; no map of priority locations	Local priorities clearly and unambiguously stated and mapped for use in site design.	No language related to resource areas
Contiguity of open space; relationship to previously protected open space	No contiguity requirement	Contiguity required within subdivision	Contiguity required; adjacent land considered	No contiguity requirement
Quality of open space conserved: Allowed uses of open space	Allowed use of open space not addressed	Vague language regarding use of conserved open space	Clear list of allowed uses consistent with conservation and recreation goals	Allowed use of open space not addressed
Quality of open space conserved: Submission requirements - GIS maps, data, etc. to inform the review process	Vague or no language regarding submission of information on site resources and no specified process for the use of the data submitted	General non-comprehensive data and mapping requirements; vague process for the application of the data to site design and open space conservation	Specific plans, maps, & comprehensive data regarding natural, cultural, and historic resources required and used as the basis for open space conservation	No language
Relationship to Plans	Relationship to plans not discussed	Optional consideration of open space goals of OSRP, master, and/or regional policy plan	Required consideration of open space goals of OSRP, master, and/or regional policy plan	Relationship to plans not discussed
Low Impact Design	Not addressed	Encouraged	Required	Not addressed
Density bonus for enhanced public benefit(s)	No bonus offered	Bonus by special permit	Automatic or formulaic bonus	§410-4.3.H.(1) Various bonuses offered
Review Entity	ZBA, council or selectmen as special permit authority	Planning Board	Planning Board	Planning board
Flexibility re: open space protection to facilitate wastewater treatment facilities	No flexibility provided	Aggregate calculations allowed by board of health	If necessary, required open space may be reduced by < 10% to accommodate; disposal area deed restricted; aggregate calculations allowed by BoH, etc.	Not addressed
Monitoring of open space	No specified monitoring requirements and no requirements that would assist the party responsible for monitoring	Loose provisions to facilitate, municipal monitoring, or no specificity regarding monitoring interval	Specific provisions to aid endowed monitoring by a conservation org at stated intervals	Not addressed

APPENDIX B

- Municipal Regulations Review Matrix

Factors	Conventional	Better	Best	Zoning	Chapter 530 Subdivision Regulations	Chapter 354 Stormwater Management & Draft SW Regs
GOAL 1: PROTECT NATURAL RESOURCES AND OPEN SPACE						
Soils managed for revegetation	Not addressed	Limitations on removal from site, and/or requirements for stabilization and revegetation	Prohibit removal of topsoil from site. Require prep of soils compacted during construction	Not addressed	Not addressed	not addressed
Limit clearing, lawn size, require retention or planting of native vegetation/naturalized areas	Not addressed or general qualitative statement not tied to other design standards	Encourage minimization of clearing/ grubbing	Require minimization of clearing/grubbing with specific standards	Not addressed	§530-5.3.C Trees intended to be reserved shall be protected from injury by suitable boxes, fences, or wells if in fill.	§10(B)(1) minimize total area of disturbance (in context of minimizing erosion).
Require native vegetation and trees	Require or recommend invasives	Not addressed, or mixture of required plantings of native and nonnative	Require at least 75% native plantings	Not addressed	Not addressed	not addressed.
GOAL 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL						
Lot size	Required minimum lot sizes	OSRD/NRPZ preferred. Special permit with incentives to utilize	Flexible with OSRD/NRPZ by right, preferred option	Article V Tables 50-54 – Required minimums	(Not applicable)	(Not applicable)
Housing density	Multi-family housing not allowed, or only in/adjacent to commercial and industrial uses	Multi-family and cluster developments allowed by special permit	Multi-family housing allowed by right in most residential areas; cluster developments encouraged with density bonuses for LID features and no maximum lot coverage	§410-4.3.A. Multi-family and cluster developments allowed by special permit	(Not applicable)	(Not applicable)
Setbacks	Required minimum front, side, and rear setbacks	Minimize, allow flexibility	Clear standards that minimize and in some instances eliminate setbacks	Article V Tables 50-54 – Required minimums	(Not applicable)	(Not applicable)
Frontage	Required minimum frontage for each lot/unit	Minimize especially on curved streets and cul-de-sacs	No minimums in some instances, tied into other standards like OSRD design and shared driveways.	Article V Tables 50-54 – Required minimums	(Not applicable)	(Not applicable)
Common driveways	Often not allowed, or strict limitations	Allow for 2-3 residential units	Allow for up to 4 residential units, preferably constructed with permeable pavers or pavement	Not addressed	Not addressed	(Not applicable)
GOAL 3: SMART DESIGNS THAT REDUCE OVERALL IMPERVIOUSNESS						
Impervious cover limits and infiltration rates	Not usually addressed in zoning and subdivision regs for rural/suburban residential	Require no net increase in site run-off from pre- to post-development	Impervious cover limits tailored to the community and district type (i.e. <10% total impervious cover in rural districts, but higher in urban and redevelopment districts); post-development infiltration should be equal to or greater than pre-development. Following best practice may also help communities comply with MS4 permit requirements	Not addressed	Not addressed	§10(A)(7) Must comply with Stormwater Management Bylaw (which requires no increase in peak rate and volume of runoff)
Street location	Numeric and geometric standards based primarily on vehicular travel and safety, with basic pedestrian requirements e.g. sidewalks	Flexibility in applying standards, to reduce area of impact, grading, avoid key natural features	OSRD design preferred by-right. Require locating streets to minimize grading and road length, avoid important natural features	(Not applicable)	§530-4.2.B.(1) primarily concerned with safe travel, but minimize cutting and filling.	(Not applicable)

Factors	Conventional	Better	Best	Zoning	Chapter 530 Subdivision Regulations	Chapter 354 Stormwater Management & Draft SW Regs
Road width	Major and minor categories, 24-30'	Wide, medium, narrow categories. 22-24' max, plus 2' shoulders	Wide, medium, narrow, and alley categories. 20-24' widest for 2 travel lanes, 18-20' low traffic residential neighborhood, plus 2' shoulders. Allow alleys and other low traffic or secondary emergency access and all shoulders to use alternative, permeable materials.	(Not applicable)	§530-4.2.C.(1) Varies 21-40' based on road type	(Not applicable)
Road ROW width	50-75', fully cleared and graded	40-50', some flexibility in extent of clearing	20-50'depending on road type	(Not applicable)	§530-4.2.C.(1) 40-60' no flexibility stated - clearing not mentioned	(Not applicable)
Access Options	No common drives allowed, dead end allowed with limit on length and # of units	Allow dead end with limit on length and # of units. Allow common drives up to 2-3 units	Allow one way loop streets. Allow common drives up to 4 units, and alleys and rear-loading garages where suitable.	(Not applicable)	§530-4.2.D.(1) Allow dead end to a length 800 ft Common drives not mentioned	(Not applicable)
Dead Ends/Cul-de-sacs	120 ft or more minimum turnaround	Minimize end radii – 35 ft	Allow hammerhead turnaround	(Not applicable)	§530-4.2.A.(4) 124' ROW dia. with 55' dia. vegetated center island Hammerhead allowed for 4 or less lots	(Not applicable)
Cul-de-sacs	Full pavement standard	Encourage center landscaping with bioretention	Require center landscaping with bioretention	(Not applicable)	§530-4.2.D.(1) vegetated center island, LID not mentioned.	(Not applicable)
Curbing	Curbing required full length both sides of road	Allow curb breaks or curb flush with pavement to enable water to flow to vegetated LID features	Open drainage with roadside swales and no curbs preferred	(Not applicable)	§530-5.10. Curbing required if needed to control runoff	not addressed
Roadside Swales	Allowed as an option	Preferred over closed drainage	Preferred, with criteria for proper design. Adoption of technical specifications and design templates for green infrastructure recommended	(Not applicable)	Not specifically mentioned	
Utilities	Off sets required contributing to wide road ROWs	Not specified, flexible	Allow under road, sidewalks or immediately adjacent to roads to enable placement of roadside swales.	(Not applicable)	§5.B.19 All utilities shall be placed underground unless otherwise directed by the Board - location of private utilities not specified in typical section	(Not applicable)
Sidewalks	Concrete or bituminous	Some flexibility in material and design	Prefer permeable pavement or permeable pavers	(Not applicable)	§530-5.9 Bituminous concrete	(Not applicable)
Sidewalk location	Required both sides of road	Allow on only 1 side of road especially in low density neighborhoods	Prefer siting with land contours and for best pedestrian utility (e.g. connect with common areas and shared open spaces) – not necessarily immediately parallel to road.	(Not applicable)	§530-4.6 Allow only on one side for secondary and minor streets	(Not applicable)
Sidewalk drainage	Drains to road closed drainage system	Not addressed	Disconnect drainage from road system – e.g. adjacent green strips or within vegetated areas that can absorb sheet flow	(Not applicable)	Not addressed	(Not applicable)
GOAL 4: ADOPT GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS						
Rooftop runoff	Prohibit directing clean roof runoff into closed municipal drainage systems.	Allow clean roof runoff to be directed to landscaped or naturally vegetated areas capable of absorbing without erosion, or infiltration	Require directing clean roof runoff to landscaped or naturally vegetated areas capable of absorbing, or infiltration	(Not applicable)	Not addressed	not specifically addressed §10(A)(7) Must comply with Stormwater Management Bylaw (which requires no increase in peak rate and volume of runoff)

Appendix B: Municipal Regulations Review Matrix

Factors	Conventional	Better	Best	Zoning	Chapter 530 Subdivision Regulations	Chapter 354 Stormwater Management & Draft SW Regs
Overall stormwater design; piping and surficial retention vs. LID	Conventional stormwater system design standards	Encourage LID features and BMPs; design standards often not specified	LID design standard encouraging infiltration, allowing surficial ponding of retained runoff for up to 72 hours; systems designed for larger volume storms, accounting for future precipitation predictions; credit for green roofs towards stormwater requirements. Following best practice may also help communities comply with MS4 permit requirements	(Not applicable)	§530-1.2. Conventional stormwater system design standards	§10(A)(6) LID must be implemented where adequate soil, groundwater, topographic conditions allow.
Site Plan/Design Requirements	LID not addressed	Encourage LID features in site design - such as reduced imperviousness, maintaining natural hydrology, preserving open space, & rainwater reuse	Include bioretention and other vegetated LID features in site landscaping/open space requirements. Following best practice may also help communities comply with MS4 permit requirements. See section 2.3.5 of the MS4 permit for more information	LID not addressed	(Not applicable)	§11(A)(6) LID must be implemented where adequate soil, groundwater, topographic conditions allow.
Allow easy siting of LID features (bioretention, swales, etc.)	Often not addressed, may require waivers from subdivision standards	Encouraged along road ROW	Allowed on lots, common open space, or road ROW, easement recorded. For commercial development, allow an increase in floor area ratio or other developmental incentives for green roofs	not addressed.	Siting LID practices not specifically addressed	(Not applicable)
Permeable paving	Often not addressed, may require waivers from subdivision standards	Allowed on private residential lots for parking, patios, etc.	Allowed for residential drives, parking stalls, spillover parking spaces, emergency access ways (with proper engineering support for emergency vehicles) Two track design allowed for driveways and secondary emergency access ways (where required)	not addressed.	not addressed.	not specifically addressed.
Stormwater management O&M plan	Typically only addressed if municipality has a stormwater or LID bylaw, or for areas subject to wetlands permitting	Required	Required, contents specified in alignment with current MassDEP Stormwater Handbook. Following best practice may also help communities comply with MS4 permit requirements	(Not applicable)	not addressed.	§9 Required and contents specified
Construction Erosion and Sedimentation Plan, and stormwater control	Basic general requirements	Required, contents specified - the site design process should include soil erosion and sedimentation control measures	Goes beyond minimum NPDES requirements. Requires minimization of site disturbance, reduction of construction waste, control measures not removed until proof of soil stabilization or reestablishment of vegetation. Written procedures for site inspection and enforcement included. Following best practice may also help communities comply with MS4 permit requirements. See section 2.3.5 of the MS4 permit for more information	(Not applicable)	§III.B.3.v Required, contents specified	§8 Required and contents specified
Stormwater discharge detection & elimination	Not addressed	Discharges and connections noted and/or limits set on quantity and quality	Illicit discharges and connections are prohibited and enforced. Following best practice may also help communities comply with MS4 permit requirements. Find more information in section 2.3.4.a of the MS4 permit	(Not applicable)	(Not applicable)	§354-10 Prohibited and §354-22 enforced.

Factors	Conventional	Better	Best	Zoning	Chapter 530 Subdivision Regulations	Chapter 354 Stormwater Management & Draft SW Regs
Post- construction stormwater management and drainage patterns	Not addressed	Allow LID	Resemble pre-existing conditions of volume, velocity, quality and location, as nearly as possible, requiring LID to the max extent feasible. Retain vol of runoff >1in. per sq.ft. of impervious surface and/or remove 90% TSS post-construction & 50% TP generated on the site for new development, or >0.8in. per sq.ft and/or remove 80% TSS and 50% of TP load for redevelopment. Following best practice may also help communities comply with MS4 permit requirements.	(Not applicable)	§III.B.3.I Must demonstrate compliance with Massachusetts Stormwater Management Policy	§10 Resemble pre-existing conditions of volume, velocity, quality and location, as nearly as possible, requiring LID to the max extent feasible. Retain vol of runoff >1in. per sq.ft. of impervious surface and/or remove 90% TSS post-construction & 50% TP generated on the site for new development, or >0.8in. per sq.ft and/or remove 80% TSS and 50% of TP load for redevelopment.
As-built surveys	Not addressed	Recommended	Required, with written instructions for process; electronic submittal allowed	Not addressed	§V.B.13 & 15 Drainage As-built Certification required	§354-21. Drainage As-built required
Intra-departmental communication and coordination	Not addressed	Informally or loosely occurring	Required for plan review and/or permit approvals	§40-3.D.3 &4. Site Plan review includes reports from all building related departments	§530-3.3.D. Requires review by various departments	§354-2. Stormwater authority consists of department heads
Enforcement	No	Yes	Yes with fines. Same entity should oversee permit approvals and enforcement	§3 Enforcement and penalties described	§V.B.4 Performance guarantee (covenant for lot releases) required	§354-22. Enforcement with penalties
GOAL 5: ENCOURAGE EFFICIENT PARKING						
Parking	Specific minimums set based on projected maximum use times	Encourage minimum # needed to serve routine use (e.g. 2/residential unit with any additional/visitors parking behind in driveway or on street).	Establish Maximum Parking spaces allowed. Do not require more than 2/residence. Allow tenants separate, optional lease agreements for parking.	§31-2 Minimums set	(Not applicable)	(Not applicable)
Commercial Parking	Specific minimums set based on projected maximum use times adding all on-site uses together.	Some flexibility to reduce minimums based on street or other available nearby parking or transit.	Allowed shared parking for uses with different peak demand times. Provide model agreements/deed restrictions. Reduce parking requirements near transit. Limit parking stall size (9ftx18ft max), with up to 30% smaller for compact cars	§35-2 Specific minimums required §39B 12.3.8 Shared parking allowed in Nantasket Beach Overlay District §52-2 Space size 9'x20'	(Not applicable)	(Not applicable)
LID in Parking Areas	Often not addressed, may require waivers e.g. for planting islands to drain down rather than built up surrounded by curbs	Allow LID/bioretention within parking areas.	Require landscaping within parking areas, as LID/bioretention, at a minimum of 10% of the interior area landscaped and a minimum of 25 square feet for island planting areas.	§39B 12.3.8 To the greatest extent possible ...design for "Green Building" in Nantasket Beach Overlay District	(Not applicable)	not specifically addressed. §10.A.(6) LID required for all applicable projects unless infeasible.