June 2021 Supplemental Directive to:

City of Cambridge, Massachusetts

Department of Public Works

147 Hampshire Street • Cambridge, MA 02139

Wastewater and Stormwater Management Guidance

May 2008 (Draft Version)

Introduction

The City of Cambridge is in the process of updating the detailed written guidance presented in the **Wastewater and Stormwater Guidance Manual** (Draft Manual, May 2008). The purpose of the update is to ensure that published guidance aligns with existing regulations and ordinances that pertain to new and redevelopment activities (i.e. land disturbance) within the City. Regulations have been modified to address regulatory requirements under the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) General Permit to which the City is subject, consistency with Massachusetts Water Resources Authority Sewer Use Regulations, as well as local initiatives undertaken to enhance resiliency to climate change-related impacts.

This Directive is an interim step to inform project proponents and the public of pertinent requirements that are already in place and which are applicable to subject development or land disturbance activities under current regulations and practice. This information will be integrated fully into the published Guidance Manual, anticipated to be completed in FY 2022.

The document has been structured to provide streamlined information related to modifications to terms and definitions, permit types and/or names, stormwater management design standards, and reporting requirements. This Directive addresses significant issues that require clarity or modification in the near term. **If otherwise unaddressed here, the existing relevant guidance or regulations in place shall still apply**. The underlying ordinances and regulations to which the Guidance Manual and this Directive refers include the following:

- Chapter 13.16 – Wastewater and Stormwater Drainage System (Cambridge, Massachusetts Code of Ordinances (Ordinance)
- City of Cambridge Department of Public Works (DPW) Wastewater and Stormwater Drainage Use Regulations (Regulations)
- City of Cambridge DPW Land Disturbance Regulations (LD Regulations)

All regulations can be found on the Stormwater website at: www.cambridgema.gov/stormwater

Definitions

Definitions or new terms and/or clarifications of existing terms have been added to the City of Cambridge *Land Disturbance Regulations* – Article I General Provisions and Definitions. Among those changes, and particularly pertinent to the City's MS4 program, are the following:

Infeasible shall mean not technologically possible, or not economically practicable and achievable in light of best industry practices.

Stormwater Control Permit is a permit required to conduct land disturbing activities. [Note: this permit replaces the Land Disturbance Permit and the Stormwater and Wastewater Infrastructure Permit previously required under *Land Disturbance Regulations*, and *Wastewater and Stormwater Drainage Use* regulations, respectively.]

Modifications to Stormwater Management Standards and TMDL Information

The City of Cambridge has adopted Stormwater Management Standards in conformance with water quality protection thresholds of the Massachusetts NPDES MS4 permit. In addition, the City has adopted standards that are protective of public health and safety through mitigation of peak flows and potential flood risks. Both the *Wastewater and Stormwater Drainage Use Regulations* and the *Land Disturbance Regulations* include language with respect to water quality and water quantity requirements, however, both also cite the Guidance Manual as the source for details regarding minimum design standards. These design standards are addressed specifically in Sections 3.1.1 and 3.1.2 of the Guidance Manual. Per this Directive, those referenced sections of the Guidance Manual are voided and shall be replaced in their entirety with the language below. In addition, Appendix C of the Guidance Manual address Total Maximum Daily Load (TMDL) requirements and shall be voided and shall be replaced in its entirety with the document provided with this Directive in Attachment A.

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[3.1.1] Water Quantity Controls

Acceptable water quantity controls must meet the following criteria:

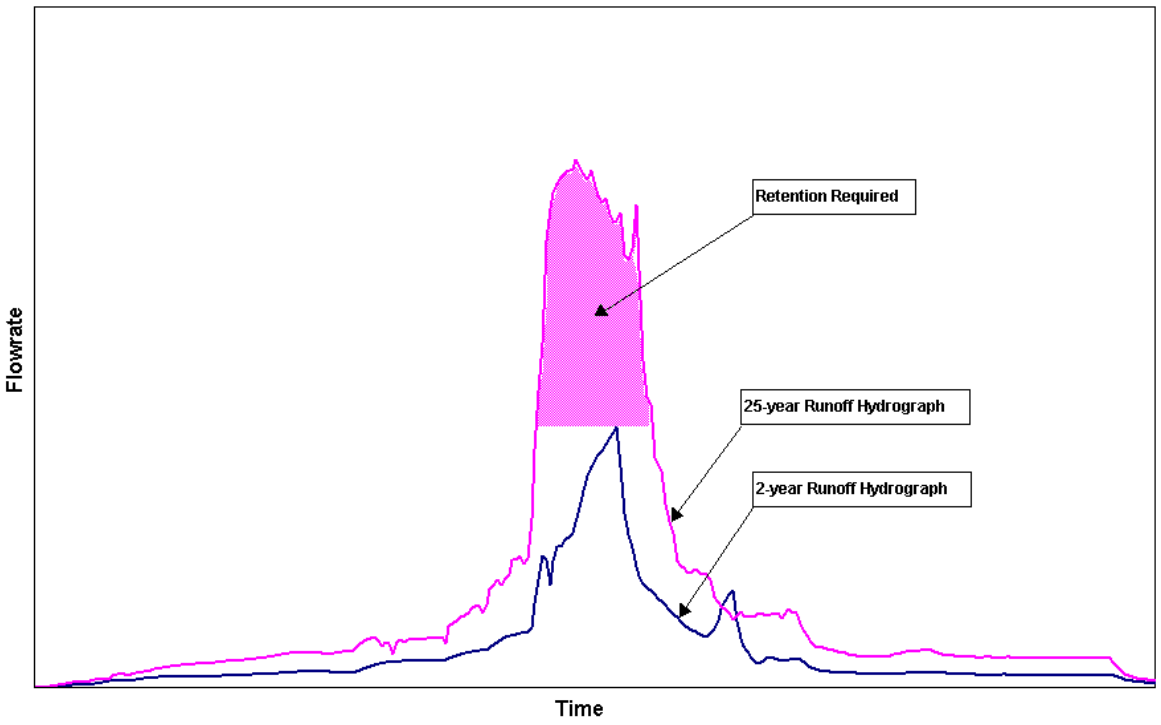
1. Low Impact Development (LID) site planning and design strategies must be implemented unless infeasible in order to reduce the discharge of stormwater from development sites.
2. Maximize the extent to which runoff from the project site is infiltrated to groundwater, providing that in so doing, soil and groundwater contamination is not exacerbated in accordance with MA DEP guidelines.
3. Rainfall data shall be based on the Cambridge projected rainfall data for 2070 as shown in Table 1. This table provides a summary of current design storms for reference and information. Projected Cambridge 2070 storm events shall be used for calculating the required post construction runoff storage and for all water quality and stormwater BMP sizing.

Table 1. Rainfall Data Change based on 2070 Projected Event

	2 year (in)	10 year (in)	25 year (in)	100 year (in)
TP-40		4.70		6.80
Cambridge Present (Current Cornell)	3.25	4.90	6.21	8.90
Cambridge 2030	3.34	5.60	7.25	10.20
Cambridge 2070	**3.65**	**6.40**	**8.22**	**11.70**

4. Store the difference between the 2-year 24-hour pre-construction runoff hydrograph from the site and the post construction 25-year 24-hour runoff hydrograph from the site utilizing the City's projected rainfall data for the 2070 storm event as shown in Table 1. As a general rule, for properties discharging into the City of Cambridge municipal drainage system the City will provide a drainage level of service capacity to accept and transport up to the 2-year storm event. The stormwater runoff detention requirement states that the total volume of runoff generated between the pre-development 2-year 24-hour storm peak discharge and the post development 25-year 24-hour storm peak discharge shall be retained. Figure 3-1 illustrates this requirement with hypothetical stormwater runoff plots. The shaded area (the area between the peak 2-year runoff and the 25-year runoff) represents the quantity of stormwater retention required for achieving compliance with the City's stormwater quantity control rule.

Figure 3-1: Onsite Retention Requirements



5. Infiltrate at a minimum the first inch of runoff from the project site to groundwater when soil and groundwater conditions allow.
6. Where soil conditions do not permit infiltration, provide alternative BMPs that ensure 90% removal of TSS from the site for New Development and 80% removal of TSS from the site for Redevelopment projects.
7. New Development and Redevelopment projects: All projects are required to remove between 65 - 100% of the average annual load of Total Phosphorus generated from the total post-construction impervious area on the site. Refer to the updated Appendix C of the Guidance Manual for TMDL Information (provided as Attachment A to this Directive). Note that the Massachusetts MS4 General Permit Appendices F and H (with attachments) provide detailed guidance on calculation of pollutant load reductions based on specific BMPs, and should be referenced as appropriate. Project proponent shall appropriately address all other pollutants of concern.
8. Ensure that the post-project peak discharge rates do not exceed the pre-project peak discharge rates (from the project area).
9. Ensure that stormwater runoff, as a result of the project, does not have a negative impact on abutting property.
10. Ensure that there will be no reduction in groundwater recharge as a result of the project.

These control requirements are in addition to those required for properties within the 1-percent-annual-chance floodplain, can be engineered to complement each other, and are discussed in more detail in Section 3.3.

[3.1.2] Water Quality Controls

The runoff volume to be treated for water quality is based in part on the MA DEP Stormwater Management Policy and EPA's General Permit for Municipal Separate Storm Sewer Systems (MS4). Acceptable water quality controls must meet the following criteria:

1. Treat the full water quality volume.
2. New Development projects: Retain the volume of runoff equivalent to, or greater than, 1.0 inch multiplied by the total post-construction impervious surface area on the site AND/OR remove 90% TSS and 98% trash and floatables by following the prescribed stormwater runoff treatment train in accordance with the type of project and site conditions. Refer to Section 3.3 for more details.
3. New Development and Redevelopment projects: Remove a minimum of 65% - 100% Total Phosphorous load. Refer to Attachment A for TMDL Information.
4. Redevelopment projects: 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 remove 80% of the average annual post construction load of TSS and trash and floatables removal to the maximum extent feasible.

For the purposes of this Guidance document, "to the maximum extent feasible" will be defined as:

- Applicants have illustrated that they have made all reasonable efforts to meet the applicable requirements;
- Applicants have made a complete evaluation of possible stormwater management measures which could be used on site including environmentally sensitive site design that minimizes land disturbance and impervious surfaces, LID techniques, and stormwater BMPs; and,
- If not in full compliance with the applicable requirements, Applicants are implementing the highest practicable level of stormwater management.

The water quality runoff volume can be applied toward the total runoff quantity control volume to be retained onsite, provided the post-development peak discharge rate requirements are met.

With the exception of "stormwater hot spots" noted in Section 3.1.3, all treatment systems capable of satisfying the above requirements are also assumed to satisfy pollutant level criteria for other "pollutants of concern".

These control requirements are discussed in more detail in Section 3.3.

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TMDLs

Note, that as of the date of this Directive, two Final TMDLs have been approved for the Charles River Watershed, and one final TMDL and one Alternative TMDL Report have been approved for the Mystic River Watershed:

- Final Phosphorus TMDL for the Lower Charles River Basin
- Final Pathogen TMDL for the Charles River Watershed
- Final Pathogen TMDL Report for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds
- Mystic River Watershed Alternative TMDL Development for Phosphorus Management - Final Report

More detailed information about these TMDLs can be found in the updated Appendix C to the Wastewater and Stormwater Management Guidance document, provided as Attachment A to this Directive.

Pollutants of concern and TMDLs in Cambridge can begin to be addressed through BMP selection as discussed in more detail in Section 3 of the Guidance Manual.

Stormwater management systems shall be designed to meet an average annual pollutant removal equivalent to 90% for new development or 80% for redevelopment of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND a minimum of 65% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site (refer to Attachment A for more information). Pollutant removal is calculated based on average annual loading and not on the basis of any individual storm event. Average annual pollutant removal requirements are achieved through one of the following methods:

1. Installing Best Management Practices (BMPs) that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; **or**
2. Retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site (0.8 inch for redevelopment site); **or**
3. Meeting a combination of retention and treatment that achieves the above standards; **or**
4. Utilizing offsite mitigation that meets the above standards within the same USGS HUC12 (Hydrologic Unit Code 12) as the new development site and within the City of Cambridge. Note: watersheds are delineated by USGS using a nationwide system based on surface hydrologic features. HUC12 refers to a local sub-watershed level sufficient to ensure mitigation is applied in an area proximate to the impacts associated with land disturbance within the same sub-watershed. See attached USGS map for reference to applicable areas within the City.

5. For the use of other BMPs not covered in item 1 above, provide documentation of approval from EPA in accordance with the *Alternatives Methods* section of "Methods to Calculate Phosphorous and Nitrogen Load Reductions for Structural Stormwater Best Management Practices in the Watershed" in the Massachusetts MS4 General Permit Appendices F Attachment 3.

Other Provisions

- Per Appendix G Stormwater Control Permit Checklists of the Wastewater and Stormwater Guidance Document, the City requires the contractor to post information related to the approved Stormwater Control Permit at the entrance to the site in order that the public may have the opportunity to comment on erosion or water quality concerns and how to submit their concerns.
- Per City of Cambridge *Land Disturbance Regulations Article VI – Operation and Maintenance Standards,* the project owner is responsible for maintenance and shall prepare and submit to the DPW for approval an Operation and Maintenance Plan for the stormwater management measures incorporated in the Stormwater Control Permit. In addition, the owner of the property shall submit to DPW a certification annually that inspections and maintenance of the stormwater management measures have been performed according to these regulations.
- In addition to the pollutant reduction requirements cited above, industrial and commercial projects (new or redevelopment) that discharge through the MS4 to water quality limited waterbodies and their tributaries where solids, oil and grease (hydrocarbons), or metals is the cause of the impairment are obligated to implement additional protective practices. Both the Charles River and the Alewife Brook are considered impaired for these pollutants. Practices must include designs that allow for shutdown and containment, where appropriate, to isolate the system in the event of an emergency spill or other unexpected event. In conformance with MS4 requirements under Appendix H (V)(2)(a) the City requires "all stormwater management systems designed to infiltrate stormwater on commercial or industrial sites to provide the level of pollutant removal equal to or greater than the level of pollutant removal provided through the use of biofiltration of the same volume of runoff to be infiltrated, prior to infiltration."

Cambridge HUC-12 Map

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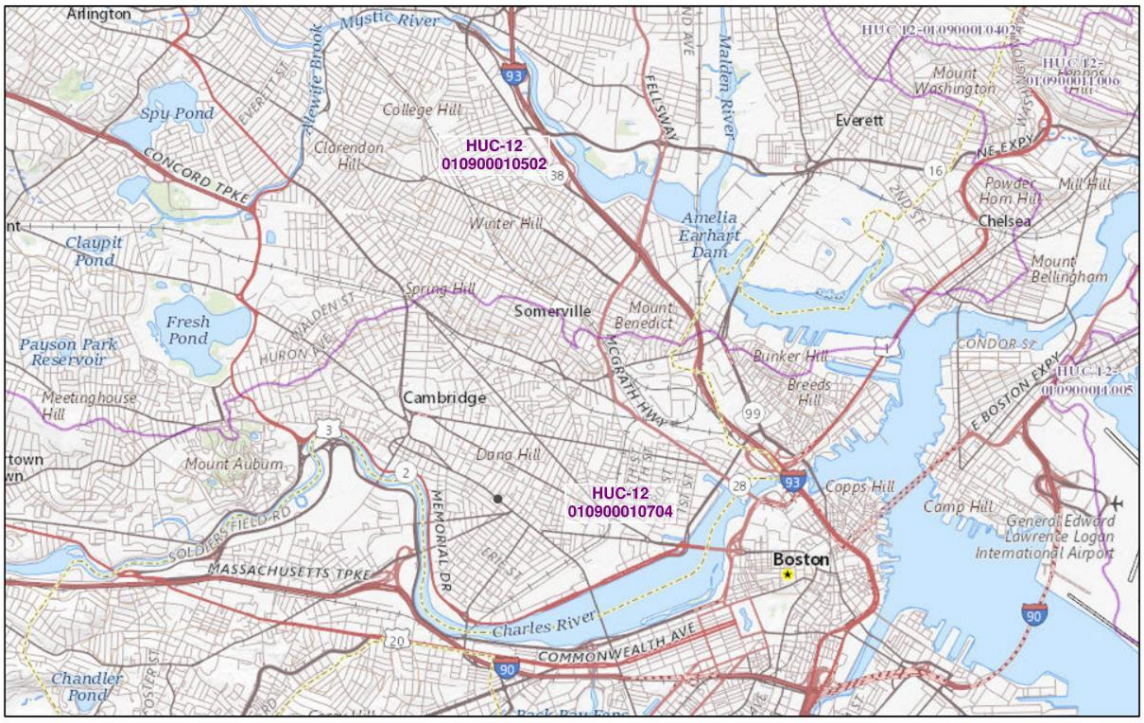


Website: https://apps.nationalmap.gov/viewer/

12-digit HU (Subwatershed)

1:72,224

0 0.45 0.9 1.8 mi

0 0.75 1.5 3 km

USGS WBD - Watershed Boundary Dataset. Data refreshed April, 2021.

USGS

2021 USGS

Attachment A (June 2021 Supplemental Directive)

Wastewater and Stormwater Management Guidance: Appendix C

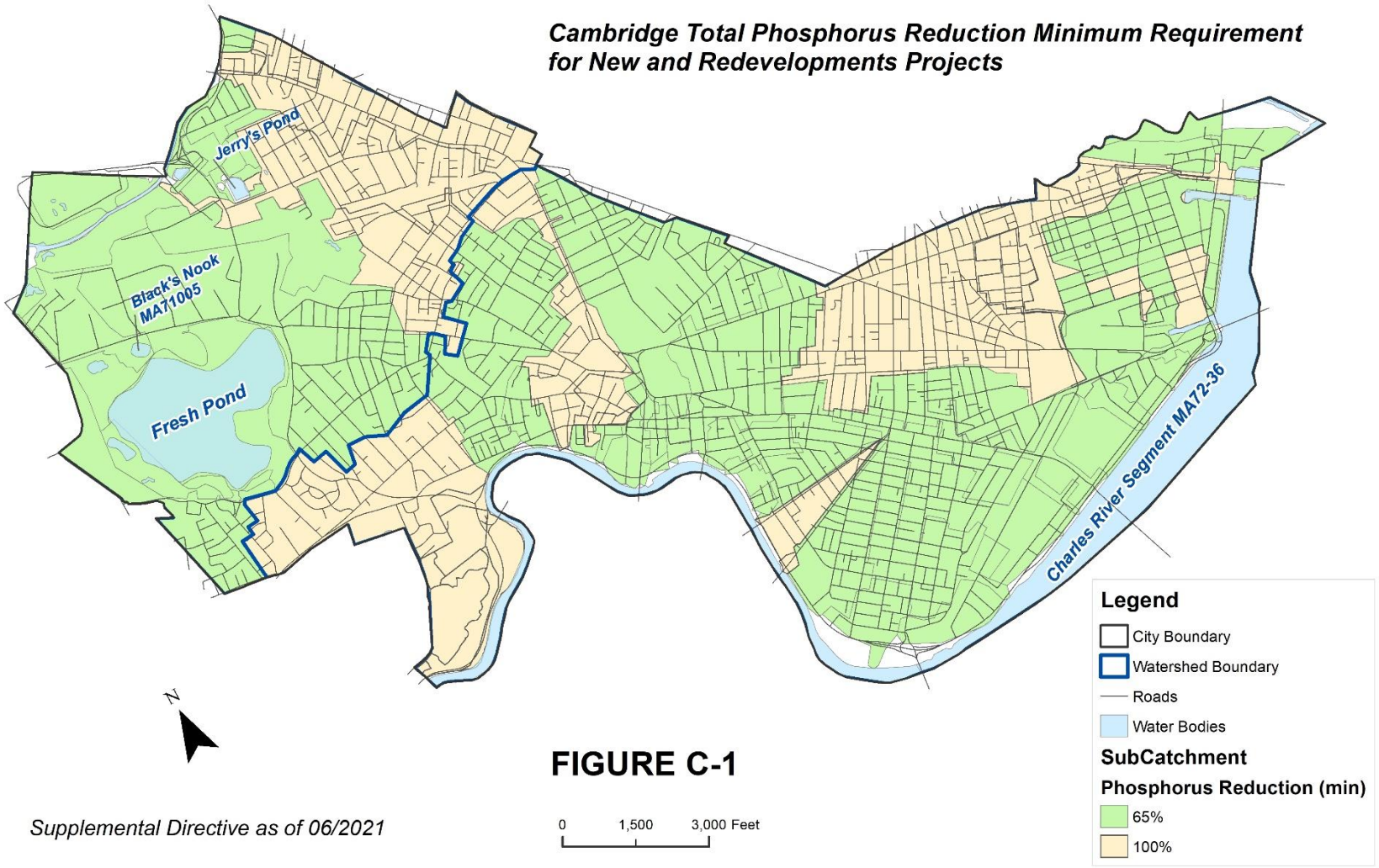
Total Maximum Daily Loads (TMDL) Information

Total Phosphorus TMDL

The Massachusetts MS4 Permit requires the reduction of Total Phosphorous (TP) discharging to impaired receiving waters. In Cambridge, approximately 317 kg/yr (62%) of TP load must be reduced in discharges to the Charles River by July 2038. The TP load reduction for the Alewife Brook (Mystic River Watershed) has not yet been finalized but required TP load reductions from stormwater discharges are expected to be between 59-62% of annual load.

To meet these requirements, the City requires that all New and Redevelopment projects reduce TP loads by a minimum of 65% or up to 100% as shown in Figure C-1. Areas that require a minimum TP load reduction of 65% are areas that currently discharge to or were planned to discharge directly to the receiving waters at the time of TMDL development. Areas that require a TP load reduction of 100% are areas that were considered combined sewer areas at the time of TMDL development and where additional sewer separation would result in a new or previously unplanned discharge to the receiving waters.

Figure C-1. TP Removal Requirement



Total Maximum Daily Loads Information – Reference and Links

Charles River Watershed As of the date of this document, two TMDLs have been set for the Charles River Watershed.

- Final Phosphorus TMDL for the Lower Charles River Basin
- Final Pathogen TMDL for the Charles River Watershed

For the most updated information on TMDLs for the Charles River Watershed, please visit: http://www.mass.gov/dep/water/resources/tmdls.htm#charles

The BMP treatment trains outlined in this Guidance Manual utilize suggested BMPs for mitigating pathogen and nutrient control.

Mystic River Watershed As of the date of this directive, a TMDL and alternative TMDL has been developed for the Mystic River Watershed (which is part of the larger watershed area that drains to Boston Harbor). The Alewife Brook is a sub watershed of the Mystic River Watershed.

- Final Pathogen TMDL Report for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds
- Mystic River Watershed Alternative TMDL Development for Phosphorus Management - Final Report

For the most updated information on TMDLs for the Mystic River Watershed, please visit: https://www.mass.gov/lists/total-maximum-daily-loads-by-watershed.