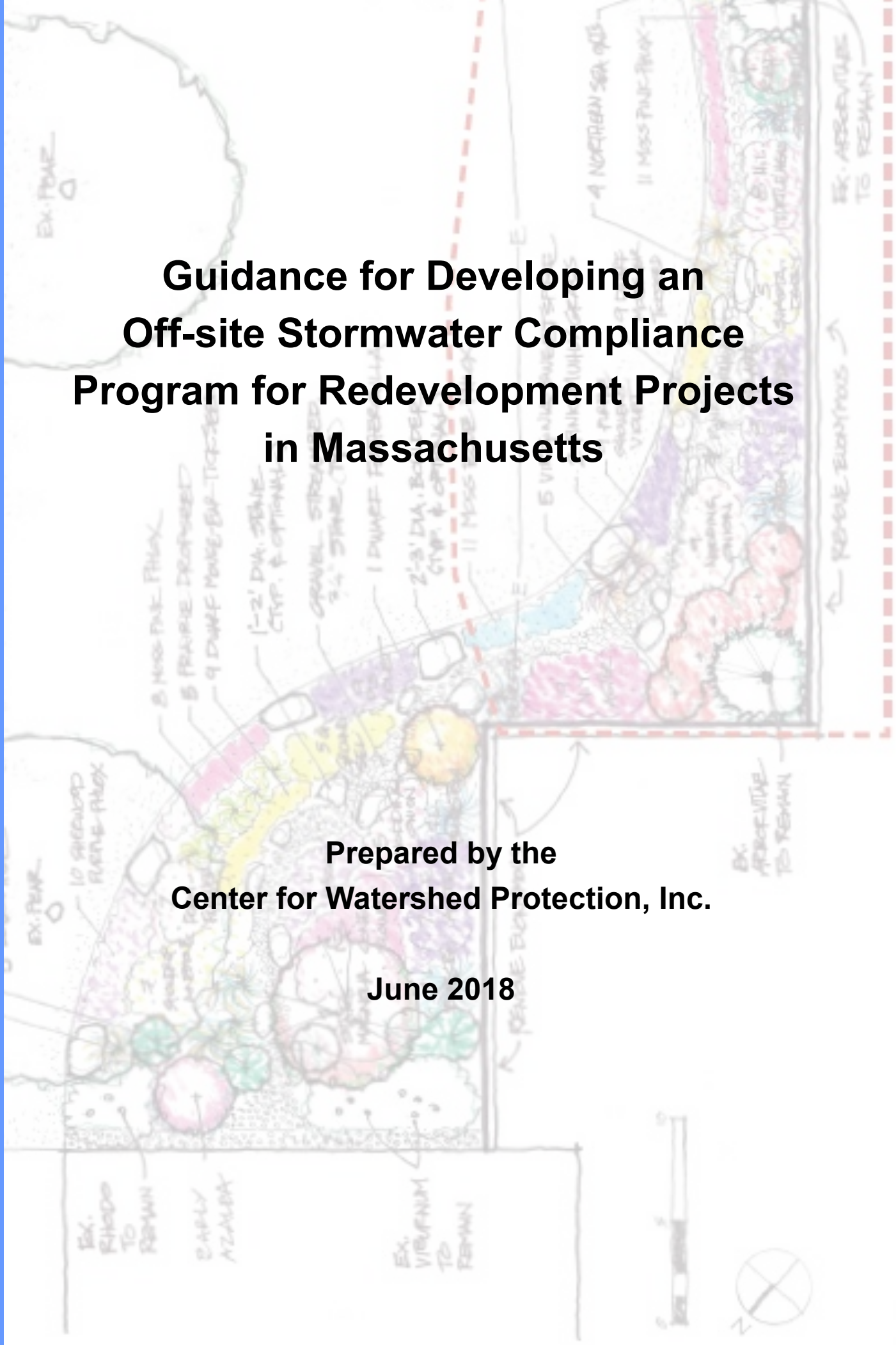
Guidance for Developing an Off-site Stormwater Compliance Program for Redevelopment Projects in Massachusetts



Prepared by the
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Table of Contents

Appendices

Tables

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1. Overview of the MS4 General Permit and Off-Site Compliance Terminology

1.1. Purpose of this Guidance Document

Through the issuance of the Massachusetts Small MS4 General Permit (MS4 General Permit), EPA Region 1 established a new stormwater performance standard for **redevelopment projects** within regulated small MS4 communities. Part 2.3.6.a.ii.4 of the MS4 General Permit outlines the **redevelopment requirements** for the Post-Construction minimum measure. As part of these requirements, the MS4 General Permit establishes flexibility for meeting the redevelopment performance standard in Part 2.3.6.a.ii.4(c) of the MS4 General Permit:

> *Stormwater management on redevelopment sites may utilize off-site mitigation within the same USGS HUC 10 watershed for the developer to meet the equivalent retention or pollutant removal requirements of the redevelopment site.*

If an MS4 decides to provide for off-site mitigation for redevelopment projects, the MS4 needs to set up a program that integrates with its stormwater permit review process. This would include receiving documentation of off-site practices and analysis of achieving required runoff/pollutant reductions by the developer.

This guidance document provides definitions, details, and resources for MS4s that wish to establish an off-site approach for redevelopment sites. This approach is referred to as "off-site compliance" for the purposes of this document. This document is intended to assist and guide MS4s in integrating an off-site mitigation program within their stormwater permit review process for redevelopment projects.

EPA Redevelopment Definition:
Any construction, land alteration, or improvement of impervious surfaces resulting in total earth disturbances equal to or greater than 1 acre (or activities that are part of a larger common plan of development disturbing equal to or greater than 1 acre). Redevelopment does not include activities such as exterior remodeling or roadway work that does not increase the impervious area equal to or greater than a single lane width.

An MS4 may have multiple objectives for undertaking an off-site compliance program, some of which are listed below:

1. Provide **regulatory flexibility** for redevelopment sites where meeting the performance standard on-site is not possible and/or sites at which the local government wishes to promote infill or redevelopment and/or targeted development.
2. Seek **cost-effective strategies to achieve equivalent or superior runoff/pollutant reduction** compared to what would otherwise be accomplished on the redevelopment site in question.

3. Tie in with the **Municipal Vulnerability Preparedness (MVP) program**. This program helps municipalities understand climate change impacts and reduce vulnerabilities, including to their stormwater management system. A community's MVP plan may include implementing nature-based solutions such as green infrastructure (GI) or low impact development (LID). Nature-based solutions "use natural systems, mimic natural processes, or work in tandem with traditional approaches to address natural hazards like flooding, erosion, drought, and heat islands. Incorporating nature-based solutions in local planning, zoning, regulations, and built projects can help communities reduce their exposure to these impacts, resulting in reduced costs, economic enhancement, and safer, more resilient communities" (TNC, 2018).
4. Help meet a community's **Hazard Mitigation Plan** through use of LID.

Table 1 lists the MS4 General Permit language concerning redevelopment standards and off-site compliance. The language gives the MS4 discretion to authorize off-site compliance when meeting the stormwater management requirements. Therefore, off-site compliance is a critical decision point for MS4s in building the stormwater management program.

For more detailed information on the post-construction minimum measure, see the MS4 General Permit and the Massachusetts Stormwater Handbook. Information is available on the EPA MS4 and Massachusetts websites (see **Section 5. References and Resources**).

Table 1. MS4 General Permit Language on Off-Site Compliance.

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

[*] For purposes of this manual, maximum extent practicable and maximum extent feasible mean the same thing.
[†] No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.
[‡] Design stormwater management systems so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.
[§] Eliminate or minimize loss of annual recharge to groundwater using environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance.
[**] Eliminate or reduce the discharge of pollutants from land uses with higher pollutant loads.
[††] Protect Zone II or Interim Wellhead Protection Areas of public water supplies.

NOTE to MS4s: Stormwater management discussed in this guidance manual will focus on pollutant removal requirements and not stormwater retention. By focusing on pollutant reduction stormwater management practices, municipalities can also help meet their total maximum daily load (TMDL) goals.

Interested in Payment-in-Lieu?

- **Please note:** This manual does **not** recommend this approach for most municipalities due to the complicated nature of starting and managing a successful program.
- For more information on what is needed to set up this type of program, see **Appendix E**.

1.2. Stormwater Management Practices

The MS4 General Permit presents options for using stormwater best management practices (BMPs) to meet environmental and public safety objectives on redevelopment sites. BMPs such as bioretention cells, infiltration trenches, extended detention wetlands, and permeable pavement can mitigate flooding, create wildlife habitat, and promote community health and safety.

BMPs may be implemented as part of a larger, coordinated community stormwater management plan. Often implemented according to their pollutant reduction efficacy, BMPs may be combined and compared using EPA's BMP Accounting and Tracking Tool (BATT) or Opti-Tool. A developer or a municipality considering off-site mitigation could utilize the EPA Region 1 BATT or Opti-Tool for pollutant reduction planning.

Consistent and careful BMP maintenance directly affects long-term BMP efficacy and performance. Maintenance responsibilities should be established during the design, finalized with completed installation of the BMP, and periodically reviewed.

BMP Design Resources

- **Massachusetts Stormwater Handbook**
  https://www.mass.gov/guides/massachusetts-stormwater-handbook-and-stormwater-standards
- **EPA Region 1 BATT and Opti-Tool**
  The BATT is a spreadsheet-based tool that provides accounting, tracking, and reporting for nutrient load reduction. Opti-Tool is a spreadsheet-based tool that provides analysis of BMP opportunities and optimizes BMP performance results to provide cost-effective BMP sizing strategies.
  https://www.epa.gov/npdes-permits/stormwater-tools-new-england#swbmp
- **BMP Performance Factsheets - University of New Hampshire**
  https://www.unh.edu/unhsc/pubs-specs-info

Table 2 outlines common stormwater BMPs with their benefits and limitations. Note that the BMPs in **Table 2** are only a small selection of the BMPs available for consideration in the *Massachusetts Stormwater Handbook*.

Table 2. BMP Benefits and Limitations.

BMP	Benefits						Limitations
	Runoff Reduction	Pollutant Removal	Groundwater Recharge	Scalable	Habitat Creation	Other Advantages	
Infiltration	✓	TSS, TN, TP, Metals, Pathogens	✓	✓			• Needs adequate pretreatment
Bioretention	✓	TSS, TN, TP, Metals, Pathogens	✓	✓	✓	• Can reduce heat islands	• May require underdrain connection to storm sewer
Permeable Pavement	✓	TSS	✓	✓			• Needs regular maintenance to prevent clogging
Green Roof	✓			✓		• Provides increased insulation for building • Extends roof life • Visual amenity • Can reduce heat islands	• No groundwater recharge • May need supplemental irrigation • May require additional roof structural support for retrofitting
Rainwater Harvesting	✓			✓		• Conserves use of drinking water (especially for such activities as irrigation and toilet flushing)	• Must have demand for rainwater • Must have space for cistern • No groundwater recharge
Constructed Stormwater Wetland or Submerged Gravel Wetland	✓	TSS, TN, TP, Metals, Pathogens		✓	✓		• Needs adequately large drainage area • No groundwater recharge

1.3. Definitions & Terminology

This guidance manual uses certain terms, some of which are also used in the MS4 General Permit. The following definitions apply in the context of this manual. While Appendix A of the MS4 General Permit also contains definitions, there is no overlap with those definitions and the additional ones provided below. The words in *italics* below cross-reference terms that have their own definition.

Allowable Practices: Stormwater and/or watershed practices authorized by the MS4 to be used as part of an off-site compliance program, and for which pollutant removal equivalents can be established.

Credit: The amount of pollutant removal assigned to a practice based on scientific information, literature review, and/or modeling. This should be distinguished from the term "credit" used as part of a stormwater utility program.

Eligibility: In the context of this guidance, eligibility refers to the documentation and resulting decision about whether a redevelopment site may use *off-site compliance* options, as authorized by the MS4.

Geographic Scale: The geographic boundary that links the redevelopment site that is *eligible* for *off-site compliance* and the off-site practice(s) that provides mitigation. The MS4 General Permit specifies that this scale shall be the same *HUC 10 watershed* for *off-site mitigation.*

Hydrologic Unit Code (HUC): A sequence of numbers that identify a watershed. USGS divided the United States into a six-level hierarchical system of watersheds labeled with codes from 2 to 12 digits in length. Watershed information can be found at the USGS website: https://water.usgs.gov/wsc/watershed_finder.html. **Table 3** describes the system's hydrologic unit level and its average size. While the MS4 General Permit specifies that *off-site mitigation* be within the HUC 10 watershed, for the purposes of this guidance manual, it is recommended that off-site mitigation practices be constructed within the HUC 12 subwatershed. The HUC 12, a smaller unit, enables an MS4 to keep projects more local to redevelopment sites and nearby waters.

Table 3. HUC Levels and Average Size.

Name	Level	HUC No. of Digits	Average Size (square miles)
Region	1	2	177,560
Subregion	2	4	16,800
Basin	3	6	10,596
Subbasin	4	8	700
Watershed	5	10	227 (40,000-250,000 acres)
Subwatershed	6	12	40 (10,000-40,000 acres)

Maximum Extent Practicable (MEP): Refers to the extent of efforts to comply with local post-construction stormwater management requirements. Elements of MEP indicate serious intent to comply and include selecting and implementing design elements to address site restrictions. MEP is defined as the following:

1. Proponents of redevelopment projects have made all reasonable efforts to meet the applicable Massachusetts Stormwater Management Standards;
2. They have made a complete evaluation of possible stormwater management measures, including environmentally sensitive site design that minimizes land disturbance and impervious surfaces, low impact development techniques, and stormwater BMPs; and,
3. If not in full compliance with the applicable Standards, they are implementing the highest practicable level of stormwater management.

CAUTION:

Maximum Extent Practicable has stringent standards associated with documentation and demonstration.

Off-Site Compliance: A general term that covers *off-site mitigation* and refers to meeting all redevelopment stormwater requirements, as specified in the local stormwater bylaw or ordinance, at an off-site location(s).

Off-Site Mitigation: The *off-site compliance* approach whereby pollutant removal practices are implemented at redevelopment or retrofit sites at another location, approved by the MS4, in the same *HUC 10 watershed* and achieves the same pollutant removal equivalents specified in the local stormwater bylaws or ordinances. Ideally, the site is upstream or in the same *HUC 12 subwatershed* as the original redevelopment project.

Stormwater Utility/Enterprise Fund: A stormwater utility recognizes stormwater management as a public service (e.g. electricity, heating, and water). The utility operates as a dedicated enterprise fund that typically collects fees related to the control and treatment

of stormwater that are then directed to fund the municipal stormwater management program.

1.4. Appendices

This guidance offers an overview of the subject of off-site compliance. More detail is contained in program tools in the appendices, which are summarized below:

- **Appendix A:** A streamlined statewide application form for off-site compliance, demonstration of efforts complying with stormwater requirements to the MEP, and calculation of off-site pollutant reduction requirements. The intent of this form is that MS4s will adapt it to their conditions and needs.
- **Appendix B:** Model language for use in amending a stormwater management ordinance or bylaw for off-site compliance. The model language should be reviewed and adapted by local program staff, including legal staff.
- **Appendix C:** Example bylaw/ordinance language to ensure long-term operation and maintenance of stormwater BMPs and a maintenance agreement for the off-site stormwater practices. The maintenance agreement should be reviewed and adapted by local program staff, including legal staff.
- **Appendix D:** Provides examples of and resources on creating a stormwater utility/enterprise fund.
- **Appendix E:** An overview of a payment-in-lieu program for off-site compliance.

2. On-Site Compliance and Off-Site Hierarchy Options

Any off-site compliance program must be built on a strong foundation of routine, full, on-site compliance. Off-site options are not intended to become automatic whenever on-site compliance becomes difficult. Any off-site mitigation must exceed the off-site owner's own stormwater obligations. Before an off-site option can be considered, the MS4 must have in place the standards and protocols for plan review, inspections, and enforcement for on-site compliance in accordance with the MS4 General Permit and the *Massachusetts Stormwater Handbook*. This is a necessary step for the MS4 to conclude which sites can be authorized to achieve compliance off-site.

CAUTION:

An MS4 must first have a robust plan review process to evaluate a redevelopment project's on-site compliance capabilities before authorizing any off-site compliance requests.

As noted in **Section 1,** an MS4 has discretion to authorize off-site compliance, and some MS4s may opt out of this program element. However, it is worth noting that without eventual use of off-site compliance options, the MS4 will likely find it challenging to approve difficult or tricky infill, redevelopment, and/or targeted development projects where full on-site compliance is not possible. The MS4 General Permit does not include a waiver procedure either for the 0.80-inch reduction performance standard or the total suspended solid (TSS) and total phosphorus (TP) reduction performance standards. Therefore, off-site compliance serves as the "relief valve" for sites where compliance is not possible. **Section 3.5** discusses in further detail the eligibility of sites for off-site compliance.

2.1. Off-Site Compliance Hierarchy

A hierarchy of off-site compliance options provides a useful framework for MS4s to evaluate the various approaches available. Three options are described in **Sections 2.2, 2.3, and 2.4** and include the following:

Option #1. Developer-driven off-site mitigation on private property

Option #2. Developer-driven off-site mitigation on public property

Option #3. MS4-facilitated off-site mitigation

Less complicated

More complicated

Based on an analysis of these options and the feasibility considerations outlined in **Section 3**, the MS4 may decide to adopt one of these options.

The hierarchy of the options are provided in order of the level of effort, service, and program sophistication required to implement them. In this regard, it is a way of framing the off-site compliance program to fit the MS4's desired level of involvement in planning, review, construction, and maintenance of BMPs.

This section describes meeting the stormwater obligations on-site or off-site and describes each of the off-site options and outlines the roles of the MS4 and applicant (developer).

2.2. Option #1. Developer-Driven Off-Site Mitigation on Private Property

When the developer has shown meeting the pollutant reduction requirement on-site to the MEP, pollutant removal practice(s) may be implemented off-site in the same HUC 10 watershed (or within more restrictive limits such as the HUC 12 subwatershed, at the discretion of the MS4) as the original project. Depending upon the on-site feasibility, off-site mitigation may be used to fulfill the entire pollutant removal requirement or the remaining pollutants, after partial on-site management.

Why MS4s May Be Interested in Option #1: MS4s that are just "dipping their toe" into the off-site compliance realm may want to start with this approach, since the role of the MS4 is only to review and verify the activities of the applicant.

With this option, the applicant initiates site identification for off-site mitigation, with approval from the MS4. The MS4 should develop a general prioritization of areas where off-site projects would be most beneficial to receiving waterways (i.e. upstream or local water projects); however, the applicant plays the major role in selecting, designing, constructing, and maintaining the project. The applicant is legally responsible for ensuring off-site mitigation BMPs meet the pollutant reduction standards, and that they continue to operate as designed.

NOTE to MS4s: The MS4 must ensure long-term operation and maintenance of all stormwater BMPs. Based on the MS4 permit, "the new development/redevelopment program shall have procedures to ensure adequate long-term operation and maintenance of stormwater management practices that are put in place after the completion of a construction project." It is recommended that for all privately owned stormwater BMPs, MS4s require applicants to execute an operation and maintenance agreement, an operation and maintenance plan, including a map showing all locations of BMPs, all of which are to be recorded with the property deed. Ordinances/bylaws may need to be amended to require these documents from applicants.

2.3. Option #2. Developer-Driven Off-Site Mitigation on Public Property

Just as with Option #1, when the developer has shown meeting the pollutant removal requirement on-site to the MEP, pollutant removal practice(s) may be implemented in the same HUC 10 watershed as the original project (or within more restrictive geographic limits such as the HUC 12 subwatershed, at the discretion of the MS4). Depending upon the on-site feasibility, off-site mitigation may be used to fulfill the entire pollutant removal requirement or the remaining pollutants after partial on-site management.

With Option #2, the applicant takes the initiative to identify the location for off-site mitigation on public property, with site location suggestions and approval from the MS4. The MS4 should develop a general prioritization of areas where off-site projects would be most beneficial to receiving waterways (i.e. upstream or local water projects, improved water quality over existing conditions, and on-site alternatives, including improving brownfield and greyfield properties); however, the applicant plays the major role in selecting, designing, and constructing the project. As the off-site project is on public land, the MS4 would take ownership of and maintain the project once constructed, possibly through funding provided by the applicant.

Why MS4s May Be Interested in Option #2: MS4s that have stormwater mitigation needs on their public property may want to start with this Option #2. The main role of the MS4 with this option is to review and verify the activities of the applicant.

NOTE to MS4s: Projects on public property would be owned and maintained by the MS4 upon construction completion.

2.4. Option #3. MS4-Facilitated Off-Site Mitigation

Similar to Options #1 and #2, Option #3 may be utilized when the developer has been shown meeting the pollutant removal requirement on-site to the MEP, and pollutant removal practices may be implemented in the same HUC 10 watershed as the original project (or more restrictive limits such as the HUC 12 subwatershed, at the discretion of the MS4).

Why MS4s May Be Interested in Option #3: As opposed to the more hands-off approaches of Options #1 and #2, Option #3 suggests that the MS4 may have specific projects that it would like to see constructed (e.g., as part of a watershed, stormwater, or public works master plan), and may want to steer or facilitate the process of identifying and selecting off-site mitigation projects, without assuming direct responsibility for design and construction.

However, with Option #3, the MS4

assumes an active facilitation role, possibly identifying and prioritizing mitigation site(s). Stormwater management retrofits that the MS4 may want to see constructed include any locations identified through the MVP plan or hazard mitigation plan. The MS4 may also assist with property access and guide the design and construction process. While the MS4 takes on these additional roles, the applicant remains responsible for designing, constructing, and maintaining the project with guidance from the MS4.

Table 4 outlines the specific roles and responsibilities for the MS4 and the applicant for each option.

Table 4. Responsibilities for Off-Site Compliance.

Tasks	Responsible Party for Options		
	Option #1	Option #2	Option #3
Verifies of on-site compliance met to maximum extent practicable	MS4	MS4	MS4
May identify priority areas and potential projects in the HUC 10 watershed (or within more restrictive geographic limits, such as the HUC 12 subwatershed) to help guide the applicant in selection of off-site projects		MS4	MS4
Identifies priority areas and potential projects in HUC 10 watershed (or within more restrictive geographic limits, such as the HUC 12 subwatershed) and works with the applicant to select a site that helps meet MS4 permit requirements and community goals			MS4
May assist applicant with securing property access, approvals, permits, etc.			MS4
Reviews plans for on-site and off-site compliance	MS4	MS4	MS4
Inspects on-site and off-site practices during installation	MS4	MS4	MS4
Verifies long-term maintenance of on-site and off-site practices	MS4	MS4	MS4
Conducts necessary tracking and reporting for the MS4 permit	MS4	MS4	MS4
Documents on-site compliance met to maximum extent practicable	Applicant	Applicant	Applicant
Identifies location for off-site project (with input from MS4)	Applicant	Applicant	
Works with MS4 to identify location(s) for off-site project, securing property access, permits, etc.			Applicant
Prepares and submits plans for on-site and off-site practices	Applicant	Applicant	Applicant
Enters into a maintenance agreement for on-site and off-site practices	Applicant		Applicant
Secures any necessary property rights for off-site practices	Applicant		Applicant
Constructs on-site and off-site practices	Applicant	Applicant	Applicant
Maintains on-site and off-site practices, unless this responsibility is assigned to another party (e.g., local stormwater utility that expressly takes the responsibility)	Applicant	MS4	Applicant

3. Off-Site Compliance Program Considerations

Several program considerations should be evaluated when developing an off-site compliance program. This section outlines in greater detail the preparatory work an MS4 should do to ensure a well-crafted and effective program, which include constructing maintenance agreements and programs, modifying ordinances/bylaws to support off-site mitigation, and establishing funding sources.

3.1. Program Motivation & Drivers

When developing an off-site compliance program, an MS4 should ask questions to identify potential issues at an early stage and direct further data-gathering needs. These questions and considerations include the following examples:

- ***What local community interests, priorities, and resources should the program reflect?***
  The local government may have a capital improvement program (CIP) with identified stormwater or drainage projects, and an off-site compliance program could offer these locations as off-site mitigation project options. Off-site compliance may also serve other objectives and may be an important strategy to meet the following:
    - Regulatory objectives, such as compliance with total maximum daily loads (TMDLs) established for a watershed by MassDEP.
    - Local mitigation objectives under Water Management Act permitting for drinking water.
- ***Are there local areas where lack of baseflow is causing streams to run dry or where storms frequently cause flooding and/or erosion?***
  If so, are there sites within those areas where soils are suitable for infiltration, or where additional riparian plantings or other restoration work might improve the situation?
- ***Does the locality have a downtown or intensively developed area where compliance is expected to be difficult and the locality wants to incentivize investment and redevelopment?***
- ***Is the local development community expected to push for the off-site options to provide flexibility? What level of participation by the local government is anticipated?***
  If a strong role is expected, Option #3 should be pursued. On the other hand, if the MS4 is motivated to play a smaller role and put most of the onus on the developer to justify, find, build, and maintain off-site projects, then Options #1 and #2 may be the best fit.

3.2. Who's Participating?

Generally, an off-site compliance program would be administered solely by the MS4 and only within the MS4 boundaries. However, this is not the only model that is available. Other parties, such as neighboring municipalities or MS4s, and/or conservation groups, among other entities, may be able to play a constructive role.

> **CAUTION:**
> An MS4 is ultimately responsible for complying with the MS4 General Permit, no matter how many partnership agreements the MS4 enters into.

One possible example is for the MS4 to team with the local soil and water conservation district to help identify and implement mitigation projects. In any such partnerships, the participant groups can influence the geographic scale of the program and can also assist in spreading the administrative burden. However, the MS4 should realize that it is responsible for the ultimate success of the installed practices, even if implemented or administered by other parties. In this regard, the MS4 should establish clear objectives and guidelines as well as verification and quality control procedures.

3.3. Siting Off-Site Mitigation Projects

The MS4 General Permit establishes that off-site mitigation should be within the same HUC 10 watershed. However, the MS4 may choose to make the boundary more restrictive, or alternately join with a neighboring small MS4 authority within the watershed to work together to implement off-site mitigation projects. The most environmentally beneficial off-site mitigation projects are those upstream or within the same HUC 12 subwatershed as the redevelopment project.

The graphic below shows an example hierarchy demonstrating potential mitigation project locations, from most desirable to less desirable, left to right.

A HUC 10 watershed may extend beyond the MS4 boundary; however, extending an off-site compliance program beyond the MS4 geographic boundary should be considered with care. Depending on program partners, the MS4 must confirm that the program will have authority to verify project design, proper installation, and long-term maintenance. It may be that these

issues can be addressed through cooperative agreements with program partners and should be established during program development.

Why would municipalities partner with their neighbors to implement an off-site project?

Consider two municipalities – Municipality A (located upstream in a watershed) and Municipality B (located downstream in the watershed). It may be that meeting the stormwater requirements for a redevelopment project in Municipality B is not possible, but the developer owns or can obtain access to a site suitable for stormwater pollutant removal in Municipality A. If Municipality A undertakes permitting review and enforcement responsibility for the off-site mitigation project site, Municipality B will benefit by not having to inspect and enforce the redevelopment post-construction stormwater practices. Municipality B will also have flood capacity in their watershed due to the upstream retention built in Municipality A. Why would Municipality A agree to such an arrangement? It may also see some mitigation of stormwater issues within in their municipal jurisdiction and they may enhance aesthetics within their community with the stormwater facility practices, i.e. water features, vegetated areas, brick streets, etc.

Likewise, a neighboring municipality might want to complete redevelopment projects in a historical or archeologically significant area where below ground excavation is not possible or timely, and because of their geographic configuration they must look at sites outside of their municipality. Off-site mitigation in a neighboring municipality would be one way to accomplish such a redevelopment.

3.4. Program Administration

Operating an off-site mitigation program requires the MS4 and its partners to undertake basic tasks that include identifying and prioritizing sites, tracking pollutant removal across sites, approving designs, inspecting sites, verifying performance through time, tracking, and reporting. Program administration considerations include the following:

Ordinances/Bylaws/Administrative Provisions/Program Tools

- Is there an enabling authority to undertake this program?
- What local ordinances/bylaws, policies, and administrative provisions must be adopted? See **Appendix B** for model off-site compliance ordinance/bylaw language.
- The MS4 should strongly consider the use of performance bonds, in addition to other compliance tools, to ensure that on-site and off-site practices are installed correctly and properly maintained in the long-term.
- The MS4 General Permit specifically assigns responsibility to the MS4 for determining who will be responsible for long-term maintenance. In this regard, a recorded maintenance agreement and compliance reporting procedure for each project is another important program tool. See **Appendix C** for an example stormwater inspection and maintenance agreement.

Staffing

- How many staff will be needed to administer the program (e.g., plan reviewers, inspectors, program administrators)?
- What is the associated administrative cost?
- These costs would apply to the overall stormwater program and not just the off-site compliance component.

Program Finances

- The program may consider instituting review or administrative fees to handle off-site mitigation applications.
- These fees may be in addition to the locality's regular plan review fees (if they exist).
- The costs of public bidding and prevailing wage rates that may apply on public property and publicly driven projects must be addressed.

NOTE to MS4s: Ordinances/bylaws or codes may need to be changed to support administrative needs when implementing an off-site mitigation program.

3.5. Eligibility for Off-Site Compliance

As stated in the MS4 General Permit, off-site compliance is not an automatic option for all redevelopment sites. The decision to offer this alternate compliance method is entirely up to the MS4. This manual proposes three scenarios MS4s may consider when creating an off-site mitigation program:

1. Using a **qualitative** approach by meeting the on-site pollutant removal requirements to the MEP.

2. Using a **quantitative** approach by allowing developers to meet a certain percentage or amount of their on-site pollutant removal requirements and then automatically allowing the remainder of the pollutant removal amount to be met off-site.
3. Offering **no guidance** to developers on defining a minimum on-site requirement and allow some or all of pollutant removal amounts to be met off-site.

Each of these scenarios is discussed further below.

Scenario 1 – Qualitative Approach

Using the qualitative approach, developers must show that they have done the best they could (i.e. to the MEP) in meeting the redevelopment pollutant removal requirements and that any remaining pollutant removal required can be met off-site. This scenario is recommended because the developer will ideally be able to meet all or most of their stormwater management on-site. From **Section 1.3**, Maximum Extent Practicable is defined as follows:

1. Proponents of redevelopment projects have made all reasonable efforts to meet the applicable Massachusetts Stormwater Management Standards;
2. They have made a complete evaluation of possible stormwater management measures, including environmentally sensitive site design that minimizes land disturbance and impervious surfaces, low impact development techniques, and BMPs; and,
3. If not in full compliance with the applicable Standards, they are implementing the highest practicable level of stormwater management.

What does it mean to make a "complete evaluation of possible stormwater management measures"?

Not all stormwater management measures are possible for every site. An explanation as to why any stormwater management measures are not possible to implement should be provided. **Table 5** lists the potential constraints to a site and which BMPs could be considered.

Table 5. Potential Site Constraints and BMP Options.

Environmental Site Constraint	Stormwater Best Management Practice Option					
	Bioretention	Infiltration	Green Roof	Rainwater Harvesting	Constructed Stormwater Wetland or Submerged Gravel Wetland	Permeable Pavement
Soils have little to no infiltration	✓ (w/ underdrain)		✓	✓	✓	✓ (w/ underdrain)
Shallow groundwater			✓	✓	✓	
Shallow bedrock	✓ (above ground adjacent to building)		✓	✓		
Soil contamination	✓ (w/ underdrain and liner)		✓	✓		✓ (w/ underdrain and liner)
Steep slopes	✓ (terraced)		✓	✓		
Insufficient area outside of building footprint		✓ (under parking areas)	✓	✓		✓
Underground utilities	✓ (may need underdrain and liner)		✓	✓		✓ (may need underdrain and liner)

What does "environmentally sensitive site design" mean?

According to the *Massachusetts Stormwater Handbook*, environmentally sensitive design "is a multi-step process that involves identifying important natural features, placing buildings and roadways in areas less sensitive to disturbance, and designing stormwater management systems that create relationships between development and natural hydrology. The attention to natural hydrology, stormwater "micromanagement," nonstructural approaches, and vegetation results in a more attractive, multifunctional landscape with development and

maintenance costs comparable to or less than conventional strategies that rely on pipe-and-basin approaches."

A municipality should review its bylaws or ordinances to ensure that environmentally sensitive site design is not restricted by regulation. Mass Audubon has a free Bylaw Review spreadsheet for LID and Climate-Smart, Nature-Based Solutions. https://www.massaudubon.org/our-conservation-work/advocacy/shaping-the-future-of-your-community/publications-community-resources#bylaw

The Center for Watershed Protection has a free Code and Ordinance Worksheet (COW) that municipalities can use to allow for environmental site design. https://www.cwp.org/updated-code-ordinance-worksheet-improving-local-development-regulations/

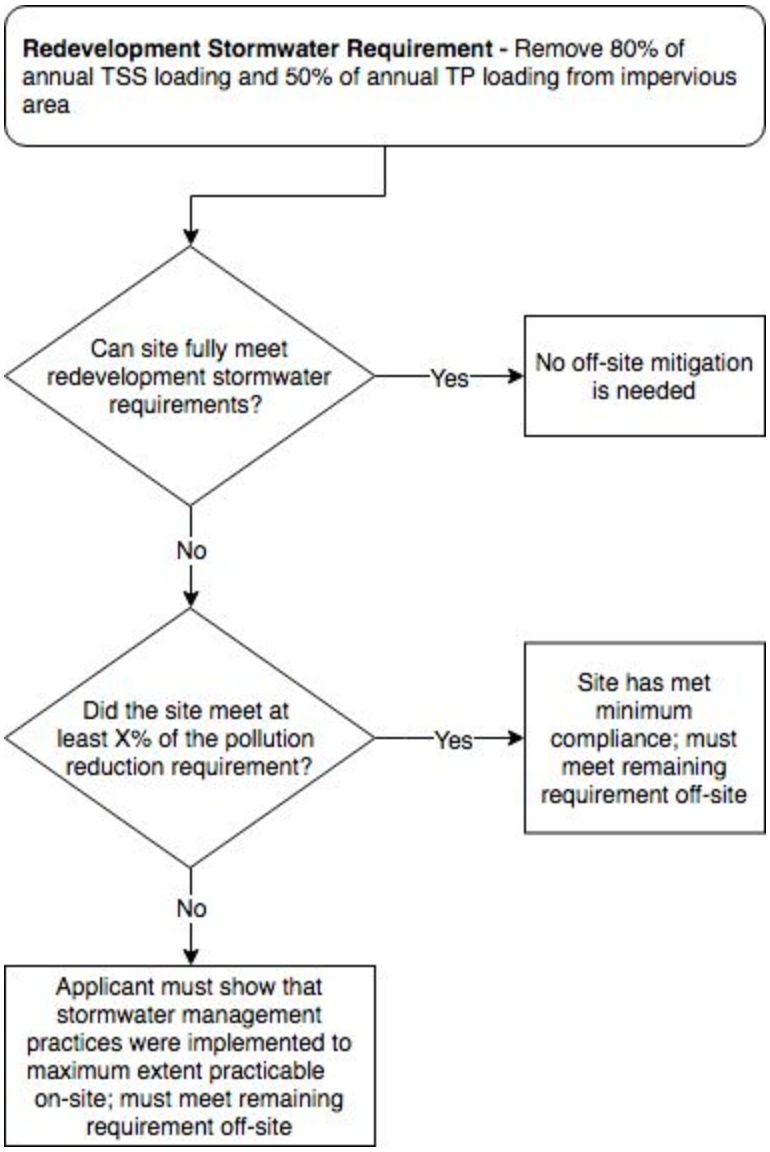
Appendix A also includes this list of considerations and requirements for further documentation of meeting stormwater obligations to the MEP.

Scenario 2 – Quantitative Approach

If a quantitative approach is preferred, the municipality decides what constitutes a sufficient minimum amount of pollutant removal on-site for redevelopment projects. If the developer meets that minimum amount of pollutant removal, they are then free to meet their remaining requirements off-site and do not have to go through the MEP process. For example, a municipality could determine that if the developer meets at least 80% of their pollutant load reduction requirement, they can automatically meet the remainder off-site. There is no scientific basis for choosing a minimum requirement; the percent reduction is up to the municipality. Choosing this approach allows for reducing the number of MEP reviews both the applicant and municipality need to conduct.

> **Consider:** A municipality may discourage off-site compliance by making additional requirements for projects to be done off-site. This could include an increase in the standards by a ratio of 1:1.2. This means that an applicant would need to implement 1.2 units of pollutant removal for every 1 unit required.

An example flowchart of this approach is provided showing whether a site is eligible for off-site compliance.



One advantage of this approach is that once a municipality chooses the percentage of pollutant removal that must be met on-site (e.g. 80%), and if the developer meets that minimum, no further documentation from the developer is required to allow for the remaining pollutant removal to be met off-site. This approach means that the longer MEP process is eliminated from most redevelopment projects and a portion of the pollutant removal is still conducted at the redevelopment site. An additional advantage is that if the developer chooses to do off-site mitigation, multiple smaller stormwater management practices will be constructed throughout the watershed. This benefits the watershed because there are more dispersed stormwater BMPs that can capture the dirtiest water, i.e. the first flush, from more frequent, smaller storms. The disadvantage is that the municipality cannot require a developer to meet more

than the chosen percentage on-site, especially if the redevelopment site is in a location where a municipality needs more pollutant removal to meet other TMDL requirements.

Scenario 3 – No Guidance

With this approach, the municipality does not require the developer to meet any minimum of pollutant removal requirement, nor show that the developer has followed the MEP process. The advantage for this approach is that the redevelopment process is streamlined for everyone; there is no review process for meeting requirements on-site first. The disadvantage to this approach is that the municipality cannot force the developer to meet any of their redevelopment obligations on-site; the developer may choose to construct the entirety of their redevelopment stormwater management practices far from the redevelopment site (albeit within the HUC 10 watershed).

3.6. BMP Maintenance

Maintenance of BMPs is a crucial aspect for success of any MS4 off-site compliance option. Maintenance of off-site BMPs is particularly difficult compared to on-site BMPs as the off-site BMP is not necessarily in view of the party responsible for maintenance, and maintenance can easily be neglected.

Suggested considerations to evaluate BMP maintenance readiness include the following:

- Has the MS4 selected BMPs that can be well-maintained and are suitable for the geographic region?
- Is adequate and timely maintenance provided for all BMPs?
- Has the MS4 passed ordinance/bylaw language that establishes authority for operation and maintenance requirements?
- Does the MS4 have a documented easement if the structures are on private property?
- Is the documented easement part of the property deed so future property owners are aware of their maintenance responsibility?
- If BMPs are to be located on private property and maintained privately, does the ordinance/bylaw outline specific requirements in the permitting process that secure long-term operation, maintenance, and access?
- Will the MS4 accept responsibility for privately constructed stormwater management structures or allow for creation of an entity which can do so?
- Does the MS4 have a reimbursement system in place for maintenance it takes on for private stormwater systems?
- Does the MS4 have a means for establishing a funding agreement for the party responsible for BMP maintenance?
- Does the MS4 have adequate staffing and computer tracking systems, including automatic reminders or notifications to the MS4 manager if periodic maintenance reports are not received on time?

Whether on-site or off-site, poorly maintained BMPs may not meet the pollutant removal standards for which they were designed. ***Not only will such BMPs be out of compliance with the permit requirements, but they also are a potential flood hazard.*** The expectation of ongoing, long-term maintenance should be considered at the creation of an off-site compliance program and can be enforced through the codes and ordinances/bylaws (see **Appendix B** for model ordinance/bylaw language addressing maintenance).

3.7. Availability of Sites

The demand for off-site mitigation must be balanced with the supply of sites so demand can be met. Supply of sites will depend somewhat on the geographic scale of the off-site mitigation program and the types of practices authorized for off-site mitigation. The MS4 should develop a prioritized list of sites with planning level costs through a retrofit inventory, watershed plan, stormwater master plan, or similar effort that includes field verification to determine site feasibility, practice size, and site constraints, among other factors. The identification of available sites can also be tied to ongoing municipal transportation and other capital improvement projects.

The Center for Watershed Protection, *Urban Stormwater Retrofit Practices (Manual 3, Urban Subwatershed Restoration Manual Series, 2007)* is a good resource for conducting a stormwater retrofit inventory. The manual can be downloaded at *https://owl.cwp.org/mdocs-posts/urban-subwatershed-restoration-manual-series-manual-3/*. Additionally, the local watershed association may have information about optimal recharge sites.

Choosing a site and linking to other plans

MVP – Is your community a Municipal Vulnerability Preparedness designated community? What areas were identified as needing conservation or remediation?

Open Space Plan – What areas are identified for conservation that can serve as flood mitigation and runoff reduction?

Mitigation under the Water Management Act Permit for drinking water - Can retrofit activities receive credit for mitigation under a municipality's Water Management Act Permit?

3.8. Restrictions

Certain criteria may constrain the use of an off-site compliance program in a location or watershed. These criteria can be regulatory or be based on site circumstances, such as degraded conditions downstream that would be worsened if stormwater is not fully managed on-site.

3.9. Allowable Practices

A major program decision is the types of practices that are authorized as part of an off-site compliance program. When considering maintenance requirements and public works priorities, an MS4 may determine some BMPs are more suited to its municipality than others. For example, if road maintenance or snow plowing are major considerations, an MS4 may choose to limit the types of BMPs implemented in roadside areas to those that would not interfere with snow plowing or potentially cause road freeze/thaw damage. Allowable practices should be considered in light of the MS4's stormwater program and public works goals and priorities.

CAUTION:

BMPs selection must correspond with the BMPs listed in the *Massachusetts Stormwater Handbook* or EPA's menu of BMPs. It may be best to focus on BMPs that also remove pollutants needed to meet TMDL requirements.

An MS4 may have an interest in keeping the list of stormwater BMPs as broad as possible to provide flexibility for off-site project implementation but must also comply with what is allowed in the *Massachusetts Stormwater Handbook* or by EPA Region 1. Desirable practices include those that meet multiple objectives, such as TMDL implementation, community recreational and aesthetic enhancements, revitalization of degraded areas, drinking water supply protection, groundwater recharge, flood control, and other local water resources goals.

NOTE to MS4s: Stormwater practices need to meet town bylaws/city ordinances. Consistency is needed between the MS4 General Permit, *Massachusetts Stormwater Handbook*, and local bylaws/ordinances.

3.10. Timing and Sequencing

Timing and sequencing are major elements of program accountability. All hierarchy levels require consideration of when the off-site project is built in relation to the redevelopment site. At a minimum, each redevelopment site utilizing off-site mitigation for pollutant removal credit should have associated stormwater controls with schedules for implementation and tracking to ensure permit requirements are met.

CAUTION:

An MS4 needs to ensure off-site mitigation projects are constructed in a timely manner to comply with the MS4 General Permit.

4. Steps to Build the Program

Table 6 provides a relatively brief and conceptual step-by-step process for developing and implementing an off-site compliance program. The sequencing of steps should not be taken too literally, as program development will likely involve some of these steps taking place concurrently or even in a different order than is shown in the table. Much of the information in the table references previous sections of this guidance, as well as the appendices.

Table 6. Outline of Steps Needed to Establish an Off-Site Compliance Program.

Step	Brief Description
Step 1: Program Selection & Feasibility	The MS4 should carefully consider which of the program options outlined in **Section 2** are appropriate. The MS4 should also review the program considerations listed in **Section 3**. Some considerations, such as the demand for and availability of off-site projects and administrative structure, inform the program feasibility. The MS4 may choose to have stakeholder involvement at this point and develop a written plan. The MS4 can also consider when to implement off-site compliance; some may decide to undertake this as a program enhancement after several years of experience with the "on-site only" stormwater ordinance/bylaw and program.
Step 2: Ordinance/ Bylaw & Policies	The MS4 must establish the regulatory framework in its stormwater and/or land development ordinances/bylaws and associated policies. First, establish the "rules of the game": ▪ An ordinance/bylaw enabling the specific off-site compliance approaches and the relevant "participants" (see **Appendix B** for model language). This should include how to establish eligibility for off-site compliance. ▪ A method to verify property rights and maintenance for off-site projects (e.g., maintenance agreements). ▪ Authorization for MS4 inspectors to enter the property of off-site projects for the purposes of verification and inspection. ▪ Establishment of performance bonds to verify proper installation of off-site practices (also a good tool for on-site practices). ▪ Establish plan review fees.
Step 3: Administrative Structure	Operating an off-site compliance program requires project tracking and record-keeping. The administrative structure includes systems for tracking on-site versus off-site compliance for redevelopment sites and program reporting.

Step	Brief Description
Step 4: Identify Specific Projects & Costs	MS4-led programs (Option #3) identify specific projects for implementation through off-site mitigation. Even for Options #1 and #2, the MS4 General Permit states that the MS4 should "identify a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs" for mitigation projects. Identifying priority areas and/or specific candidate mitigation projects can be done through stormwater retrofit inventories, watershed assessments, stormwater master plans, Municipal Vulnerability Preparedness (MVP) plans, or other studies that should drill down to the project-site scale.
Step 5: Initiate the Program	Steps 1 through 4 provide the program with the regulatory, administrative, and technical structure to begin implementation. Implementation involves activities associated with the overall stormwater program, such as plan review, inspections, verifying maintenance, enforcement, and tracking and reporting.
Step 6: Education, Training, Stakeholder Involvement	Education, training, and stakeholder involvement is often neglected once a program is up and running. Education activities can explain the types of off-site mitigation projects and outline how they benefit the community. Stakeholders may want to be involved in decisions related to project prioritization and selection, and construction and maintenance.

5. References and Resources

EPA Administered Permit Programs: The National Pollutant Discharge Elimination System, 40 C.F.R. § 122.34(b)(5)(iii). 2017.

EPA Small MS4 Stormwater Program Overview (Fact Sheet 2.0). Revised 2005. https://www.epa.gov/npdes/stormwater-phase-ii-final-rule-fact-sheet-series

EPA Post Construction Runoff Control Minimum Control Measure (Fact Sheet 2.7). Revised 2005. https://www.epa.gov/npdes/stormwater-phase-ii-final-rule-fact-sheet-series

EPA Who's Covered? Designations and Waivers of Regulated Small MS4s (Fact Sheet 2.1). Revised 2012. https://www.epa.gov/npdes/stormwater-phase-ii-final-rule-fact-sheet-series

Massachusetts Small MS4 General Permit. (Final 2016). https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit

Massachusetts Stormwater Handbook. https://www.mass.gov/guides/massachusetts-stormwater-handbook-and-stormwater-standards

Massachusetts Water Management Act Program. https://www.mass.gov/water-management-act-program

Nature Based Solutions. Municipal Vulnerability Preparedness (MVP) Webinar 6. The Nature Conservancy (TNC). 2018. https://www.mass.gov/service-details/ensuring-success-webinars-municipal-vulnerability-preparedness-mvp-programs-tool

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Appendix A. Example Application for Off-Site Compliance

NOTE TO MS4s: This is a sample form to standardize the application process for off-site compliance. The intention is that MS4s will customize the form based on local program needs and characteristics.

Submit this application in conjunction with the appropriate review fee and a stormwater management concept plan that shows on-site and/or off-site conceptual Best Management Practices (BMPs).

I. Applicant Information		
1. Name/Company:		
2. Primary contact:		
3. Title:		
4. Mailing address:		
5. City:	6. Zip code:	7. County:
8. Telephone number:		
9. Email:		

II. Site Information		
10. Property Identification Number:		
11. Mailing address:		
12. City:	13. Zip code:	14. County:
15. Driving directions:		
16. Property size (acres):		
17. Watershed (reference MS4 maps):		
18. Plan name/number (attach stormwater management concept plan that shows conceptual on-site and/or off-site BMPs:		

III. Land Cover Information
19. Is there a maximum percent impervious regulation on-site? (Y/N):
20. What is the maximum percent impervious cover allowed?:
21. Is a variance requested? (Y/N):
22. Pre-redevelopment impervious cover (%):
23. Post-redevelopment impervious cover (%):

To be eligible for off-site compliance, the applicant must document that *on-site management has been met to the maximum extent practicable.* Complete the checklist below and provide additional documentation as requested below. Or, if instead the MS4 chooses instead that the developer has met a minimum amount of pollutant removal, then the developer can skip this section.

IV. Eligibility for Off-Site Compliance: Documentation of On-Site Compliance to the MEP

24. Check each eligibility criterion that applies to this site:

☐ Little to no soil infiltration, soil instability, shallow groundwater, or shallow bedrock as documented by a geotechnical analysis (attach geotechnical report).

☐ Soil contamination or other subsurface or geologic conditions that create risks or hazards for disturbance, excavation, and/or movement of water into the ground, even with the use of an underdrain or impermeable liner (attach appropriate documentation and/or geotechnical report).

☐ Steep slopes (attach topographic report).

☐ Insufficient area outside of the building footprint (minimum horizontal clearances not met) or other site constraints to construct BMPs (attach graphic showing available area and explain below).

☐ Underground utilities or storage tanks (attach utility plan and clearances).

☐ Preservation of mature trees (attach report from certified arborist or forester).

☐ Other significant site constraints (explain below).

☐ Explain the condition of downstream receiving waters and whether local stormwater detention and/or flood control standards can be met on the redevelopment site.

NOTE to MS4s: For the purposes of this example application, stormwater management systems will focus on pollutant removal requirements and not stormwater retention. By focusing on pollutant reduction stormwater management practices, the municipalities can also help meet their TMDL goals.

25. Complete Section V to determine the amount of Pollutant Load Reduction needed off-site.

V. Pollutant Removal Amount

STEP 1: Download the EPA BMP Accounting and Tracking Tool (BATT)
https://www.epa.gov/npdes-permits/stormwater-tools-new-england

Required information needed to run BATT:

State and Town

Land Use Type, Hydrologic Soil Group, and Land Use Area

BMP Type, Infiltration Rate, and Storage Volume

STEP 2: Run BATT for On-Site BMP

The BMP credit will be calculated.

STEP 3: View the Project Summary Report

Project Summary Report will provide the Removed Phosphorus Load (lb/yr), the Removed Nitrogen Load (lb/yr), and the Removed Sediment Load (lb/yr) for each of the following:

Structural BMPs (e.g. bioretention, gravel wetland, infiltration trench, etc.)

Non-Structural BMPs (e.g. catch basin cleaning, enhanced sweeping program, etc.)

Land Use Conversion

STEP 4: Export the Project Summary Report

The Project Summary Report can be exported to a word document. Attach the report to this application.

Pollutant Load to be Managed **On-Site** = _____ lb/yr

STEP 5: Repeat Steps 1 – 4 for Off-Site BMP

Attach the Project Summary Report to this application. Provide pollutant load to be managed off-site.

Pollutant Load to be Managed **Off-Site** = _____ lb/yr

26. Complete Section VI instead of Section V to determine the amount of Retention Volume needed off-site *only if the MS4 off-site mitigation program allows for meeting the MS4 permit requirements with stormwater retention BMPs*.

VI. Water Retention Volumes

STEP 1: TOTAL ON-SITE RETENTION VOLUME

Retention volume = $RV_{SITE} = (0.8\ inches \times IA) \div 12 =$ _____ ft^3

Where:

RV_{SITE} = Required retention volume

IA = Total post-construction impervious surface area of site (ft^2)

12 = Conversion factor; inches to feet

STEP 2: VOLUME TO BE MANAGED **ON-SITE**

Runoff Volume to be Managed **On-Site** = $RV_{ON-SITE} =$ _____ ft^3

STEP 3: VOLUME TO BE MANAGED **OFF-SITE**

Runoff Volume to be Managed **Off-Site** = $RV_{OFF-SITE} =$ _____ ft^3

VII. Off-Site Mitigation
27. Describe the off-site mitigation site location and provide address and property identification number.
28. Describe the type(s) of practice(s). Attach a stormwater management concept plan showing off-site BMP conceptual designs to this application.
29. Describe property rights obtained (or that will be obtained) to use the off-site location. Note that all easements must be recorded with the deed and documentation provided.
30. Attach the long-term maintenance agreement to this application (if applicable).

VIII. Off-Site Compliance Determination (to be completed by Stormwater Authority)	
31. Select one of the off-site compliance determinations. ☐ Off-site compliance ***approved*** based on documentation of meeting full on-site compliance to the MEP and stormwater management concept plan provided in this application. ☐ Off-site compliance ***approved with conditions*** (list conditions to the right). ☐ ***Further documentation needed*** before a decision can be made (list documentation to the right). ☐ Off-site compliance ***NOT approved*** (list reasons to the right).	

IX. Next Steps

32. After approval, the applicant must complete the following steps:

<u>If off-site mitigation has been approved:</u>

☐ Submit final stormwater management plan(s) for on-site and off-site BMPs

☐ Obtain any outstanding property rights

☐ Submit and record maintenance agreement

☐ Calculate and post performance bond for BMPs

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Appendix B. Model Language for use in Amending Stormwater Management Ordinance or Bylaw

NOTE to MS4s: This model language is intended to be plugged into a broader stormwater management ordinance/bylaw that addresses all aspects of stormwater management for new development and redevelopment projects (in other words, not just off-site compliance). Therefore, some sections of the model ordinance/bylaw below may be duplicative of the broader ordinance/bylaw (e.g., procedures for plan review, inspections, maintenance, performance bonds, etc.). In these cases, the off-site compliance section can simply reference the appropriate section of the broader ordinance/bylaw.

Definitions

Allowable Practices – Stormwater and/or watershed practices authorized by the MS4 to be used as part of an off-site compliance program, and for which pollutant removal equivalents can be established.

Credit – The amount of pollutant removal assigned to a practice based on scientific information, literature review, and/or modeling. This should be distinguished from the term "credit" used as part of a stormwater utility program.

Eligibility – In the context of this guidance, eligibility refers to the documentation and resulting decision about whether a redevelopment site can use off-site compliance options, as authorized by the MS4.

Geographic Scale – The geographic boundary that links the redevelopment site that is eligible for off-site compliance and the off-site practice(s) that provides mitigation. The MS4 General Permit specifies that this scale shall be the same HUC 10 watershed for off-site mitigation.

Maximum Extent Practicable (MEP) – Refers to the extent of efforts to comply with local post-construction stormwater management requirements. Elements of MEP indicate serious intent to comply and include selecting and implementing design elements to address site restrictions. Maximum extent practicable is defined as the following:

1. Proponents of redevelopment projects have made all reasonable efforts to meet the applicable Massachusetts Stormwater Management Standards;
2. They have made a complete evaluation of possible stormwater management measures including environmentally sensitive site design that minimizes land disturbance and impervious surfaces, low impact development techniques, and stormwater best management practices (BMPs); and,

3. If not in full compliance with the applicable Standards, they are implementing the highest practicable level of stormwater management.

Off-Site Compliance – A general term that covers off-site mitigation and refers to meeting all a redevelopment's stormwater requirements, as specified in the local stormwater bylaw or ordinance, at an off-site location(s).

Off-Site Mitigation – The off-site compliance approach whereby pollutant removal practices are implemented at redevelopment or retrofit sites at another location in the same HUC 10 watershed, ideally upstream or in the same HUC 12 subwatershed as the original redevelopment project, as approved by the MS4 and at the pollutant removal equivalents specified in the local stormwater bylaws or ordinances.

Off-site compliance for stormwater management at redevelopment sites.

1. Every Applicant shall install or construct measures that retain the volume of runoff equivalent to, or greater than, 0.8 inches multiplied by the total post-construction impervious surface area on the site AND/OR remove 80% of the average annual post-construction load of total suspended solids (TSS) AND 50% of the average annual load of total phosphorus (TP) generated from the total post-construction impervious area on the site, as described in the Small Municipal Separate Sewer System (MS4) General Permit unless off-site compliance is approved by [Stormwater Authority].

2. [Stormwater Authority] may not waive the minimum requirements of the Small MS4 General Permit for stormwater management of water quality protection.

3. The application for off-site compliance for stormwater management on a redevelopment site must include:
    a. A review fee in the amount of [$X] for review of the off-site compliance application
    b. Stormwater management concept plan
    c. Applicant information
    d. Redevelopment site information
    e. Documentation of meeting on-site compliance to the maximum extent practicable (MEP)
    f. Water volume calculations using the procedures established in the Massachusetts Stormwater Handbook, or other equivalent method pre-approved by [Stormwater Authority], OR pollutant removal calculations consistent with EPA Region 1's BMP Performance Extrapolation Tool, other BMP

performance evaluation tool provided by EPA Region 1, or federally or state approved BMP design guidance or performance standards.

4. To be eligible for off-site compliance on a redevelopment site, the Applicant must demonstrate to the satisfaction of [Stormwater Authority] that on-site compliance was met to the MEP.

5. Where off-site compliance is approved, the Applicant shall satisfy stormwater management requirements by accomplishing an approved off-site mitigation project.

6. Off-site mitigation projects must meet the following conditions:
    a. The off-site mitigation project must be in the same [watershed] as the original project, and on existing impervious surface not expected to be the subject of redevelopment in the next 5 [or more] years, as approved by [Stormwater Authority].
    b. [Stormwater Authority] shall, at its discretion, identify priority areas within the [watershed] in which off-site mitigation projects may be completed.
    c. Off-site mitigation must be for retrofit or redevelopment projects, and cannot be applied to new development.
    d. In all cases, land rights, access agreements or easements, and a maintenance agreement and plan shall be developed to ensure long-term maintenance of any off-site mitigation project prior to approval of the off-site mitigation proposal.
    e. Installation of the off-site mitigation project shall be completed: (a) within three (3) years from the date that the stormwater management design plan is approved, or (b) prior to full completion of the new development or redevelopment project related to the off-site mitigation project, whichever of (a) or (b) is earlier.

NOTE to MS4s: Section 7 is one model for ensuring that off-site mitigation projects are held to the same requirements as on-site projects. Using this approach, the new off-site ordinance/bylaw simply references the appropriate sections of the broader ordinance/bylaw.

7. All requirements in Sections [list sections] for on-site stormwater management shall also apply to off-site mitigation projects. These requirements include but are not limited to a stormwater management design plan, inspections, maintenance, and performance bonds.

NOTE to MS4s: Sections 8 is an alternative model in which the requirements related to inspections of off-site mitigation projects are provided in more detail.

8. [Stormwater Authority] shall inspect all off-site mitigation projects to ensure that they are properly installed to manage the required volume of stormwater.
    a. The applicant shall grant [Stormwater Authority] the right to enter the property of the off-site project for the purposes of making inspections and ensuring compliance with this Section.
    b. The applicant must notify [Stormwater Authority] before the commencement of construction of the off-site mitigation project. In addition, the applicant must notify [Stormwater Authority] in advance of construction of critical components of the stormwater practices on the approved stormwater management design plan. [Stormwater Authority] may, at its discretion issue verbal or written authorization to proceed with critical construction steps, such as installation of permanent stormwater practices based on stabilization of the drainage area and other factors.
    c. [Stormwater Authority] or its representatives shall conduct periodic inspections of the stormwater practices shown on the approved stormwater management design plan, and especially during critical installation and stabilization steps. All inspections shall be documented in writing. The inspection shall document any variations or discrepancies from the approved plan, and the resolution of such issues. Additional information regarding inspections can be found in Section [X]. A final inspection by [Stormwater Authority] is required before any performance bond or guarantee, or portion thereof, shall be released.
    d. At its discretion, [Stormwater Authority] may authorize the use of private inspectors to conduct and document inspections during construction. Such private inspectors shall submit all inspection documentation in writing to [Stormwater Authority]. All costs and fees associated with the use of private inspectors shall be the responsibility of the applicant.
        i. If the use of private inspectors in authorized, [Stormwater Authority] shall, at its discretion, maintain a training and certification program, or authorize another entity to maintain such a program. If such a certification program exists, all private inspectors shall be certified prior to conducting any inspections or submitting any inspection documentation to [Stormwater Authority].

ii. If private inspectors are utilized, then inspections by [Stormwater Authority] or its representatives, as provided in Section [X], may be reduced in frequency. However, [Stormwater Authority] shall remain the responsible entity for ultimate inspection, approval, and acceptance of all stormwater BMPs, and for issuance of the Certificate of Completion in accordance with Section [X].

e. The applicant shall prepare an as-built plan for all off-site projects. The plan must show the final design specifications, materials, and elevations for all stormwater management facilities and clearly show deviations from the approved stormwater management design plan. The as-built shall be sealed by a registered professional engineer or other design professional approved by [Stormwater Authority].

f. Subsequent to final installation and stabilization of all stormwater BMPs shown on the stormwater management design plan, submission of all necessary as-built plans, and final inspection and approval by [Stormwater Authority], [Stormwater Authority] shall issue a Stormwater Certificate of Completion for the project. In issuing such a certificate, [Stormwater Authority] shall determine that all work has been satisfactorily completed in conformance with this Ordinance/Bylaw.

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Appendix C. Operation and Maintenance Materials

C.1. Suggested Bylaw/Ordinance Language to Ensure Long Term Operation and Maintenance of Stormwater BMPs

An operation and maintenance manual shall be developed by the project designer for the owner's use once construction on the proposed system is complete. The manual will include a description of each component of the drainage system, inspections, maintenance, and the frequency of each for continued operation of the system.

A draft Operation and Maintenance Plan (O&M Plan) is required at the time of stormwater plan submission for all projects. The O&M Plan shall be designed to ensure compliance with the Stormwater Permit and the Massachusetts Surface Water Quality Standards, 314 CMR 4.00, are met in all seasons and throughout the life of the system.

A final O&M Plan shall be submitted upon project completion. The O&M Plan shall remain on file with the Stormwater Authority and shall be an ongoing requirement. The O&M plan and all of its contents shall be recorded at the Registry of Deeds. Proof of that recording shall be included with the submission of the final O&M Plan. Contents of the O&M Plan shall include:

1. The name(s) of the owner(s) for all components of the system;
2. A plan drawn to scale showing the location of all stormwater BMPs in each treatment train, including catch basins, manholes/access lids, main, and stormwater devices, along with the discharge point, and any easements provided for access to stormwater BMPs;
3. A description and delineation of public safety features;
4. An estimated operations and maintenance budget;
5. Maintenance agreements that specify the following:
    a. The names and addresses of the person(s) responsible for operation and maintenance;
    b. The person(s) responsible for financing maintenance and emergency repairs;
    c. An Inspection and Maintenance Schedule for all stormwater management facilities including routine and non-routine maintenance tasks to be performed;
    d. Agreement that the person(s) responsible for operation and maintenance will follow this schedule, maintain an operation and maintenance log to include inspections, repairs, replacement and disposal (type of material and disposal location), and submit annual certification to the stormwater authority that operation and maintenance work has been completed;
    e. A map and list of easements with the purpose and location of each;

f. Information on how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;

g. The signature(s) of the owner(s) and person(s) responsible for operation and maintenance.

6. Stormwater Management Easement(s)

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

      i. Access for facility inspections and maintenance;

      ii. Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event;

      iii. Direct maintenance access by heavy equipment to structures requiring regular maintenance.

   b. The location of each easement shall be indicated on the plan described in #2 above.

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

   d. Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Stormwater Authority.

   e. Easements and other applicable deed restrictions shall be recorded with the _____ County Registry of Deeds prior to issuance of a Certificate of Completion by the Stormwater Authority.

7. Changes to Operation and Maintenance Plans

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

   b. The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of this Regulation by mutual agreement of the Stormwater Authority and the Responsible Parties. Amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, persons with operational responsibility, and easement grantors.

C.2. Example Stormwater Inspection and Maintenance Agreement

NOTE to MS4s: This example maintenance agreement language is intended to be a starting place for a municipality and should be modified to meet all legal requirements of the municipality. Highlighted text indicates items that may need to be altered to fit a municipality's needs.

STORMWATER MANAGEMENT/ BMP FACILITIES AGREEMENT

Permit Number: _____

Map & Parcel Number: _____

Project Name: _____

Project Address: _____

THIS AGREEMENT, made this _____ day of _____, 20__, by and between _____ [Full Owner's Name], hereinafter referred to as the "[OWNER]" of the following property and [Stormwater Authority] hereinafter referred to as the "[Authority]."

WITNESSETH, that

WHEREAS, the Landowner is the [OWNER] of certain real property, with full authority to execute deeds, mortgages, other covenants, do hereby covenant with the [Authority] and agree as follows:

1. The [OWNER'S] covenant with the [Authority] is that the [OWNER] shall provide for adequate long-term maintenance and continuation of the stormwater control measures described in the Stormwater Management Plan and shown in the location map, deed of easement drawing, or plat attached hereto to ensure that the facilities are and remain in proper working condition in accordance with approved design standards, rules and regulations, and applicable laws. The [OWNER] shall perform preventative maintenance activities at intervals described in the inspection schedule included in the Operations and Maintenance Plan along with necessary landscaping (grass cutting, etc.) and trash removal as part of regular maintenance.

2. The [OWNER] shall submit to the [Authority] an annual report by _____ [date] each year. The report shall include the Operations and Maintenance Plan that documents the inspection schedule, times of inspection, remedial actions taken to repair, modify, or reconstruct the system, the state of control measures, and notification of any planned change in responsibility for the system.

3. The [OWNER] shall grant to the [Authority] or its agent or contractor the right of entry at reasonable times and in a reasonable manner for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining, or repairing the facility.

4. The [OWNER] shall grant to the [Authority] the necessary easements and rights-of-way and maintain perpetual access from public rights-of-way to the facility for the [Authority] or its agent and contractor.

5. If, upon inspection, the [Authority] finds that [OWNER] has failed to properly maintain the facilities, the [Authority] may order the work performed within _____ days. In the event the work is not performed within the specified time, the [OWNER] agrees to allow the [Authority] to enter the property and take whatever steps it deems necessary to maintain the stormwater control facilities. This provision shall not be construed to allow the [Authority] to erect any structure of a permanent nature on the land of the [OWNER] without first obtaining written approval of the [OWNER].

6. The [Authority] is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the [Authority]. The [OWNER] shall reimburse the [Authority] upon demand the costs incurred in the maintenance of the facilities.

7. If the [OWNER] fails to pay the [Authority] for the above expenses after _____ days written notice, the [OWNER] authorizes the [Authority] to collect said expenses from the [OWNER] through appropriate legal action and the [OWNER] shall be liable for the reasonable expenses of collection, court costs, and attorney fees.

8. The [OWNER] and the [OWNER'S] heirs, administrators, executors, assigns, and any other successor interest shall indemnify and hold harmless the [Authority] and its officers, agents and employees for any and all damages, accidents, casualties, occurrences, claims, or attorney's fees which might arise or be asserted, in whole or in part, against the [Authority] from the construction, presence, existence, or maintenance of the stormwater control facilities subject to the Agreement. In the event a claim is asserted against the [Authority], its officers, agents, or employees, the [Authority] shall notify [OWNER] and the [OWNER] shall defend at [OWNER'S] expense any suit based on such claim. If any judgment or claims against the [Authority], its officers, agents, or employees, shall be allowed, the [OWNER] shall pay all costs and expenses in connection therewith. The [Authority] will not indemnify, defend, or hold harmless in

any fashion the [OWNER] from any claims arising from any failure, regardless of any language in any attachment or other document that the [OWNER] may provide.

9. The [OWNER] shall not be able to transfer, assign, or modify its responsibilities with respect to this agreement without the [Authority's] written prior consent. Nothing herein shall be construed to prohibit a transfer by [OWNER].

10. No waiver of any provision of this Agreement shall affect the right of any party thereafter to enforce such a provision or to exercise any right or remedy available.

11. The [OWNER] shall record a plat showing and accurately defining the easements for stormwater control facilities. The plat must reference the Instrument Number where this Agreement and its or attachments are recorded and contain a note that the [OWNER] is responsible for maintaining the stormwater management facilities.

12. The [OWNER] shall record that Agreement in the Registry of Deeds for _____ County, Massachusetts, and the Agreement shall constitute a covenant running with the land and shall be binding upon the [OWNER] and the [OWNER'S] heirs, administrators, executors, assigns, and any other successors in interest.

Attest by [OWNER(S)] **For the [City/Town]**

_____ _____
[OWNER] Signature Signature

_____ _____
Print Name Print Name

_____ _____
Date Date

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Appendix D. Resources for Creating a Stormwater Utility

When it comes to the development and implementation of stormwater utility, there is an abundance of guidance available. The appendix lists the basic steps to developing a stormwater utility, lists the municipalities that have stormwater utility, and summarizes a handful of resources relevant to program development in Massachusetts.

D.1. Step-by-Step Summary (US EPA, 2009; PVPC, 1999)

1. Define stormwater management problems within the scope of the municipality
2. Identify contributing factors to stormwater management problems
3. Develop a feasibility study
4. Create a billing system
5. Roll out a public information program
6. Adopt an ordinance/bylaw
7. Provide credits/exemptions (optional)
8. Implement the utility
9. Collect public feedback and continue refining the utility

D.2. Massachusetts Towns with a Stormwater Utility

There are 10 municipalities with a stormwater utility. **Table D.2** lists the municipalities and their relevant program information.

D.3 Literature Summary

See below.

Table D.2. Massachusetts Municipalities with Stormwater Utilities. (Prepared and updated by Pioneer Valley Planning Commission, July 2018)

Municipality (population)	Organizational Structure	Date Created	Annual Revenue	Annual Rate	Credit Program?
Braintree (pop. 35,744)	Stormwater Enterprise Fund	2018	$600,000	ERU = 2,780 SF of IA[7] Residential (1 to 3 family) = $25 All other properties = $25 for each ERU (min. charge $25 and max. charge $2,917.50)	None yet
Chelmsford (pop. 33,802)	Stormwater Enterprise Fund	2017 (started 2018)	FY18 = $1,142,588 FY19 = $1,467,474	Single and two-family residential = $40 Multi-family and non-residential based on 18 tiers of impervious area: Tier 1: < 5,000 SF of IA = $250 Tier 18: ≥ 1.1 million SF of IA = $8,000	Starts FY2019
Chicopee (pop. 55,298)	Stormwater Utility Bureau, DPW	1998	$1,000,000	Single family residential = $100 Multi-family, industrial, commercial properties = $1.80 per 1,000 SF of IA (min. charge $100 and max. charge $640)	Yes
Fall River (pop. 88,930)	Sewer Commission SW fee (also funds CSO abatement)	2008	FY18 = $5,883,757	ERU = 2,800 SF of IA Residential (1 to 8 family) = $176 Commercial, industrial, residential > than 8-family = $176 for each ERU	Yes
Longmeadow (pop. 15,806)		May 2017; effective July 1, 2018	FY19 = $215,000	ERU = 3,400 SF of IA Residential = $27 Non-residential = declining block rate structure. Determined by multiplying user fee rate per ERU x # of ERUs Block ERU Range — Coefficient 1–10 — 1.0 11–50 — 0.9 51–100 — 0.8 101–500 — 0.7	In process

[7] SF of IA = square feet of impervious area

<table>
<tr><th>Municipality (population)</th><th>Organizational Structure</th><th>Date Created</th><th>Annual Revenue</th><th>Annual Rate</th><th>Credit Program?</th></tr>
<tr><td>Milton
(pop. 27,003)</td><td>Enterprise Fund</td><td>2016</td><td>$793,836 (estimated for FY18 budget)</td><td>
<table>
<tr><th></th><th>Tier</th><th>SF of IA</th><th>Fee</th></tr>
<tr><td>Single family</td><td>Tier 1</td><td>0–2,075</td><td>$32</td></tr>
<tr><td></td><td>Tier 2</td><td>2,076–2,675</td><td>$44</td></tr>
<tr><td></td><td>Tier 3</td><td>2,676–4,225</td><td>$61</td></tr>
<tr><td></td><td>Tier 4.1</td><td>4,226–8,364</td><td>$110</td></tr>
<tr><td></td><td>Tier 4.2</td><td>8,365–15,894</td><td>$205</td></tr>
<tr><td></td><td>Tier 4.3</td><td>≥15,895</td><td>$468</td></tr>
<tr><td>Other</td><td></td><td>$1.88 x 100 sf</td><td>Varies by area</td></tr>
</table>
</td><td>Under consideration</td></tr>
<tr><td>Newton
(pop. 85,146)</td><td>Enterprise Fund</td><td>2006 (rates updated 2016)</td><td>$2,100,000</td><td>1-4 family dwellings = $75 per year
All other properties, one of 13 tiers =
<table>
<tr><th>SF of IA</th><th>Fee</th></tr>
<tr><td>0–4,999</td><td>$250</td></tr>
<tr><td>5,000–7,499</td><td>$500</td></tr>
<tr><td>7,500–9,999</td><td>$750</td></tr>
<tr><td>10,000–14,999</td><td>$1,000</td></tr>
<tr><td>15,000–24,999</td><td>$1,250</td></tr>
<tr><td>25,000–49,999</td><td>$1,500</td></tr>
<tr><td>50,000–74,999</td><td>$1,750</td></tr>
<tr><td>75,000–99,999</td><td>$2,000</td></tr>
<tr><td>100,000–199,999</td><td>$2,500</td></tr>
<tr><td>200,000–299,999</td><td>$3,000</td></tr>
<tr><td>300,000–399,999</td><td>$3,500</td></tr>
<tr><td>400,000–499,999</td><td>$4,000</td></tr>
<tr><td>500,000 and greater</td><td>$5,000</td></tr>
</table>
</td><td>Yes</td></tr>
</table>

Municipality (population)	Organizational Structure	Date Created	Annual Revenue	Annual Rate	Credit Program?
Northampton (pop. 28,540)	DPW Stormwater and Flood Control Utility Enterprise Fund	2014	$1,940,000	Residential = SF of IA — Fee < 2,250 — $63.94 2,250–3,056 — $91.05 3,056–4,276 — $125.60 > 4,276 — $259.07 Other (including residential > 4 units) = Based on impervious and pervious area (max. of 1 acre for pervious area) each property with runoff coefficient factors applied to each and pervious area for each property capped at one acre. Formula = Impervious Area x 0.95 + Pervious Area x 0.1 = Hydraulic Area The hydraulic area is then multiplied by the rate that is set each year to calculate the fee.	Yes
Reading (pop. 24,747)	DPW Stormwater Enterprise Fund	2006 (small fee increase in 2010)	$517,000	ERU = 3,210 SF of IA Single and two-family residences = $60 Multi-family, commercial, and industrial properties = $60 per ERU	Yes
Westfield (pop. 41,094)	Stormwater Utility, Enterprise Fund	2010	$560,000	Residential = $20 Non-residential = $0.045/ SF of IA • Min = $100 • Max = $640	Yes

Note: Gloucester passed a stormwater utility ordinance in 2009 and the City passed accompanying draft regulations in 2011. The City Council has not yet established an enterprise fund or user fees.

D.3. Literature Summary

Below is a summary of some relevant literature to assist with the development of a new stormwater utility program.

Metropolitan Area Planning Council. (2014). Stormwater Financing/Utility Starter Kit. https://www.mapc.org/resource-library/stormwater-financing-utility-starter-kit/

The Metropolitan Area Planning Council (MAPC) developed a Stormwater Utility/Funding Starter Kit to help municipalities take control of local water quality issues via a long-term funding source for stormwater management. The Stormwater Utility/Funding Starter Kit website includes stormwater fee strategies; starter kit modules in topics including needs assessment, financing structure and rate development, outreach and education (internal and external), and administration and management options; a stormwater utility analysis workbook; and templates that can be used by municipalities to begin to plan and develop their long-term stormwater management funding scheme.

The Financing/Fee Structure module discusses several funding options including drainage fees, a graduated fee system, enterprise funds, general fund appropriation, bonds/loans, grants, betterments, capitalization recovery fees, and plan review, development inspection, and other review fees.

Massachusetts Coastal Zone Management (2007). Assessment of Stormwater Financing Mechanisms in New England. http://www.crwa.org/hs-fs/hub/311892/file-687519663-pdf/Our_Work_/Stormwater/Municipal_SFM_Case_Studies_Repo.pdf

The Charles River Watershed Association (CRWA) authored a report published by Massachusetts Coastal Zone Management in 2007 containing the results of their evaluation of stormwater financing mechanisms in New England. The CRWA assessed the development and implementation process for stormwater financing mechanisms in three New England cities, two of which were in Massachusetts (Newton and Reading). This assessment included interviews with staff associated with the development and implementation of the financing mechanisms along with an assessment of a variety of online stormwater financing guidance.

Pioneer Valley Planning Commission (1999). How to Create a Stormwater Utility. http://www.pvpc.org/sites/default/files/storm_util.pdf

The Pioneer Valley Planning Commission (PVPC) published a comprehensive, detailed guide to creating stormwater utilities in 1999 to complement their findings from a project examining the feasibility of stormwater utility creation in Massachusetts. This document contains a summary

of research, a step-by-step guide to the utility development process, and sample public education materials. Additionally, this guide outlines the five essential areas to consider when developing a municipal stormwater utility: legal issues, community outreach and public involvement, management, assessment, and rate setting.

Massachusetts Rivers Alliance (2016). Creating a Revenue Stream for Stormwater Management. http://massriversalliance.org/wp-content/uploads/2016/04/StormwaterFundingResourcesHhandout04-16.pdf

In 2016, the Massachusetts Rivers Alliance published an informative handout with links to a variety of stormwater funding resources, including information on general stormwater funding, stormwater fees and utilities, grants and loans, and examples and case studies.

Merrimack Valley Stormwater Collaborative c/o Merrimack Valley Planning Commission (2015). A Quick Reference for Defining and Funding Your Municipal Stormwater Program. http://www.merrimackvalleystormwater.org/wp-content/uploads/2015/01/MVPC-Guide-to-Defining-Funding-SW-Program-2.pdf

The Merrimack Valley Stormwater Collaborative, a part of the Merrimack Valley Planning Commission, published a reference document in 2015 for defining and funding municipal stormwater programs. This document provides basic reference information to assist communities in developing stormwater utilities. It emphasizes the importance of identifying the 'driver' that defines the stormwater problems that a municipality may face. According to the MVPC, some of the most common challenges among municipalities include drainage and roadway safety, aging infrastructure, regulatory compliance, flooding, and water quality. However, there are unique challenges that face individual communities that can also drive support for stormwater program development. Examples of such unique drivers include recurring localized flooding, beach closures at ponds or coastal beaches, shellfish closures, drainage problems at public recreational areas, visible degradation or algae growth in ponds, trash and aesthetics issues, and/or significant erosion that affects public infrastructure.

United States Environmental Protection Agency (2009). Funding Stormwater Programs. https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/FundingStormwater.pdf

The United States Environmental Protection Agency published a fact sheet in 2009 on funding stormwater programs in the New England area. This document assists local stormwater managers by providing information on several types of stormwater utilities along with stormwater funding sources.

Appendix E. Overview of Payment-in-Lieu

E.1. Introduction to Payment-in-Lieu

A payment-in-lieu program is not recommended for most small MS4s because of its complexity and potential that it will not fulfill the MS4's permit requirements. With a payment-in-lieu program, the applicant provides a fee to the MS4 (or its assigned entity) that will help cover the cost of implementing approved pollutant removal projects elsewhere in the HUC 10 or designated HUC 12 subwatershed. Payment-in-lieu fees from multiple sites are aggregated by the MS4 to construct "public stormwater projects", which are projects deemed by the MS4 to have a public benefit for water resources protection or enhancement, stormwater treatment, ecological restoration, and other community benefits. Fees might also allow economies of scale. However, a payment-in-lieu program requires a much more active role for the MS4 compared to the site developer. The MS4 must have several program elements in place before considering a payment-in-lieu program and is responsible for establishing the amount paid for unmet on-site pollutant removal, as well as collecting, tracking, administering, and constructing off-site compliance projects.

E.2. Administration of a Payment-in-Lieu Program

A payment-in-lieu program can be administered through the MS4, a public/private initiative, or a private bank. Any payment-in-lieu program must have an Enterprise Fund and ability to oversee construction activities (e.g. programs managed by a water and sewer utility district) or be able to collect fees and dedicate those funds to stormwater related projects. In-lieu fees typically need to cover higher municipal prevailing wage and public bidding costs. The off-site mitigation practices must be implemented in the same HUC 10 watershed as the original project (or more restrictive limits, at the discretion of the MS4). Therefore, careful accounting must take place to ensure that each site utilizing off-site mitigation to meet pollutant removal requirements has corresponding off-site controls in the same watershed.

Why MS4s May Be Interested in Payment-in-Lieu

Some MS4 programs, particularly those that operate through utilities or enterprises with existing mechanisms for collecting fees and capitalizing, constructing, and maintaining projects, may prefer a higher level of control over their stormwater management program. The MS4 may prefer to use its own crews for project management and construction rather than verifying the work of third-party applicants. An important element of this approach is making sure the payment-in-lieu fee is set at an adequate amount to plan, design, build, maintain, and administer projects that achieve the same or higher level of pollutant removal required by the redevelopment project.

One of the largest criticisms of these types of programs to date is that the program collects the fees but is slow to build the projects, leaving the MS4 at risk of an enforcement action. To maintain permit compliance MS4s should install off-site mitigation stormwater controls as soon as possible after the redevelopment project is complete and must ensure that each redevelopment project has associated stormwater controls in the same watershed.

Table E.1 outlines the specific roles and responsibilities for the MS4 and the applicant for payment-in-lieu.

CAUTION:

Payment-in-lieu fees collected by the MS4 must be used to construct stormwater BMPs. The fees cannot be used as a source of general fund money for the MS4.

Table E.1. Responsibilities for Off-Site Payment-in-Lieu Compliance.

MS4 and Applicant Responsibilities
MS4 Program Prerequisites and Responsibilities ▪ Enterprise Fund ▪ Choose site ranking criteria ▪ Develop scoring and weighting structure ▪ Score and rank potential projects ▪ Establish fee schedule ▪ Spending the available funds on eligible BMPs accountable to the EPA or permit administrator ▪ Design, construct, and maintain off-site compliance projects ▪ Track and report redevelopment projects and all associated stormwater controls used to meet pollutant removal requirements on a per site basis to EPA or permit administrator
Applicant Responsibilities ▪ Documents on-site compliance was met to the maximum extent practicable ▪ Pays fee

E.3. Importance of Setting the Payment-in-Lieu Fee

For an MS4 developing payment-in-lieu as part of an off-site mitigation program, setting the proper payment-in-lieu fees may be one of the more complicated and important decisions to be made. To successfully set payment-in-lieu fees during the program planning stage, it is necessary for the MS4 to accurately estimate the true costs of the BMPs making up the mitigation "portfolio." However, the costs to design, construct, and maintain various stormwater BMP are notoriously variable and dependent on local factors. Cost estimates from literature can be inconsistent and tend to measure different cost factors for different locations and projects. For example, some cost estimates address only construction, while others consider design and maintenance, as well as program administrative costs (e.g., plan review

and inspection time). Some cost estimates are based on actual projects, while others are modeled from literature searches and best professional judgment. BMP costs are dependent on temporal market conditions, the costs of materials and labor, and other variable factors.

While establishing "true" BMP costs is challenging, MS4s planning to establish an off-site mitigation program should tackle the cost issue because BMP costs are an important element to setting an equitable fee structure which can genuinely cover BMP implementation projects. A brief outline to establish BMP costs and set a payment-in-lieu fee are listed in the following sections.

E.4. Methods to Establish a Payment-In-Lieu Fee

There are no widely-accepted means to set a payment-in-lieu fee. However, the MS4 may consider using the approaches listed below:

1. Select a "Typical" BMP on which to Base Payment-in-Lieu Fees

   A typical BMP should be one that is anticipated by the MS4 and/or state to be used widely to comply with the MS4 General Permit standards, and for which cost and implementation data are available. Bioretention is by far the BMP of choice for this exercise, based on its suitability for a wide variety of sites and ability to meet the pollutant removal performance standard.

2. Set the Fee Based on a Pre-Established Portfolio of Off-Site Mitigation Projects

   If the MS4 has conducted an inventory of specific candidate projects to be used for the off-site mitigation program and project information (such as drainage area and BMP size) are known, the MS4 can forecast composite costs to implement the priority projects.

E.5. Using Bioretention as the "Typical" BMP to Set the Payment-In-Lieu Fee

E.5.1. Representative Bioretention Retrofit Offset Projects

Select a standard drainage area and land characteristics for "typical" bioretention sizing (e.g. an urban site with a 1-acre contributing drainage area, 70% impervious surface and 30% managed turf (Class C Soils)). Based on the typical drainage area, determine the storage volume of a typical bioretention design that can retain runoff from the typical contributing drainage area.

E.5.2. Costs of Implementing Bioretention in Retrofit Situations

The ideal payment-in-lieu fee estimate should reflect the typical costs of implementing the bioretention and include such factors as the following:

- Design and engineering
- Land acquisition – includes opportunity costs

- Construction – includes materials, equipment usage, labor, utility location, and demolition
- Overhead – includes the program administration, insurance, taxes, and interest on loans
- Long-term operation and maintenance

E.5.3. Setting a Payment-In-Lieu Fee

Given the cost variability of bioretention retrofit projects, the challenges faced by the MS4 in setting a fee should be clear. If the fee is set too low then there will not be sufficient funds for full implementation of off-site projects without the use of supplemental public funding, thus subsidizing the developer. If the fee is set too high, then undue burden is placed on developers, which may discourage participation in the program or possibly development of certain sites with limited on-site opportunities. Also, consider indexing fees for inflation and periodically revisit the fee based on actual experience with BMP construction and maintenance.

E.5.4. Private Sector Involvement to Ascertain Costs

As with existing wetland and stream mitigation banks, the private sector and public/private partnerships may have a role in off-site mitigation programs. Their involvement may help establish the correct "price points" for various stormwater and watershed practices used as part of the mitigation program. Putting projects out to bid and/or having the private sector conduct some of the design, construction oversight, and maintenance tasks would allow MS4s to know the actual dollar figures of doing these tasks. Costs would likely vary over time as both public and private professionals and materials vendors become accustomed to designing and building the practices. The choice to involve private sector partners rests with the local MS4 and its existing capabilities.