Stormwater Management Standards

In 1996, the Massachusetts Department of Environmental Protection (the "Department" or "MassDEP") issued the Stormwater Policy that established Stormwater Management Standards aimed at encouraging recharge and preventing stormwater discharges from causing or contributing to the pollution of the surface waters and groundwaters of the Commonwealth. In 1997, MassDEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy. MassDEP has revised the Stormwater Management Standards and Massachusetts Stormwater Handbook to promote increased stormwater recharge, the treatment of more runoff from polluting land uses, low impact development (LID) techniques, pollution prevention, the removal of illicit discharges to stormwater management systems, and improved operation and maintenance of stormwater best management practices (BMPs). MassDEP applies the Stormwater Management Standards pursuant to its authority under the Wetlands Protection Act, M.G.L. c. 131, § 40, and the Massachusetts Clean Waters Act, M.G.L .c. 21, §§ 26-53. The revised Stormwater Management Standards have been incorporated in the Wetlands Protection Act Regulations, 310 CMR 10.05(6)(k) and the Water Quality Certification Regulations, 314 CMR 9.06(6)(a).

Stormwater runoff results from rainfall and snow melt and represents the single largest source responsible for water quality impairments in the Commonwealth's rivers, lakes, ponds, and marine waters. New and existing development typically adds impervious surfaces and, if not properly managed, may alter natural drainage features, increase peak discharge rates and volumes, reduce recharge to wetlands and streams, and increase the discharge of pollutants to wetlands and water bodies.

The Stormwater Management Standards address water quality (pollutants) and water quantity (flooding, low base flow and recharge) by establishing standards that require the implementation of a wide variety of stormwater management strategies. These strategies include environmentally sensitive site design and LID techniques to minimize impervious surface and land disturbance, source control and pollution prevention, structural BMPs, construction period erosion and sedimentation control, and the long-term operation and maintenance of stormwater management systems.

The Stormwater Management Standards

1. No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

2. Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

3. Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

4. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

    a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
    b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
    c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

6. Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

8. A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

10. All illicit discharges to the stormwater management system are prohibited.

Applicability

Except as expressly provided herein, stormwater runoff from all industrial, commercial, institutional, office, residential and transportation projects including site preparation, construction and redevelopment, and all point source stormwater discharges from said projects shall be managed according to the Stormwater Management Standards.

The Stormwater Management Standards shall not apply to:

(1) A single-family house;
(2) Housing development and redevelopment projects comprised of detached single-family dwellings on four or fewer lots provided that there are no stormwater discharges that may potentially affect a critical area;

(3) Multi-family housing development and redevelopment projects with four or fewer units, including condominiums, cooperatives, apartment buildings and townhouses, provided that there are no stormwater discharges that may potentially affect a critical area; and
(4) Emergency repairs to roads or their drainage systems.

The Stormwater Management Standards shall apply to the maximum extent practicable to the following:

(1) Housing development and redevelopment projects comprised of detached single-family dwellings on four or fewer lots that have a stormwater discharge that may potentially affect a critical area;
(2) Multi-family housing development and redevelopment projects, with four or fewer units, including condominiums, cooperatives, apartment buildings, and townhouses, that have a stormwater discharge that may potentially affect a critical area;
(3) Housing development and redevelopment projects comprised of detached single-family dwellings on five to nine lots, provided there is no stormwater discharge that may potentially affect a critical area;
(4) Multi-family housing development and redevelopment projects with five to nine units, including condominiums, cooperatives, apartment buildings, and townhouses, provided there is no stormwater discharge that may potentially affect a critical area;
(5) Marinas and boat yards, provided that the hull maintenance, painting and service areas are protected from exposure to rain, snow, snow melt, and stormwater runoff; and
(6) Footpaths, bikepaths and other paths for pedestrian and/or nonmotorized vehicle access.

Critical areas include Outstanding Resource Waters as designated in 314 CMR 4.00, Special Resource Waters as designated in 314 CMR 4.00, recharge areas for public water supplies as defined in 310 CMR 22.02 (Zone Is, Zone IIs and Interim Wellhead Protection Areas for groundwater sources and Zone As for surface water sources), bathing beaches as defined in 105 CMR 445.000, cold-water fisheries as defined in 310 CMR 10.04 and 314 CMR 9.02, and shellfish growing areas as defined in 310 CMR 10.04 and 314 CMR 9.02.

For phased projects, the determination of whether the Stormwater Management Standards apply is made on the entire project as a whole including all phases. When proposing a development or redevelopment project subject to the Stormwater Management Standards, proponents shall consider environmentally sensitive site design that incorporates low impact development techniques in addition to stormwater best management practices.

Project proponents seeking to demonstrate compliance with some or all of the Stormwater Management Standards to the maximum extent practicable shall demonstrate that:

(1) They have made all reasonable efforts to meet each of the Standards;
(2) They have made a complete evaluation of possible stormwater management measures, including environmentally sensitive site design, low impact development techniques that minimize land disturbance and impervious surfaces, structural stormwater best management practices, pollution prevention, erosion and sedimentation control, and proper operation and maintenance of stormwater best management practices; and
(3) If full compliance with the Standards cannot be achieved, they are implementing the highest practicable level of stormwater management.

The Stormwater Management Standards (Standards 4, 5, 6, 8, and 9) require project proponents to develop a construction-period erosion, sedimentation, and pollution prevention plan and long-term pollution prevention and operation and maintenance plans. The level of detail in these plans should reflect the complexity of the project and the nature and extent of the impacts that may arise both during and after construction. For small residential projects that are subject to jurisdiction under the Wetlands Protection Act and that are required to meet the Stormwater Management Standards only to the maximum extent practicable, the issuing authority has broad discretion to tailor this requirement to the specific stormwater

impacts of the project and require the construction period erosion and sedimentation control plan and the long-term pollution prevention and operation and maintenance plans only to the extent that they are necessary to address those impacts.

Even if the Stormwater Management Standards do not apply, a proponent still must implement erosion and sedimentation control if the project is located in a wetland resource area or associated Buffer Zone. See CMR 10.05(6). Although the Stormwater Management Standards do not apply, a person constructing a single-family house that extends into the Buffer Zone must control erosion and sedimentation within wetland resource areas and the Buffer Zone.

Environmentally Sensitive Site Design and Low Impact Development Techniques

The Wetlands Regulations, 310 CMR 10.04, and the Water Quality Certification Regulations, 314 CMR 9.02, define environmentally sensitive site design to mean design that incorporates low impact development techniques to prevent the generation of stormwater and non-point source pollution by reducing impervious surfaces, disconnecting flow paths, treating stormwater at its source, maximizing open space, minimizing disturbance, protecting natural features and processes, and/or enhancing wildlife habitat. The Wetlands Regulations, 310 CMR 10.04, and the Water Quality Certification Regulations, 314 CMR 9.02, define low impact development (LID) techniques to mean innovative stormwater management systems that are modeled after natural hydrologic features. Low impact development techniques manage rainfall at the source using uniformly distributed decentralized micro-scale controls. Low impact development techniques use small cost-effective landscape features located at the lot level.

Proponents of projects subject to the Stormwater Management Standards must consider environmentally sensitive site design and low impact development techniques to manage stormwater. Proponents shall consider decentralized systems that involve the placement of a number of small treatment and infiltration devices located close to the various impervious surfaces that generate stormwater runoff in place of a centralized system comprised of closed pipes that direct all the drainage from the entire site into one large dry detention basin.

MassDEP has established an "LID Site Design Credit" to encourage developers to incorporate LID techniques in their projects.[1] In exchange for directing runoff from roads and driveways to vegetated open areas, preserving open space with a conservation restriction, or directing rooftop runoff to landscaped or undisturbed areas, MassDEP allows developers to reduce or eliminate the traditional BMPs used to treat and infiltrate stormwater.

Incorporating environmentally sensitive design that uses the land to filter and recharge the water back into the ground and that reduces the amount of paved areas is a critical first step in creating sustainable development. Inspired by EEA's Smart Growth Toolkit, MassDEP believes that the LID Site Design Credit protects our natural resources, encourages cluster development, and reduces the environmental impacts of growth.[2] By using this credit, proponents can reduce the volume of stormwater subject to Standard 3 - the Recharge Standard, and Standard 4 - the Water Quality Standard.

Explanation of the Standards

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

This standard allows the direct discharge of stormwater to waters and wetlands provided the discharge is adequately treated. The term "treated" refers to the implementation of stormwater management systems that are specifically designed to achieve sediment and contaminant removal rates that adequately protect groundwater, surface waters and wetlands in accordance with all applicable statutes,

[1] Information on the LID Site Design Credit is found in Volume 3 of the Massachusetts Stormwater Handbook.

[2] Smart Growth Toolkit - http://www.mass.gov/envir/sgtk.htm

regulations, permits, and approvals, the other standards, and the technical specifications set forth in Volume 2 of the Massachusetts Stormwater Handbook. The level of treatment required by the other standards is based on whether the discharge impacts a critical area, is from a land use with a higher potential pollutant load, or to soils with a rapid infiltration rate.

The requirement that stormwater discharges must not cause erosion in wetlands or waters of the Commonwealth means that there must be no wearing away of the soil or land surface in excess of natural conditions. To prevent erosion and sedimentation, BMPs and associated pipes and other conveyances must be properly designed and installed in accordance with Volume 2 of the Massachusetts Stormwater Handbook. The use of level spreaders or other techniques at the point of discharge is required to minimize erosion. For projects subject to jurisdiction under the Wetlands Protection Act, the applicant shall demonstrate to the issuing authority that the discharge velocities will not cause erosion or scouring at the point of discharge or downstream. Discharge velocities from BMPs should take into account factors such as soils, slope and the type of receiving resource.

Standard 2: Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

To prevent storm damage and downstream and off-site flooding, Standard 2 requires that the post-development peak discharge rate is equal to or less than the pre-development rate from the 2-year and the 10-year 24-hour storms. BMPs that slow runoff rates through storage and gradual release, such as LID techniques, extended dry detention basins, and wet basins, must be provided to meet Standard 2. Where an area is within the 100-year coastal flood plain or land subject to coastal storm flowage, the control of peak discharge rates is usually unnecessary and may be waived.

For projects subject to jurisdiction under the Wetlands Protection Act, the issuing authority relies on TR 20 and 55[3], which are guides for estimating the effects of land use changes on runoff volume and peak rates of discharge published by Natural Resource Conservation Service (NRCS). Applicants must calculate runoff rates from pre-existing and post-development conditions. Measurement of peak discharge rates is calculated at a design point, typically the lowest point of discharge at the downgradient property boundary. The topography of the site may require evaluation at more than one design point, if flow leaves the property in more than one direction. An applicant may demonstrate that a feature beyond the property boundary (e.g. culvert) is more appropriate as a design point.

Proponents must also evaluate the impact of peak discharges from the 100-year 24-hour storm. If this evaluation shows that increased off-site flooding will result from peak discharges from the 100-year 24-hour storms, BMPs must also be provided to attenuate these discharges. [4]

Standard 3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The intent of this standard is to ensure that the infiltration volume of precipitation into the ground under post-development conditions is at least as much as the infiltration volume under pre-development

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[3] NRCS TR 20&55 - http://www.wsi.nrcs.usda.gov/products/W2Q/H&H/Tools_Models/tool_mod.html. See the Hydrology Handbook for Conservation Commissioners, http://www.mass.gov/dep/water/laws/hydrol.pdf.

[4] The evaluation may show that retaining the 100-year 24-hour storm event is not needed. In some cases, retaining stormwater from the 100-year 24-hour storm event onsite may aggravate downstream impacts, because of the project's location within the watershed and the timing of the release of stormwater.

conditions. Standard 3 requires the restoration of recharge, using infiltration measures and careful site design. Through judicious use of low impact development techniques and other approaches that minimize impervious surfaces and mimic natural conditions, new developments can approximate pre-development recharge for most storms.

The NRCS classifies soils into four hydrologic groups, A thru D, indicative of the minimum infiltration obtained for a soil after prolonged wetting[5]. Group A soils have the lowest runoff potential and the highest infiltration rates, while Group D soils have the highest runoff potential and the lowest infiltration rates. The required recharge volume, the stormwater volume that must be infiltrated, shall be determined using existing site conditions and the infiltration rates set forth below.

Hydrologic Group Volume to Recharge (x Total Impervious Area)	
Hydrologic Group	Volume to Recharge x Total Impervious Area
A	0.60 inches of runoff
B	0.35 inches of runoff
C	0.25 inches of runoff
D	0.10 inches of runoff

For each NRCS Hydrologic Group on the site, the required recharge volume equals the recharge volume set forth above multiplied by the total area within that NRCS Hydrologic Group that is impervious. Infiltration of these volumes must be accomplished using appropriate BMPs. The following BMPs may be used to infiltrate stormwater in compliance with Standard 3: dry wells; infiltration basins; infiltration trenches; subsurface structures; leaching catch basins; exfiltrating bioretention areas[6] and porous pavement. Some proprietary BMPs can also be used to infiltrate stormwater in compliance with Standard 3. Proponents can reduce the volume of stormwater that they are required to recharge by using the LID Site Design Credit.

Infiltration BMPs must be designed, constructed, operated, and maintained in accordance with the specifications and procedures set forth in Volume 2 of the Massachusetts Stormwater Handbook. To size infiltration BMPs so that they infiltrate the required recharge volume, proponents may use the static method or one of the two dynamic methods specified in Volume 3.[7] The static method assumes that no infiltration occurs until the recharge device is filled to the elevation associated with the required recharge volume, is easy to calculate, and generally results in a larger recharge volume than the dynamic methods. The dynamic methods assume that that the recharge BMP is infiltrating as it fills and require certain technical calculations that take this recharge into account when sizing the infiltration BMP.

MassDEP recognizes that it may be difficult to infiltrate the required recharge volume on certain sites because of soil conditions[8]. For sites comprised solely of C and D soils and bedrock at the land

[5] Soil Groups – http://soils.usda.gov/education/

[6] Bioretention areas are an example of a BMP that may be designed to act as a filtering practice or an infiltration device. Bioretention areas that act solely as filters have an underdrain that captures runoff and conveys it to another BMP before it is discharged to a surface water, a wetland, or another BMP. These bioretention areas may be lined. Bioretention areas designed to infiltrate do not have those features. To distinguish the two types of bioretention areas, this Handbook will refer to bioretention areas designed to infiltrate as "exfiltrating bioretention areas" and other bioretention areas as "filtering bioretention areas".

[7] A detailed explanation of procedures that must be followed when applying the static method and the two dynamic methods is set forth in Volume 3.

[8] It may also be difficult for MassHighway to recharge the required recharge volume at every point along an add-a -lane project. For this reason, MassDEP allows MassHighway to use the macro approach, which allows MassHighway to recharge additional runoff at certain locations along a portion of the highway within a subwatershed to compensate for sections of the roadway in the same subwatershed where it may be difficult to recharge the entire required recharge volume. MassDEP and MassHighway intend to

surface, proponents are required to infiltrate the required recharge volume only to the maximum extent practicable. MassDEP also recognizes that on some sites, there is a risk that infiltrating the required recharge volume may cause or contribute to groundwater contamination. Consequently, MassDEP requires infiltration only to the maximum extent practicable on the following sites: sites where recharge is proposed at or adjacent to an area classified as contaminated, sites where contamination has been capped in place; sites that have an Activity and Use Limitation (AUL) that precludes inducing runoff to the groundwater, pursuant to MGL Chapter 21E and the Massachusetts Contingency Plan 310 CMR 40.0000; sites that are the location of a solid waste landfill as defined in 310 CMR 19.000; and sites where groundwater from the recharge location flows directly toward a solid waste landfill or 21E site.[9]

For purposes of Standard 3, "to the maximum extent practicable" means that:

(1) The applicant has made all reasonable efforts to meet the Standard;
(2) The applicant has made a complete evaluation of all possible applicable infiltration measures, including environmentally sensitive site design that minimizes land disturbance and impervious surfaces, low impact development techniques, and structural stormwater best management practices; and
(3) If the post-development recharge does not at least approximate the annual recharge from pre-development conditions, the applicant has demonstrated that s/he is implementing the highest practicable method for infiltrating stormwater.

To ensure the long-term operation of infiltration BMPs, pretreatment is required before discharge to an infiltration BMP. For infiltration of stormwater runoff from land uses with higher potential pollutant loads, discharges to the ground within an area with a rapid infiltration rate (greater than 2.4 inches per hour), a Zone II or Interim Wellhead Protection Area, and discharges to the ground near any of the following critical areas: Special Resource Waters, Outstanding Resource Waters, bathing beaches, shellfish growing areas, or cold-water fisheries, at least 44% of the total suspended solids must be removed prior to discharge to the infiltration structure. A discharge is near a critical area, if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors.

Runoff from non-metal roofs may be discharged to a dry well without any pretreatment. Runoff from metal roofs may be discharged to a dry well without pretreatment, only if the roof is located outside the Zone II or Interim Wellhead Protection Area of a public water supply and outside an industrial site. Infiltration of runoff from a metal roof that is located within the Zone II or Interim Wellhead Protection Area of a public water supply and/or at an industrial site requires pretreatment by means of a BMP capable of removing metals, such as a sand filter, organic filter, filtering bioretention area or equivalent. Metal roofs are galvanized steel or copper.

When designing infiltration BMPs, adequate subsurface information needs to be obtained[10]. Infiltration systems must be installed in soils capable of absorbing the recharge volume (i.e. not D soils). Infiltration structures must be able to drain fully within 72 hours. In addition, there must be at least a two-foot separation between the bottom of the infiltration structure and the seasonal high groundwater table.

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provide additional information on the macro approach in the MassHighway Stormwater Handbook for Highways and Bridges when it is revised to reflect the 2008 changes in the Stormwater Management Standards.

[9] A mounding analysis is needed if a site falls within this category. See Volume 3.

[10] The required minimum infiltration rate is 0.17 inches per hour. D soils have an infiltration rate that is below this minimum. To determine the infiltration rate, proponents must perform a soil evaluation using the methodologies set forth in Volume 3.

Table RR

Rules for Groundwater Recharge
All BMPs must be designed according to the specifications and procedures in Volumes 2 and 3 of the Massachusetts Stormwater Handbook. **Except as expressly provided herein, entire required recharge volume must be infiltrated.** **Required recharge volume must be infiltrated only to the maximum extent practicable, if:** **The site is comprised wholly of C and D soils and bedrock at the land surface; Recharge is proposed at or adjacent to a site that has:** ➢ **been classified as contaminated;** ➢ **contamination that has been capped in place;** ➢ **an Activity and Use Limitation (AUL) that precludes inducing runoff to the groundwater pursuant to MGL Chapter 21E and the Massachusetts Contingency Plan, 310 CMR 40.0000;** ➢ **has a solid waste landfill as defined in 310 CMR 19.000; or** ➢ **groundwater from the recharge area that flows directly toward a solid waste landfill or 21E site.** **Design Requirements:** **At least 44% of the TSS must be removed prior to discharge to the infiltration structure if the discharge is:** ➢ **within a Zone II or Interim Wellhead Protection Area;** ➢ **near an Outstanding Resource Water or Special Resource Water;** ➢ **near a shellfish growing area, cold-water fishery, or bathing beach;** ➢ **from a land use with higher potential pollutant loads; or** ➢ **within an area with a rapid infiltration rate (greater than 2.4 inches per hour).** **Except as set forth below, roof runoff from may be discharged to the ground via a dry well without pretreatment. The discharge of roof runoff to the ground requires pretreatment by means of a BMP capable of removing metals, such as a sand filter, organic filter or filtering biorention area, if the roof is a metal roof that is located in the Zone II or Interim Wellhead Protection Area of a public water supply and/or at an industrial site. Metal roofs are galvanized steel or copper.** **Depth to groundwater: At a minimum there should be a two-foot separation between bottom of structure and seasonal high groundwater.** **Minimum Infiltration Rate. 0.17 inches per hour.** **All infiltration structures must be able to drain fully within 72 hours.** **General Setback Requirements:** **Soil Absorption Systems for Title 5 System: 50 ft.** **Private wells: 100 ft.** **Public wells: Outside Zone I** **Public reservoir, surface water sources for public water systems and their tributaries: Outside Zone A** **Other surface waters: 50 ft.** **Property Line: 10 feet** **Building foundations (including slabs): >10 to 100 ft. depending on type of recharge BMP. See BMP description for exact minimum setback.** **Specific BMPs have additional setback requirements. See Volume 2, Chapter 2.**

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

a) Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
b) Structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook; and
c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

This standard applies after the site is stabilized.[11] Since removal efficiency may vary with each storm, 80% TSS removal is not required for each storm. It is the average removal over the year that is required to meet the standard. The required water quality volume, the runoff volume requiring TSS treatment, is calculated as follows:

The required water quality volume equals 1.0 inch of runoff times the total impervious area of the post-development project site for a discharge

- from a land use with a higher potential pollutant load;
- within an area with a rapid infiltration rate (greater than 2.4 inches per hour);
- within a Zone II or Interim Wellhead Protection Area;
- near or to the following critical areas:
  - Outstanding Resource Waters,
  - Special Resource Waters,
  - bathing beaches,
  - shellfish growing areas,
  - cold-water fisheries.

The required water quality volume equals 0.5 inches of runoff times the total impervious area of the post-development site for all other discharges.

Standard 4 requires the development and implementation of suitable practices for source control and pollution prevention. These measures must be identified in a long-term pollution prevention plan. The long-term pollution prevention plan shall include the proper procedures for the following:

- good housekeeping;
- storing materials and waste products inside or under cover;
- vehicle washing;
- routine inspections and maintenance of stormwater BMPs;
- spill prevention and response;
- maintenance of lawns, gardens, and other landscaped areas;
- storage and use of fertilizers, herbicides, and pesticides;
- pet waste management;
- operation and management of septic systems; and
- proper management of deicing chemicals and snow[12].

The long-term pollution prevention plan shall provide that sand piles be contained and stabilized to prevent the discharge of sand to wetlands or water bodies, and, where feasible, covered. If a Total Maximum Daily Load (TMDL)[13] has been developed that indicates that use of fertilizers containing nutrients must be reduced, the long-term pollution prevention plan shall also include a nutrient management

[11] Construction period requirements are found in Standard 8.
[12] Snow & Deicing Policies - http://www.mass.gov/dep/water/laws/policies.htm#snowsalt
[13] Information on TMDLs is set forth in Volume 1, Chapter 2.

plan. The long-term pollution prevention plan may be prepared as a separate document or combined with the Operation and Maintenance Plan required by Standard 9.[14]

BMPs must be selected so that a total of 80% TSS removal is provided by one or more BMPs.[15] Typically a stormwater management system will have several BMPs that will control flow rates and retain contaminants. In this BMP "process train", more than one BMP will be removing TSS. The goal is to ensure that the cumulative effect of the treatment train is the removal of at least 80% of the annual average TSS load. Where there is more than one outfall or treatment train, each outfall or treatment train shall achieve 80% TSS removal prior to discharge.[16]

BMPs must be designed, constructed, operated and maintained in accordance with the specifications and procedures set forth in Volumes 2 and 3 of the Massachusetts Stormwater Handbook. Standard 4 has been designed in a manner that makes it unnecessary for the permitting authority to verify a TSS load for the site in order to confirm removal rates. Assuming all BMPs are properly designed, the percentage of TSS removed by the entire system shall be calculated by applying the TSS removal rates set forth in Table TSS for each BMP in the order in which it is used in the stormwater management system.[17] Generally, monitoring is not required to confirm removal percentages. Nevertheless, monitoring or sampling may be appropriate to ensure protection of critical areas or to verify the effectiveness of alternative technologies that are not included in Table TSS or do not have a specified TSS removal rate and that have only limited data about their long-term performance.

The BMP design removal rates cannot be added directly to arrive at 80%. For example, if the first BMP in a system has a 60% removal rate, and the second BMP has a 20% removal rate, adding 60% and 20% will not achieve the desired 80% TSS removal rate; only 68 % of the TSS will be removed. The reason is that the second BMP removes only the percentage of TSS that is routed to it after an initial amount of TSS has been removed by the first BMP. In this example, after the stormwater was routed through the first BMP, 60% of the sediment was removed. The remaining 40% was routed to the second BMP that removed 20% of that 40% (not 20% of the entire load). The second BMP therefore removed an additional 8%, leaving 12% still to be removed (60%+8%=68%; 80%-68%=12%).

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[14] Proponents are required to prepare a Stormwater Report that includes both the long- term pollution prevention plan and the operation and maintenance plan Information on the Stormwater Report is set forth in Volume 3.

[15] If there is a Total Maximum Daily Load (TMDL) that indicates that stormwater BMPs are needed to reduce the concentration in stormwater runoff of pollutants other than TSS such as nitrogen and phosphorus, the BMPs selected must be consistent with the TMDL. See Volume 1, Chapter 2.

[16] 80% TSS removal is not required at an outfall with only a *de minimus* stormwater discharge. In that event, a proponent may demonstrate compliance with the 80% TSS removal requirement by using a weighted average. See Volume 3 for a description of the highly limited circumstances in which a discharge from a stormwater outfall will be considered *de minimus* and the procedures for applying a weighted average. Because of right-of-way constraints, MassDEP anticipates that MassHighway redevelopment projects and add-a-lane projects may in some circumstances have to rely on weighted averages to meet the TSS removal requirement. MassDEP and Mass Highway intend to provide additional information on this approach in the MassHighway Stormwater Handbook for Highways and Bridges, when it is revised to reflect 2008 changes to the Stormwater Management Standards.

[17] The following rules apply to Table TSS. If pretreatment is required, the total removal efficiency includes the terminal treatment BMP and the pretreatment BMP. For purposes of assessing compliance with the 44% TSS removal pretreatment requirement, a separate credit is awarded for the required pretreatment BMP. For example, for the leaching catch basin/deep sump catch basin combination, 80% is the total TSS removal credit for both BMPs. No additional TSS removal credit is given for the deep sump catch basin. However, the separate 25% TSS removal credit for the deep sump catch basin counts towards the 44% pretreatment requirement, if it is applicable.

Table TSS

TSS Removal Efficiencies for Best Management Practices	
Best Management Practice (BMP)	**TSS Removal Efficiency**
Non-Structural Pretreatment BMPs	
Street Sweeping	0-10%, See Volume 2, Chapter 1.
Structural Pretreatment BMPs	
Deep Sump Catch Basins	25% only if used for pretreatment and only if off-line
Oil Grit Separator	25% only if used for pretreatment and only if off-line
Proprietary Separators	Varies – see Volume 2, Chapter 4.
Sediment Forebays	25% if used for pretreatment
Vegetated filter strips	10% if at least 25 feet wide, 45% if at least 50 feet wide
Treatment BMPs	
Bioretention Areas including rain gardens	90% provided it is combined with adequate pretreatment
Constructed Stormwater Wetlands	80% provided it is combined with a sediment forebay
Extended Dry Detention Basins	50% provided it is combined with a sediment forebay
Gravel Wetlands	80% provided it is combined with a sediment forebay
Proprietary Media Filters	Varies – see Volume 2, Chapter 4
Sand/Organic Filters	80% provided it is combined with sediment forebay
Treebox filter	80% provided it is combined with adequate pretreatment
Wet Basins	80% provided it is combined with sediment forebay
Conveyance	
Drainage Channels	For conveyance only. No TSS Removal credit.
Grass Channels (formerly biofilter swales)	50% if combined with sediment forebay or equivalent
Water Quality Swale – wet & dry	70% provided it is combined with sediment forebay or equivalent
Infiltration BMPs	
Dry Wells	80% for runoff from non-metal roofs; may also be used for runoff from metal roofs but only if metal roof is not located within a Zone II, or IWPA or at an industrial site
Infiltration Basins & Infiltration Trenches	80% provided it is combined with adequate pretreatment (sediment forebay or vegetated filter strip, grass channel, water quality swale) prior to infiltration
Leaching Catch Basins	80% provided a deep sump catch basin is used for pretreatment
Subsurface Structure	80% provided they are combined with one or more pretreatment BMPs prior to infiltration.
Other BMPs	
Dry Detention Basins	For peak rate attenuation only. No TSS Removal credit.
Green Roofs	See Volume 2. Chapter 2. May reduce required water quality volume. No TSS Removal Credit.
Porous Pavement	80% if designed to prevent runon and with adequate storage capacity. Limited to uses identified in Volume 2, Chapter 2.
Rain Barrels and Cisterns	May reduce required water quality volume. No TSS Removal Credit.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If, through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L.c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Land uses with higher potential pollutant loads are defined in 310 CMR 10.04 and 314 CMR 9.02 to include the following: Land uses identified in 310 CMR 22.20B(2), 310 CMR 22.20C(2)(a)-(k) and (m), 310 CMR 22.21(2)(a)(1)-(8) and 310 CMR 22.21(2)(b)(1)-(6), areas within a site that are the location of activities that are subject to an individual National Pollutant Discharge Elimination System (NPDES) permit or the NPDES Multi-Sector General Permit[18]; auto fueling facilities (gas stations); exterior fleet storage areas; exterior vehicle service and equipment cleaning areas; marinas and boatyards; parking lots with high-intensity-use; confined disposal facilities and disposal sites.

Land uses with higher potential pollutant loads include the industrial sectors regulated by the NPDES Multi-Sector General Permit Program. These sectors include manufacturing: mineral, metal, oil and gas; hazardous waste treatment or disposal facilities; solid waste facilities; wastewater residual landfills; recycling facilities; steam electric plants; transportation facilities; treatment works; and light industrial activity. Land uses with higher potential pollutant loads also include any land uses that are regulated by an individual NPDES permit or that are subject to individual effluent limits established by EPA. Land uses with higher potential loads include land uses that the Department has determined are not suitable for Zone IIs and Zone As of public water supplies, including, without limitation,[19] the following: automobile junk yards; the removal of sand and gravel within four feet of the historical high water mark; the storage of hazardous materials, liquid petroleum, liquid propane, chemical fertilizers, pesticides, manures, septage, sludge, road-deicing materials or sanding materials; snow or ice that has been removed from roads and is contaminated with de-icing chemicals; cemeteries, mausoleums; bulk oil terminals; commercial washing of vehicles and car washes. In addition, land uses with higher potential pollutant loads include: exterior fleet storage areas; exterior vehicle service maintenance and cleaning areas; marinas and boatyards; and parking lots with high-intensity-uses (1000 vehicle trips per day or more). Shopping centers, malls, and large office parks typically have high-intensity-use parking lots. Finally, land uses with higher potential pollutant load include confined disposal facilities as defined in 314 CMR 9.02 and disposal sites as defined in M.G.L. c. 21E and 310 CMR 40.000.

For the purpose of Standard 5, stormwater discharges from land uses with higher potential pollutant loads require treatment by the specific structural BMPs determined to be suitable for treating runoff from such land uses. These BMPs are listed in Table LUHPPL. This requirement applies only to stormwater discharges that come into contact with the actual area or activity on the site that may generate the higher potential pollutant load. Runoff from other portions of the project site that does not come into contact with these specific areas or activities and does not mix with the runoff from these areas or activities does not require the structural BMPs that are determined to be suitable for treating runoff from land uses with higher potential pollutant loads. For example, on the site of a chemical manufacturing plant, runoff

[18] As of the date of publication of this Handbook, the NPDES Multi-Sector General Permit issued in 2000 has expired and has been administratively continued. To date, EPA has not issued a new permit. For purpose of the Stormwater Standards, the land uses subject to the 2000 NPDES Multi-Sector General Permit are land uses with higher potential pollutant loads. A full list of these land uses is set forth in the 2000 NPDES Multi-Sector General Permit. See http://cfpub1.epa.gov/npdes/stormwater/msgp.cfm#permit_factsheet.

[19] The complete text of the regulations that identify the land uses that are not suitable for Zone As and Zone IIs is set forth in 310 CMR 22.20B(2), 310 CMR 22.20C(2)(a) and 310 CMR 22.21(2)(a) and 310 CMR 22.21(b) i. See http://www.mass.gov/dep/water/laws/regulati.htm#dw.

from any grassed open space or parking area without high-intensity use, which is separate from the chemical distribution, loading and storage areas, does not have to be treated with a BMP listed in Table LUHPPL.

A detailed source control and pollution prevention plan is crucial for sites with land uses that have higher potential pollutant loads. [20] To mitigate the potential impact of stormwater discharges from land uses with higher potential pollutant loads, the long-term pollution prevention plan shall include measures that eliminate or minimize any discharges that come into contact with the particular land uses that have the potential to generate high concentrations of pollutants. A proponent can fulfill this requirement by placing all industrial materials or activities in a storm-resistant shelter to prevent exposure to rain, snow, snow melt and runoff, or by placing all materials and wastes stored outside in sealed containers on impervious surfaces with adequate containment. The long-term pollution prevention plan shall also provide for the use of emergency shut-offs where appropriate to isolate the system in the event of an emergency spill or other unexpected event. Proponents of MassHighway projects can meet this requirement by implementing the containment procedures outlined in the MassHighway Stormwater Handbook [21].

Standard 5 expressly provides that a stormwater discharge from a land use with a higher potential pollutant load must comply with all applicable laws, regulations, permits and approvals, including 314 CMR 3.00, 314 CMR 4.00, and 314 CMR 5.00. Pursuant to 314 CMR 3.00 and 314 CMR 5.00, MassDEP has authority to require a discharge permit or other corrective action if it determines that a stormwater discharge is contaminated by contact with process wastes, raw materials, toxic pollutants or hazardous substances, oil and grease, or is a significant contributor of pollution to waters of the Commonwealth. To avoid additional requirements under 314 CMR 3.00, 314 CMR 5.00, and Standard 5, a project proponent should implement a pollution prevention plan that prevents stormwater runoff from coming into contact with significant pollutant sources.

As stated earlier, a stormwater discharge from a land use with a higher potential pollutant load also requires treatment by the specific structural BMPs determined by MassDEP to be suitable for treating discharges from such use.[22] Like all stormwater discharges, stormwater discharges from land uses with higher potential pollutant loads require the use of a treatment train that provides 80% TSS removal prior to discharge. As can be seen from Table LUHPPL, this treatment train shall provide for at least 44% TSS removal prior to discharge to the infiltration BMP and shall also be designed to treat 1.0 inch of runoff times the total impervious area at the post-development site. If the land use is one that has the potential to generate runoff with high concentrations of oil and grease such as a high-intensity-use parking lot, gas station, fleet storage area, or vehicle service and equipment cleaning area, the treatment train must include an oil grit separator, sand filter, filtering bioretention area or equivalent.[23] See Table LUHPPL.

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[20] If the land use is also subject to the NPDES Multi-Sector General Permit, a Stormwater Pollution Prevention Plan (SWPPP) will also be required. To avoid duplication of effort, a project proponent may prepare one document that satisfies the SWPPP requirements of the NPDES Multi-Sector General Permit and the long-term pollution prevention plan requirements of Standards 4 and 5.

[21] Mass Highway Handbook - http://www.mhd.state.ma.us/default.asp?pgid=content/publicationmanuals&sid=about

[22] To make sure that proponents have the most up-to-date list of these BMPs, proponents should consult the MassDEP web site.

[23] Any BMP chosen to remove oil and grease including, without limitation, the oil grit separator, must be designed in accordance with the specifications set forth in Volume 2, Chapter 2.

Best Management Practices for Land Uses with Higher Potential Pollutant Loads (Standard 5)

- Discharges from certain land uses with higher potential pollutant loads may be subject to additional requirements including the need to obtain an individual or general discharge permit pursuant to the MA Clean Waters Act or Federal Clean Water Act.
- All proponents must implement source control and pollution prevention.
- All BMPs shall be designed in accordance with specifications and sizing methodologies in the Massachusetts Stormwater Handbook Volumes 2 and 3.
- The required water quality volume equals 1 inch times the total impervious area of the post-development site.
- Many land uses have the potential to generate higher potential pollutant loads of oil and grease. These land uses include, without limitation, industrial machinery and equipment and railroad equipment maintenance, log storage and sorting yards, aircraft maintenance areas, railroad yards, fueling stations, vehicle maintenance and repair, construction businesses, paving, heavy equipment storage and/or maintenance, the storage of petroleum products, high-intensity-use parking lots, and fleet storage areas. To treat the runoff from such land uses, the following BMPs must be used to pretreat the runoff prior to discharge to an infiltration structure: an oil grit separator, a sand filter, organic filter, filtering bioretention area, or equivalent.
- At least 44% TSS removal is required prior to discharge to an infiltration device.
- Until they complete the STEP or TARP verification process outlined in Volume 2, proprietary BMPs may not be used as a terminal treatment device for runoff from land uses with higher potential pollutant loads. For purposes of this requirement, subsurface structures, even those that have a storage chamber that has been manufactured are not considered propriety BMPs, since the treatment occurs in the soil below the structure, not in the structure.

Pretreatment	
	Deep Sump Catch Basin
	Oil Grit Separator
	Proprietary Separators: See Volume 2 Chapter 4
	Sediment Forebays
	Vegetated Filter Strip (*must be lined*)
Treatment	
Sand Filters, Organic Filters, Proprietary Media Filters, Wet Basins, Filtering Bioretention Areas, and Extended Dry Detention Basins must be lined and sealed unless at least 44% of TSS has been removed prior to discharge to the BMP.	Filtering Bioretention Areas including rain gardens
	Constructed Stormwater Wetlands
	Dry Water Quality Swales
	Extended Dry Detention Basins
	Gravel Wetlands
	Proprietary Media Filter. (*Does not include catch basin inserts) (Proprietary Media Filters may be used for terminal treatment for runoff from land uses with higher potential pollutant loads, only if verified for such use by the TARP or STEP process. See Volume 2.*)
	Sand /Organic Filters
	Wet Basins
Infiltration	
	Exfiltrating Bioretention Areas including rain garden
	Infiltration Basins
	Infiltration Trenches
	Leaching Catch Basins
	Subsurface Structures

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1. or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. [24] Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of the public water supply.

Critical areas are Outstanding Resource Waters as designated in 314 CMR 4.00, Special Resource Waters as designated in 314 CMR 4.00, recharge areas for public water supplies as defined in 310 CMR 22.02 (Zone Is, Zone IIs and Interim Wellhead Protection Areas for groundwater sources and Zone As for surface water sources), bathing beaches as defined in 105 CMR 445.000, cold-water fisheries as defined in 314 CMR 9.02 and 310 CMR 10.04, and shellfish growing areas as defined in 314 CMR 9.02 and 310 CMR 10.04.

Cold-water fisheries are waters in which the mean of the maximum daily temperature over a seven-day period generally does not exceed 68°F (20°C) and, when other ecological factors are favorable (such as habitat), are capable of supporting a year-round population of cold-water stenothermal aquatic life. Waters designated as cold-water fisheries by the Department in 314 CMR 4.00, and waters designated as cold-water fishery resources by the Division of Fisheries and Wildlife, are cold-water fisheries. Waters where there is evidence based on a fish survey that a cold-water fish population and habitat exist are also cold-water fisheries.

A shellfish growing area is land under the ocean, tidal flats, rocky intertidal shores and marshes and land under salt ponds when any such land contains shellfish. Shellfish growing areas include land that has been identified and shown on a map published by the Division of Marine Fisheries as a shellfish growing area, including any area identified on such map as an area where shellfishing is prohibited. Shellfish growing areas shall also include land designated by the Department in 314 CMR 4.00 as suitable for shellfish harvesting with or without depuration. In addition, shellfish growing areas shall include shellfish growing areas designated by the local shellfish constable as suitable for shellfishing based on the density of shellfish, the size of the area, and the historical and current importance of the area for recreational and commercial shellfishing.

A list of Outstanding Resource Waters is published in the Surface Water Quality Standards, 314 CMR 4.00[25]. This list includes Class A public water supplies approved by MassDEP and their tributaries, active and inactive reservoirs approved by MassDEP, certain waters within Areas of Critical Environmental Concern, certified vernal pools, and wetlands bordering Class A waters. Wetlands bordering other Class B, SB, or SA ORWs are also Outstanding Resource Waters. Pursuant to the Surface Water Quality Standards, 314 CMR 4.00, MassDEP may designate as Special Resource Waters certain waters of exceptional significance such as waters in national or state parks and wildlife refuges.

Bathing beaches include public and semi-public bathing beaches as defined by the Massachusetts Department of Public Health in 105 CMR 445.000[26]. The Department of Public Health maintains an inventory of public and semi-public bathing beaches.

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[24] If an NPDES Construction General Permit or Multi-Sector General Permit is required for a discharge to an ORW, DEP must approve the Stormwater Pollution Prevention Plan (SWPPP).

[25] Surface Water Quality Standards – http://www.mass.gov/dep/service/regulations/314cmr04.pdf

[26] Standards for Bathing Beaches – http://www.mass.gov/Eeohhs2/docs/dph/regs/105cmr445.pdf

Recharge areas for public water supplies are defined in the Drinking Water Regulations, 310 CMR 22.02[27], and include the Zone A for surface water supplies and the Zone II and Interim Wellhead Protection Areas for groundwater supplies. The Zone A means the land area between the surface water source and the upper boundary of the bank, the land area within a 400-foot lateral distance from the upper boundary of the bank of a Class A surface water source as defined in the Surface Water Quality Standards, 314 CMR 4.05(3), and the land area within a 200-foot lateral distance from the upper boundary of the bank of a tributary or associated surface water body. The Zone II means the area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated. The Interim Wellhead Protection Area is used for groundwater sources for public water supplies that lack a Zone II that has been approved by MassDEP.

Source control and pollution prevention are particularly important for critical areas. All projects that have the potential to impact critical areas shall implement a source control and pollution prevention program that includes proper management of snow and deicing chemicals. To protect critical areas, road salt must be properly stored within a Zone II or Interim Wellhead Protection Area or near an Outstanding Resource Water, Special Resource Water, shellfish growing area, bathing beach or cold-water fishery. The use of salt for the deicing of impervious surfaces must be minimized within water supply protection areas and any area near an Outstanding Resource Water, Special Resource Water, fresh water beach, or cold-water fishery. The long-term pollution prevention strategies for sites near critical areas must also incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event. Proponents of MassHighway projects may satisfy this requirement by implementing the containment procedures outlined in the Mass Highway Stormwater Handbook[28] .

A stormwater discharge within a Zone II or Interim Wellhead Protection Area or near or to an Outstanding Resource Water, a Special Resource Water, a bathing beach, shellfish growing area, or cold-water fishery requires the use of a treatment train that provides 80% TSS removal prior to discharge. This treatment train must use the structural BMPs determined by MassDEP to be suitable for such areas as set forth in Tables CA 1 through CA 4.[29] With the exception of runoff from a non-metal roof, and runoff from metal roofs located outside the Zone II or Interim Wellhead Protection Area of a public water supply or an industrial site, the treatment train shall provide for at least 44% TSS removal prior to discharge to the infiltration structure. For discharges within a Zone II or Interim Wellhead Protection Area or near or to an Outstanding Resource Water, a Special Resource Water, a shellfish growing area, a bathing beach, or a cold-water fishery, the treatment BMPs must be designed to treat the required water quality volume, a volume equal to one inch times the total impervious surfaces at the post-development site. All BMPs must be designed, constructed, operated and maintained in accordance with the specifications set forth in Volume 2 of the Massachusetts Stormwater Handbook.

[27] Recharge Areas – http://www.mass.gov/dep/water/ccdefreg.pdf

[28] Mass Highway Stormwater Handbook - http://www.mhd.state.ma.us/default.asp?pgid=content/publicationmanuals&sid=about

[29] To make sure that they have the most up-to-date list of these BMPs, proponents should consult the MassDEP web site.

Table CA 1 Standard 6

Stormwater BMPs for Discharges Near or To Shellfish Growing Areas and Bathing Beaches If applicable, proponent must comply with Coastal Wetlands Regulations[30]. All BMPs must be designed in accordance with specifications and sizing methodologies in Volumes 2 and 3 of the Massachusetts Stormwater Handbook. Required Water Quality Volume = 1.0 inch times impervious area. At least 44 % TSS removal must be provided prior to discharge to infiltration BMP. For discharges near or to shellfish growing areas or bathing beaches, proprietary BMPs may be used only for pretreatment, unless verified by TARP or STEP for other uses. For the purpose of this requirement, subsurface structures, even those that have a storage chamber that has been manufactured are not proprietary BMPs, since the pretreatment occurs in the soil below the structure, not in the structure itself.	
Pretreatment:	Deep Sump Catch Basin
	Oil Grit Separators
	Proprietary Separators See Volume 2.
	Sediment Forebays
	Vegetated Filter Strips
Treatment: Sand Filters, Organic Filters, Proprietary Media Filters, Filtering Bioretention Areas, and Wet Basins must be lined and sealed if at least 44% TSS has not been removed prior to discharge to the BMP.	
	Filtering Bioretention Areas including rain gardens
	Constructed Stormwater Wetlands *(highly recommended)*
	Gravel Wetlands
	Proprietary Filter Media (*Proprietary Media Filters may not be used as terminal treatment for discharges near or to critical areas unless they have been verified for such use through the TARP or STEP process. See Volume 2. Proprietary media filters do not include catch basin inserts.)*
	Sand /Organic Filters
	Wet Basins
Infiltration:	
	Exfiltrating Bioretention Areas including rain gardens
	Dry Wells *(runoff from non-metal roofs and runoff from metal roofs located outside of the Zone II or Interim Wellhead Protection Area of a public water supply and outside of an industrial site only.)*
	Infiltration Basins *(highly recommended)*
	Infiltration Trenches *(highly recommended)*
	Subsurface Structures

[30] Coastal Wetlands Regulations – http://www.mass.gov/dep/service/regulations/310cmr10a.pdf#41

Table CA 2: Standard 6

Stormwater Discharges Near or To Outstanding Resource Waters including Vernal Pools and Surface Water Sources for Public Water Systems	
1. Construction Sites of 1 acre or more must file a Notice of Intent (WM 09) with MassDEP requesting approval of the Stormwater Pollution Prevention Plan (SWPPP), if they discharge to an ORW. 2. Stormwater discharges to ORWs must be set back from the receiving water or wetland and receive the highest and best practical method of treatment. 3. Stormwater BMPs must be set back 100' from a certified vernal pool and comply with 310 CMR 10.60[31]. Proponents must perform a habitat evaluation and demonstrate that the stormwater BMPs meet the performance standard of having no adverse impact on the habitat functions of a certified vernal pool. 4. Unless essential to operation of a public water system, stormwater BMPs are prohibited within the Zone A. 5. BMPs must be designed according to the specifications and sizing methodologies in Volumes 2 and 3 of the Massachusetts Stormwater Handbook. 6. Required Water Quality Volume = 1.0 inch times impervious area. 7. At least 44% TSS must be removed prior to discharge to infiltration BMP. 8. For discharges near or to ORWs, proprietary BMPs may be used for pretreatment only unless verified by TARP or STEP for other uses. For the purpose of this requirement, subsurface structures, even those that have a storage chamber that has been manufactured are not proprietary BMPs, since the pretreatment occurs in the soil below the structure, not in the structure itself. See Volume 2.	
Pretreatment BMPS	Deep Sump Catch Basin Oil Grit Separator Proprietary Separators: See Volume 2 Sediment Forebay Vegetated Filter Strip
Treatment BMPs Sand Filters, Organic Filters, Proprietary Media Filters, Filtering Bioretention Areas, and Wet Basins must be lined and sealed unless at least 44% TSS has been removed prior to discharge to the BMP.	Filtering Bioretention areas including rain gardens Constructed Stormwater Wetlands *(do not use near certified vernal pool)* Gravel Wetlands (*do not use near certified vernal pool)* Proprietary Media Filter (*Proprietary Media Filters may not be used for terminal treatment for discharges near or to critical areas, unless the filter has been verified for such use through the TARP or STEP process. See Volume 2. Proprietary Media Filters do not include Catch Basin Inserts.)* Sand /Organic Filters Wet Basins (*do not use near certified vernal pool*)
Infiltration BMPs	Exfiltrating Bioretention areas including rain gardens Dry wells *(runoff from non-metal roofs and runoff from metal roofs located outside the Zone II or Interim Wellhead Protection Area of a public water supply or an industrial site only.)* Infiltration Basins *(highly recommended)* Infiltration Trenches *(highly recommended)* Subsurface Structures

For information on vernal pools, see MassDEP's Wildlife Habitat Guidance: http://www.mass.gov/dep/water/laws/policies.htm#wetlguid

[31] Wildlife Habitat – http://www.mass.gov/dep/service/regulations/310cmr10a.pdf#98

Table CA 3 Standard 6

Stormwater Discharges within Zone Is, Zone IIs and Interim Wellhead Protection Areas	
Unless necessary to manage stormwater from essential drinking water facilities, no stormwater BMPs may be located within the Zone I. Proponents must comply with local source water protection ordinances, bylaws, and regulations. The Drinking Water Regulations, 310 CMR 22.21(2)(b)(7)[32], require the development of land use controls in the Zone II that prohibit land uses that result in rendering 15% or 2500 square feet of a lot impervious, whichever is larger, unless a system of artificial recharge that does not degrade groundwater quality is provided. Developers can comply with these land use controls by designing, constructing, operating and maintaining a stormwater management system in compliance with the Stormwater Management Standards. BMPs must be designed according to the specifications and sizing methodologies in Volumes 2 and 3 of the Massachusetts Stormwater Handbook. Required Water Quality Volume =1.0 inch times impervious area. At least 44% TSS must be removed prior to discharge to the infiltration structure. For discharges within the Zone I, Zone II or IWPA, proprietary BMPs may be used for pretreatment only, unless verified for other uses by TARP or STEP. For the purpose of this requirement, subsurface structures, even those that have a storage chamber that has been manufactured are not proprietary BMPs, since the pretreatment occurs in the soil below the structure, not in the structure itself. See Volume 2.	
Pretreatment BMPS	Deep Sump Catch Basin Oil Grit Separator Proprietary Separators: See Volume 2. Sediment Forebay Vegetated Filter Strip
Treatment BMPs Sand Filters, Organic Filters, Proprietary Media Filters, Filtering Bioretention Areas and Wet Basins must be lined and sealed unless 44% of TSS has been removed prior to discharge to the BMP.	Filtering Bioretention Areas including rain gardens Constructed Stormwater Wetlands Gravel Wetlands Proprietary Filter Media (*Proprietary Media Filter may not be used for terminal treatment for discharges near or to critical areas unless the filter has been verified by the TARP or STEP process. See Volume 2. Proprietary Media Filters do not include Catch Basin Inserts.)* Sand/Organic Filters Wet Basins
Infiltration BMPs	Exfiltrating Bioretention areas Dry wells (*runoff from non-metal roofs and runoff from metal roofs located outside the Interim Wellhead Protection Area or Zone II of a public water supply or an industrial site only)* Infiltration Basins *(highly recommended)* Infiltration Trenches *(highly recommended)* Subsurface Structures

[32] Drinking Water Regulations – http://www.mass.gov/dep/water/ccdefreg.pdf

Best Management Practices for Cold-Water Fisheries.	
All BMPs must be designed in accordance with specifications in Volume 2 of the Massachusetts Stormwater Handbook. Required Water Quality Volume = 1.0 times impervious area. At least 44% TSS removal required prior to discharge to infiltration structure. For discharges near or to cold-water fisheries, proprietary BMPs may be used for pretreatment only, unless verified for such other uses by STEP or TARP. For the purpose of this requirement, subsurface structures, even those that have a storage chamber that has been manufactured are not proprietary BMPs, since the pretreatment occurs in the soil below the structure, not in the structure itself. See Volume 2.	
Pretreatment:	Deep Sump Catch Basins
	Oil Grit Separator
	Proprietary Separators: See Volume 2
	Sediment Forebays
	Vegetated Filter Strips
Treatment: Sand Filters, Organic Filters, Proprietary Media Filters. Water Quality Swales, Grass Channels, and Filtering Bioretention Areas must be lined and sealed unless at least 44% TSS has been removed prior to discharge to the BMP.	Filtering Bioretention Areas including rain gardens with linings
	Dry Water Quality Swales
	Grass Channels
	Leaching Catch Basins
	Proprietary Media Filter (*Proprietary Media Filter may not be used for terminal treatment for discharges of stormwater runoff near or to a critical area unless verified through the TARP or STEP process. See Volume 2. Proprietary Media Filters do not include catch basin inserts).*
	Sand/Organic Filters
	Wet Water Quality Swales
Infiltration:	Infiltration Trenches
	Infiltration Basins
	Subsurface Structures
	Exfiltrating Bioretention Area including rain gardens
	Dry Wells *(runoff from non metal roofs and runoff from metal roofs located outside the Zone II or Interim Wellhead Protection Area of a public water supply or an industrial site only)*

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

For purposes of the Stormwater Management Standards, redevelopment projects are defined to include the following:

1. Maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving;
2. Development, rehabilitation, expansion and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area; and

3. Remedial projects specifically designed to provide improved stormwater management, such as projects to separate storm drains and sanitary sewers and stormwater retrofit projects.

All redevelopment projects must fully comply with the provisions of the Stormwater Management Standards requiring the development and implementation of a construction period erosion and sedimentation control plan, a pollution prevention plan, an operation and maintenance plan, and the prohibition of illicit discharges. All redevelopment projects are also required to meet the following Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6[33] and improve existing conditions. Existing stormwater discharges are also required to comply with Standard 1 only to the maximum extent practicable.

For purpose of Standard 7, "To the maximum extent practicable" means that:

(1) Proponents of redevelopment projects have made all reasonable efforts to meet the applicable Standard;
(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 Standard, they are implementing the highest practicable level of stormwater management.

Generally, an alternative is practicable if it can be implemented within the site being redeveloped, taking into consideration cost, land area requirements, soils, and other site constraints. However, offsite alternatives may also be practicable. For example, pursuing an easement for locating stormwater controls on an adjacent lot where adequate capacity exists or can be provided may be a practicable alternative. Economic factors must be weighed as redevelopment projects attempt to meet the standards. The scope and effort to be undertaken to meet the standards should reflect the scale and impacts of the proposed project and the classification and sensitivity of the affected wetlands and water resources.

As stated earlier, all redevelopment projects must improve existing conditions. New stormwater controls (retrofitted or expanded) must be incorporated into the design and result in a reduction in annual stormwater pollutant loads from the site. Proponents of redevelopment projects shall make full use of all opportunities for controlling the sources of pollution and to incorporate environmentally sensitive site design and low impact development techniques. This is particularly important for constrained redevelopment sites where it is not possible to install BMPs that treat the entire water quality volume (i.e. 0.5 inch or 1.0 inch rule). All redevelopment projects shall also incorporate measures that will address water quantity issues by reducing the peak and total runoff from the site and by increasing recharge. Actions to improve existing conditions should be geared to addressing known water quality and water quantity problems such as documented failures to meet the Surface Water Quality Standards, low stream flow, or repeated flood events.

Volume 2 Chapter 3 contains a redevelopment checklist that both the issuing authority and the applicant can use to determinine whether the stormwater management system for a redevelopment project has been designed in accordance with all the requirements of Standard 7. For MassHighway projects involving less than a single lane, the Storm Water Handbook for Highway and Bridges may be used in lieu of the redevelopment checklist.

The portion of a property that is currently undeveloped is not a redevelopment and thus does not fall under Standard 7. To the extent a project includes development of previously undeveloped areas, the

[33] The maximum extent practicable standard applies to the 80% TSS removal requirement of Standards 4 through 6. For redevelopment projects, stormwater management system must be designed to remove 80% of TSS only to the maximum extent practicable. The maximum extent practicable standard also applies to redevelopment projects with existing stormwater discharges to Zone Is, Zone As, Outstanding Resource Waters, and Special Resource Waters subject to Standard 6.

project must comply fully with all the Stormwater Management Standards. The following example demonstrates how the Stormwater Management Standards apply to a site that includes both new development and redevelopment.

Suppose a 5-acre site with 2 acres of impervious surfaces including parking, a warehouse, and manufacturing plant, will be redeveloped into a mixed-use development with 3 acres of impervious surfaces. A pollution prevention plan, an erosion and sedimentation control plan and a long-term operation and maintenance plan must be prepared for the entire site in accordance with the applicable provisions of Standards 4 through 6, 8, and 9. All illicit discharges to the stormwater system must be eliminated in accordance with Standard 10. Because there is an additional acre of impervious surface, stormwater runoff from at least one acre of impervious surface must be directed to stormwater best management practices that are designed and constructed in accordance with all the Stormwater Management Standards. The remaining two acres of impervious surfaces included in the project may be treated as a redevelopment. Runoff from that portion of the project may be directed to structural stormwater best management practices that are designed and constructed to meet Standards 2 through 6 only to the maximum extent practicable. New stormwater outfalls must be designed in compliance with Standard 1. Existing outfalls are required to comply with Standard 1 only to the maximum extent practicable. The stormwater management system must also improve existing conditions. Because the site is located in a watershed where surface waters often experience low flow, the proponent can fulfill the requirement to improve existing conditions by maximizing opportunities for infiltration and by minimizing water use by installing a rain barrel or cistern.

Standard 8: A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

During land disturbance and construction activities, project proponents must implement controls that prevent erosion, control sediment movement, and stabilize exposed soils to prevent pollutants from moving offsite or entering wetlands or waters. Land disturbance activities include demolition, construction, clearing, excavation, grading, filling, and reconstruction.

For all projects subject to Wetlands jurisdiction, a construction period erosion, sedimentation, and pollution prevention plan that identifies the party or parties responsible for implementing the plan or any components thereof must be submitted.[34] The Order of Conditions should require the responsible party or parties to implement the plan as approved by the Conservation Commission, until the site is fully stabilized and the temporary erosion and sedimentation controls are removed.

Projects that disturb one acre of land or more are required to obtain coverage under the NPDES Construction General Permit issued by EPA and prepare a Stormwater Pollution Plan (SWPPP)[35]. To avoid duplication of effort, a project proponent can prepare a single document that satisfies the SWPPP requirements of the Construction General Permit and the construction period erosion, sedimentation and pollution prevention plan requirements of Standard 8. For all projects that are required to obtain coverage under the Construction General Permit, the issuing authority shall require submission of the SWPPP before land disturbance commences. If the proponent is not using the SWPPP as its construction period erosion,

[34] For projects subject to jurisdiction under the Wetlands Protection Act, the construction period pollution prevention and erosion and sedimentation control plan should ordinarily be included in the Stormwater Report submitted with the Notice of Intent. For highly complex projects, where the proponent demonstrates that submission with the Notice of Intent is not possible, the issuing authority has the discretion to issue an Order of Conditions authorizing a project prior to submission of the construction period pollution prevention and erosion and sedimentation control plan. However, any such Order must provide that no work including site preparation and land disturbance may commence unless and until a construction period pollution prevention and erosion and sedimentation control plan that meets the requirements of Standard 8 as further elaborated by the Massachusetts Stormwater Handbook has been approved by the issuing authority.

[35] EPA NPDES – http://cfpub.epa.gov/npdes/stormwater/cgp.cfm

sedimentation and pollution prevention plan, the issuing authority shall require implementation of any measures in the SWPPP that were not included in the plan.

The construction period erosion, sedimentation and pollution prevention plan must identify all stormwater management activities that are needed during land disturbance and construction, including source control and pollution prevention measures, BMPs to address erosion and sedimentation, stabilization measures, and procedures for operating and maintaining the BMPs, especially in response to wet weather events and frost. The plan shall include a schedule for sequencing construction and stormwater management activities that minimizes land disturbance by ensuring that vegetation is preserved to the extent practicable, and disturbed portions of the site are stabilized as quickly as possible.

The BMPs used during construction must be different from the BMPs that will be used to handle stormwater after construction is completed and the site is stabilized. Many stormwater technologies (infiltration technologies) are not designed to handle the high concentrations of sediments typically found in construction runoff, and thus must be protected from construction-related sediment loadings.

All construction period BMPs must be properly designed, and sediment traps must be sized to provide adequate capacity and retention time to allow for proper settling of fine-grained soils. Construction period BMPs must be properly operated and maintained. For more information on erosion and sediment control, see Volume 2 of the Massachusetts Stormwater Handbook and the Nonpoint Source Manual, and the Erosion and Sedimentation Control Guidelines: A Guide for Planners, Designers and Municipal Officials[36,37].

Standard 9: A Long -Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

The Long-Term Operation and Maintenance Plan shall at a minimum include:

1. Stormwater management system(s) owners;
2. The party or parties responsible for operation and maintenance, including how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;
3. The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks;
4. A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point;
5. A description and delineation of public safety features; and
6. An estimated operations and maintenance budget.

The Operation and Maintenance Plan shall identify best management practices for implementing maintenance activities in a manner that minimizes impacts to wetland resource areas.[38]

For projects subject to jurisdiction under the Wetlands Protection Act, the Conservation Commission and MassDEP will take the actions set forth below to ensure compliance with Standard 9. Unless and until another party accepts responsibility, the Conservation Commission and MassDEP shall presume that the

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[36] MA Erosion & Sedimentation Control Guidelines - http://mass.gov/dep/water/esfull.pdf

[37] Nonpoint Source Manual (formally known as the MegaManual): http://projects.geosyntec.com/NPSManual/

[38] Some proponents may have developed an operation and maintenance plan for stormwater BMPs to meet the requirements of the National Pollutant Discharge System Elimination System (NPDES) Multi-Sector General Permit or the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4 Permit). To avoid duplication of effort, proponents may be able to prepare one plan for the operation and maintenance of stormwater BMPs that fulfills the requirements of Standard 8 and the applicable NPDES general stormwater permit. The Operation and Maintenance Plan must be included in the Stormwater Report. See Volume 3.

owner of the BMP is the landowner of the property on which the BMP is located, unless there is a legally binding agreement with another entity that accepts responsibility for the operation and maintenance. If an applicant envisions that the municipality may accept responsibility for the operation and maintenance of a stormwater BMP, the applicant shall notify the Conservation Commission and make available to the municipal official responsible for stormwater management the design and operation and maintenance plan for the BMP in order that the municipal official may have an opportunity to review and provide comments to the Conservation Commission within a reasonable period of time prior to the issuance of the Final Order of Conditions. It is recommended that the Conservation Commission solicit comments from the responsible municipal official.

To ensure compliance with Standard 9, the Order of Conditions should include the continuing conditions set forth below.

(1) All stormwater BMPs shall be operated and maintained in accordance with the design plans and the Operation and Maintenance Plan approved by the issuing authority.

(2) The responsible party shall:
- (a) maintain an operation and maintenance log[39] for the last three years, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location);
- (b) make this log available to MassDEP and the Conservation Commission upon request; and
- (c) allow members and agents of the MassDEP and the Conservation Commission to enter and inspect the premises to evaluate and ensure that the responsibility party complies with the Operation and Maintenance Plan requirements for each BMP.

These same continuing conditions should be included in the Certificate of Compliance.

The Order of Conditions should also include a condition requiring the responsible party to submit an O & M Compliance statement when requesting a Certificate of Compliance. The O & M Compliance Statement shall identify the party responsible for implementation of the Operation and Maintenance Plan and state that:

a. the site has been inspected for erosion and appropriate steps have been taken to permanently stabilize any eroded areas;
b. all aspects of the stormwater BMPs have been inspected for damage, wear and malfunction, and appropriate steps have been taken to repair or replace the system or portions of the system so that the stormwater at the site may be managed in accordance with the Stormwater Management Standards;
c. future responsible parties must be notified of their continuing legal responsibility to operate and maintain the structure; and
d. the Operation and Maintenance Plan for the stormwater BMPs is being implemented.

In the case of stormwater BMPs that are serving more than one lot, the applicant shall include with the Notice of Intent a mechanism for implementing and enforcing the Operation and Maintenance Plan. The applicant shall identify the lots or units that will be serviced by the proposed stormwater BMPs. The applicant shall also provide a copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of stormwater BMPs. In the event that the stormwater BMPs will be operated and maintained by an entity, municipality, state agency or person other than the sole owner of the lot upon which the stormwater management facilities are placed, the applicant shall provide a plan and easement deed that provides a right of access for the legal entity to be able to perform said operation and maintenance functions. It is recommended that the Order of Conditions include a condition requiring that the responsible party provide a copy of the Order of Conditions and the legal instrument to each unit or lot owner at or before the

[39] This is a rolling log in which the responsible party records all operation and maintenance activities for the past three years.

purchase of each unit or lot to be serviced by the stormwater BMPs. When requesting the issuance of a Certificate of Compliance, the applicant shall identify to the Conservation Commission or MassDEP in writing the entity with legal responsibility for the operation and maintenance of the stormwater BMPs and provide a copy of the recorded instrument creating the responsible entity.

Prior to issuing a Certificate of Compliance, the Conservation Commission or MassDEP should inspect the site to determine whether the Stormwater BMPs are operating as designed so that the stormwater at the site may be managed in accordance with the Stormwater Management Standards. In conducting the inspection, the Conservation Commission or MassDEP should look for indicia that the stormwater BMPs are not functioning as designed. Evidence of problems with stormwater BMPs may include without limitation sand plumes at outfalls, excessive sands in catch basins, oil sheens, stressed vegetation, accumulated litter, and/or failure of the BMP to drain after 72 hours. No Certificate of Compliance should be issued unless and until the stormwater BMPs are functioning in accordance with the Final Order of Conditions and the Stormwater Management Standards.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

Standard 10 prohibits illicit discharges to stormwater management systems. The stormwater management system is the system for conveying, treating, and infiltrating stormwater on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

Proponents of projects within Wetlands jurisdiction must demonstrate compliance with this requirement by submitting to the issuing authority an Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the site and by including in the pollution prevention plan measures to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease. The Illicit Discharge Compliance Statement may be filed with the Notice of Intent. If the Illicit Discharge Compliance Statement has not been filed, the Final Order of Conditions shall require the submission of an Illicit Discharge Compliance Statement prior to the discharge of stormwater runoff to the post-construction stormwater best management practices. The issuing authority should not issue a Certificate of Compliance until it has determined that the Illicit Discharge Compliance Statement has been submitted, has reviewed the Illicit Discharge Compliance Statement, and has verified that there are no illicit discharges at the site.

The Illicit Discharge Compliance Statement must be accompanied by a site map that is drawn to scale and that identifies the location of any systems for conveying stormwater on the site and shows that these systems do not allow the entry of any illicit discharges into the stormwater management system. The site map shall identify the location of any systems for conveying wastewater and/or groundwater on the site and show that there are no connections between the stormwater and wastewater management systems and the location of any measures taken to prevent the entry of illicit discharges into the stormwater management system. For redevelopment projects, the Illicit Discharge Compliance Statement shall also document all actions taken to identify and remove illicit discharges, including, without limitation, visual screening, dye or smoke testing, and the removal of any sources of illicit discharges to the stormwater management system.

Many municipal and state agencies that own and operate roadways are also subject to coverage under the NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (the MS4 Permit). State agencies and municipalities covered by the MS4 Permit are required to have a stormwater management program that includes illicit discharge detection and elimination. For

roadways covered by the MS4 Permit, the proponent may demonstrate compliance with Standard 10 by documenting the actions taken to identify and eliminate illicit discharges under the MS4 Permit. To prevent duplication of effort, the proponent may submit copies of reports prepared to satisfy the illicit discharge detection and elimination program requirements of the MS4 Permits as its Illicit Discharge Compliance Statement.

Legal Framework for Stormwater Management

In 1996, MassDEP issued the Stormwater Policy that established the Stormwater Management Standards. Since that time, MassDEP has applied the Stormwater Management Standards pursuant to its authority under the Massachusetts Clean Waters Act, M.G.L.c. 21, §§ 26-53, and the Wetlands Protection Act, M.G.L .c. 131, § 40. In accordance with the Wetlands Regulations, 310 CMR 10.05(6)(b), Conservation Commissions and MassDEP issue Final Orders of Conditions that require that stormwater be managed in accordance with the Stormwater Management Standards. Pursuant to the Massachusetts Clean Waters Act and 314 CMR 9.06, MassDEP also applies the Stormwater Management Standards when reviewing projects that require a Water Quality Certification. MassDEP has incorporated the Stormwater Management Standards into the Wetlands Protection Act Regulations, 310 CMR 10.05(6)(b)(1)(a), and the Water Quality Certification Regulations, 314 CMR 9.06(1)(a).

MassDEP continues to apply the Stormwater Management Standards pursuant to its authority under the Massachusetts Clean Waters Act. Acting jointly with the EPA, MassDEP issues general permits regulating certain municipal separate storm sewer systems and construction dewatering. Through the State's Water Quality Certification, the general permit for municipal separate storm sewer systems (the MS4 Permit) requires compliance with the Stormwater Management Standards.[1]

Pursuant to the Massachusetts Clean Waters Act and the regulations promulgated thereunder at 314 CMR 3.04 and 314 CMR 5.04, MassDEP has authority to require that certain existing stormwater discharges obtain a permit. More specifically, MassDEP may require an existing stormwater discharge to obtain a permit under the Clean Waters Act if it determines that the discharge is contaminated with process wastes, raw materials, toxic pollutants, hazardous substances, or oil and grease. MassDEP may also determine that a stormwater discharge that does not comply with the Stormwater Management Standards is a significant contributor of pollutants to the waters of the Commonwealth and thus requires a permit.

Stormwater Management and the Wetlands Protection Act Regulations

The Wetlands Protection Act establishes a public review and permitting process to protect wetland resources and further the interests identified in the Act. These interests are as follows:

[1] See 314 CMR 3.00. At the time of the publication of this handbook, the MS4 permit currently in effect is due to expire in 2008. When a new permit is issued, there will be a new water quality certification. EPA has also issued other NPDES general stormwater permits: a general permit for construction sites that disturb one acre or more of land, the Construction General Permit, and a general permit for certain industrial activities, the Multi-Sector General Permit. The Construction General Permit is due to expire in 2008 and the Multi-Sector General Permit has been administratively continued after expiring in 2005. For the latest information on all the NPDES stormwater permits, see http://cfpub1.epa.gov/npdes/home.cfm?program_id=6 and http://www.epa.gov/region1/topics/water/stormwater.html.

- Protection of public and private water supply;
- Protection of groundwater supply;
- Flood control;
- Storm damage prevention;
- Pollution prevention;
- Protection of fisheries;
- Protection of land containing shellfish; and,
- Protection of wildlife habitat.

If not properly managed and treated, stormwater discharges to areas subject to jurisdiction under the Act have the potential to impair some or all of these interests. To address this potential impairment, the Wetlands Regulations, 310 CMR 10.05(6)(k), provide that except as expressly provided therein, all industrial, commercial, institutional, office, residential and transportation projects, including site preparation, construction, and redevelopment in an Area Subject to Protection under the Act or the Buffer Zone, and all point source stormwater discharges from said projects within an Area Subject to Protection Under the Act and the Buffer Zone, shall be managed according to the Stormwater Management Standards. The exceptions are set forth in 310 CMR 10.05(6)(l) and (m). For information on the exceptions, see Chapter 1, pp. 2-3.

Proponents are not allowed to alter wetland resource areas to comply with the Stormwater Management Standards. Thus, the Wetland Regulations, 310 CMR 10.05(6)(k), expressly provide that stormwater best management practices may not be constructed in a wetland resource area other than isolated land subject to flooding, bordering land subject to flooding, riverfront area, or land subject to coastal storm flowage.

Point Source Discharges

A point source discharge is a discernible, confined and discrete conveyance of pollutants as opposed to a diffuse non-point source of pollution, which generally involves overland flow. Because a direct point source discharge may result in wetland alterations by changing drainage characteristics, sedimentation patterns, flood storage areas, and water temperature, thereby affecting the physical, chemical or biological characteristics of the receiving waters, the Wetlands Regulations, 310 CMR 10.05(6)(b)(1), require that all Final Orders of Conditions regulate the quality and quantity of point source stormwater discharges.

The Wetland Regulations, 310 CMR 10.03(4), provide that if the Department has issued a surface water discharge permit in conjunction with a National Pollutant Discharge Elimination System Permit (NPDES) for a point source discharge of pollutants, the effluent limits set forth in that permit shall be presumed to protect the interests identified in the Wetlands Protection Act. The Wetlands Regulations, 310 CMR 10.03(4), further provide that this presumption may be rebutted by creditable evidence. The purpose of the rebuttable presumption is to avoid subjecting a point source discharge to possibly

conflicting requirements under the Clean Waters Act, M.G.L. c. 21, §§ 26-53, and the Wetlands Protection Act, M.G.L. c. 131 § 40.

When 310 CMR 10.03(4) took effect, the presumption applied only to NPDES permits that established specific numerical effluent limits for discharges from wastewater treatment facilities. At that time, there were no NPDES permits for stormwater discharges. As more fully detailed below, there are now many NPDES permits for stormwater discharges, including individual permits as well as general permits such as the Construction General Permit, the Multi-Sector General Permit, and the general permit for Municipal Separate Storm Sewer Systems (the MS4 Permit). The vast majority of the NPDES general stormwater permits do not establish specific numerical effluent limits. An NPDES Permit that does not establish such limits should not be presumed to protect the interests of the Wetlands Protection Act in place of the one specific numerical effluent limit established by the Stormwater Management Standards, the 80% TSS removal standard set forth in Standard 4.

Moreover, there is little chance for conflicts between the requirements of the NPDES general stormwater permits and the Stormwater Management Standards. Through the state's water quality certification, the Construction General Permit requires compliance with the Stormwater Management Standards. New development and redevelopment of industrial sites that are required to obtain coverage under the Multi-Sector General Permit are also required to comply with the Stormwater Management Standards through the State's Water Quality Certification. Like other development or redevelopment projects, projects covered by a general NPDES general stormwater permit must comply with the Stormwater Management Standards.

Erosion and Sedimentation Control

The Wetlands Regulations also recognize that stormwater discharges may adversely impact wetland resource areas during construction. To prevent this impact, the Wetlands Regulations, 310 CMR 10.05(6)(b)(1), provide that the Order of Conditions shall impose conditions to control erosion and sedimentation within resource areas and the Buffer Zone. Erosion and sedimentation control is required, even if the project is a single-family house that is exempt from the requirement to comply with the Stormwater Management Standards. For projects subject to the Stormwater Management Standards, Standard 8, set forth in the Wetlands Regulations at 310 CMR 10.06(6)(k)(8), requires the development and implementation of a construction-period erosion, sedimentation and pollution prevention plan.

Wetland Resource Areas and Buffer Zones

The Wetlands Regulations, 310 CMR 10.02, define Areas Subject to Protection under the Act (Wetland Resource Areas) to include the following:

- Coastal wetland areas, i.e. coastal banks, coastal beaches, coastal dunes, land under the ocean, designated port areas, barrier beaches, rocky intertidal shores,

land under salt ponds, land containing shellfish, land subject to coastal storm flowage, and salt marsh; and

- Inland wetland resource areas, i.e. bordering vegetated wetlands (wet meadows, marsh, swamp or bog bordering any creek, river, stream, pond or lake), bank, land under water, land subject to flooding, and the riverfront area.

The Wetlands Regulations, 310 CMR 10.02(2), further define the Buffer Zone to mean the area within 100 feet of certain Wetland Resource Areas. The Wetland Resource Areas that have a Buffer Zone are:

Any bank		the ocean
any freshwater wetland		any estuary
any coastal wetland		any creek
any beach	*BORDERING*	any river
any dune	*ON*	any stream
any flat		any pond
any pond		

Stormwater Discharges Outside Wetland Resource Areas

In some cases, a stormwater discharge to Wetland Resource Areas may originate outside any Wetland Resource Area and outside the Buffer Zone. Consistent with 310 CMR 10.05(6)(b)(1), local conservation commissions and MassDEP have the authority to impose conditions on the quality and quantity of the discharge even though it comes from a source that is located outside wetlands jurisdiction. In light of this authority, the Final Order of Conditions should require that the stormwater be managed so that when the stormwater is discharged within the Wetland Resource Area or Buffer Zone, it complies with the Stormwater Management Standards. Moreover, the Final Order of Conditions should include this requirement, even if the project proponent has to install additional stormwater BMPs in an area outside Wetlands jurisdiction.

For example, a developer proposes to locate an overflow discharge pipe within the Buffer Zone from an extended dry detention basin that is installed outside the Buffer Zone. Although the issuing authority cannot regulate the extended dry detention basin, the Final Order of Conditions should require that the Stormwater Management Standards be met at the point of discharge, since the overflow pipe is located within jurisdiction. To ensure that the discharge can meet this requirement, the developer should design the extended dry detention basin in accordance with the specifications and procedures set forth in Volumes 2 and 3 of the Stormwater Management Handbook, and the issuing authority should request information about the design of the extended dry detention basin during the permitting process.

Regulatory Requirements After the Fact

As stated earlier, jurisdiction under the Wetlands Protection Act does not extend beyond Wetland Resource Areas and the Buffer Zone. The situation changes if an activity occurring outside jurisdiction results in the alteration of a Wetland Resource Area. In that event, the activity may be regulated after the fact. The Wetlands Regulations, 310 CMR 10.02(2)(d) and 310 CMR 10.05(6)(b)(1), provide that if the issuing authority determines that an activity outside the Areas Subject to Protection Under MGL c. 131, sec. 40 and outside the Buffer Zone, has in fact altered an Area Subject to Protection Under MGL c. 131, sec. 40, it may require the filing of a Notice of Intent, issue an Enforcement Order, or include in an Order of Conditions any conditions that are necessary to protect the interests of the Act. If the issuing authority exercises after-the-fact jurisdiction, it may be extremely costly to a developer, since s/he may have to redesign the project to accommodate stormwater BMPs.

For example, a conservation commission or MassDEP does not have jurisdiction over a stormwater discharge pipe located 105 feet from a bordering vegetated wetland or 205 feet from a perennial stream. Given this location, it is likely that the first heavy rainstorm will erode the channel and alter the wetland resource area. To avoid the additional costs that may arise from being subject to after-the-fact jurisdiction, a prudent developer should be proactive and implement stormwater management practices to prevent any unauthorized wetland alterations.

Issuing authorities also have authority to regulate activities outside Wetlands jurisdiction, when additional stormwater is routed through an existing outfall pipe and results in an alteration of a wetland resource area. Project proponents and municipal officials should work together to ensure adequate pretreatment prior to discharge to the municipal storm drain system. Municipal separate storm drain systems covered by the MS4 permit can ensure such pretreatment by establishing and implementing adequate post construction stormwater controls as required by that permit.

Conversion of Impervious Surfaces to Pervious Surfaces

The Wetlands Regulations, 310 CMR 10.02(1)(f), exempt from regulation under the Act the conversion of impervious to vegetated surfaces in the Buffer Zone and the Riverfront Area, provided erosion and sedimentation controls are implemented during construction and the work does not take place in a wetland resource area other than the Riverfront Area. Through this exemption, the Wetlands Regulations make it easy for property owners to decrease impervious surfaces.

Operation and Maintenance of Stormwater Management Systems

The Wetlands Regulations, 310 CMR 10.02(3), provide that a bordering vegetated wetland, land under water, land subject to flooding, or riverfront area created for stormwater management purposes may be maintained without the filing of a Notice of

Intent, provided the work is limited to the maintenance of the system and conforms to an Order of Conditions issued after 1983. The Wetlands Regulations, 310 CMR 10.02(3), have been revised to provide that all stormwater management systems designed and constructed after November 18, 1996, the effective date of the Stormwater Management Standards, may be maintained without the filing of a Notice of Intent. This exemption from filing a Notice of Intent applies to subsurface structures or leaching catch basins within a Wetland Resource Area or Buffer Zone and water quality swales or bioretention areas constructed in an area outside Wetlands jurisdiction for which no Order of Conditions has been issued, provided the stormwater management system was designed and constructed in accordance with the Stormwater Management Standards. If the system was constructed in a wetland resource area or associated Buffer Zone, this exemption applies only if the system was constructed in accordance with all applicable provisions of the Wetlands Regulations.

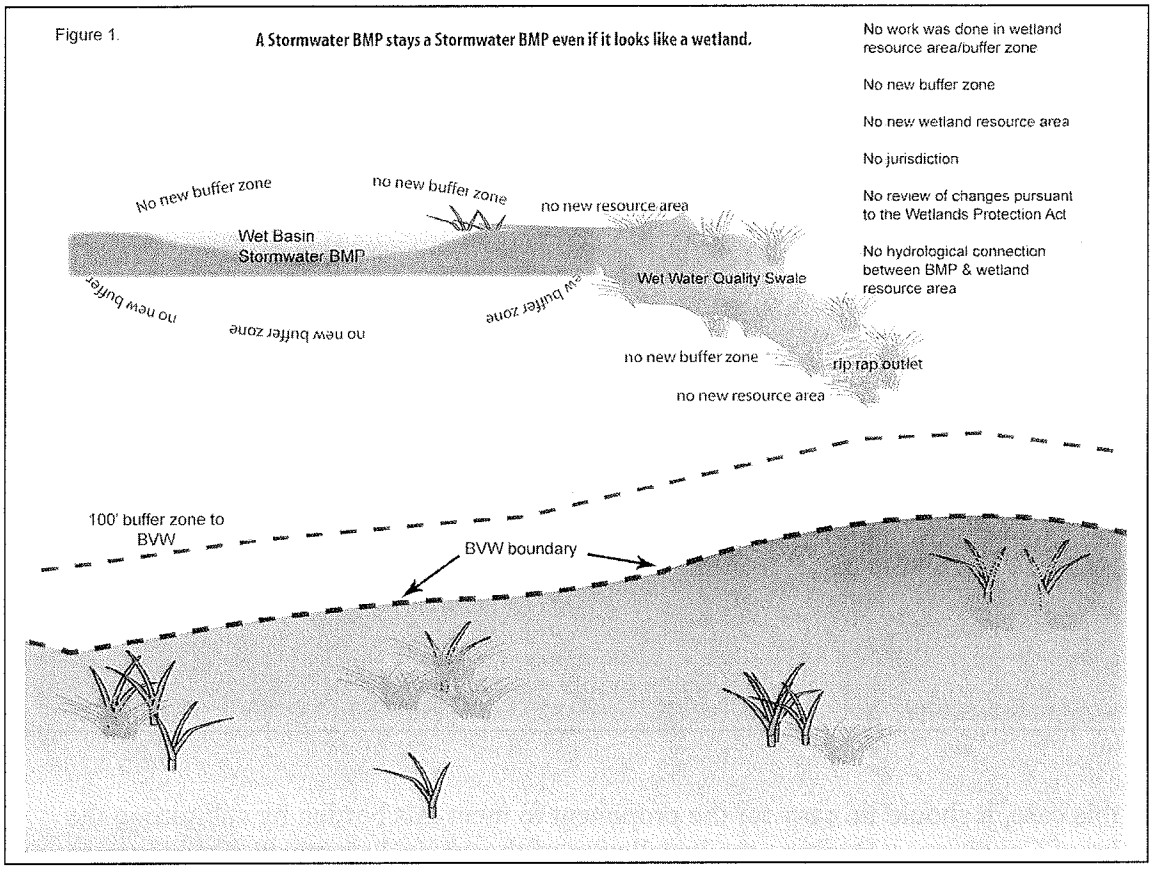
To qualify for this provision, the work must be limited to maintenance and best practical measures must be used to avoid and minimize impacts to wetland resource areas outside the footprint of the stormwater management system. Best practical measures are technologies, designs, measures or engineering practices that are in general use to protect similar interests. Work done in accordance with an Operation and Maintenance Plan qualifies for this exemption, provided the plan requires implementation of best practical measures to minimize wetland impacts during maintenance. In the absence of an Operation and Maintenance Plan, the party responsible for maintenance may file a Request for Determination of Applicability requesting the issuing authority to determine whether the proposed maintenance activities fall within the exemption.

Jurisdiction Over Stormwater Management Systems

To encourage increased use of low impact development techniques that rely on above-ground stormwater BMPs that mimic natural hydrologic conditions, the Wetlands Regulations, 310 CMR 10.02(2)(d), have been modified to provide that the installation of stormwater management systems designed and constructed on or after January 2, 2008 in accordance with the Stormwater Management Standards do not create any additional Wetland Resource Area or Buffer Zone. The Wetland Regulations, 310 CMR 10.02(4), further provide that review of future modifications to any such systems located within a wetland resource area or Buffer Zone shall be limited to the stormwater functions of the system, compliance with the Stormwater Management Standards, and those performance standards that would apply in the absence of the stormwater management system.

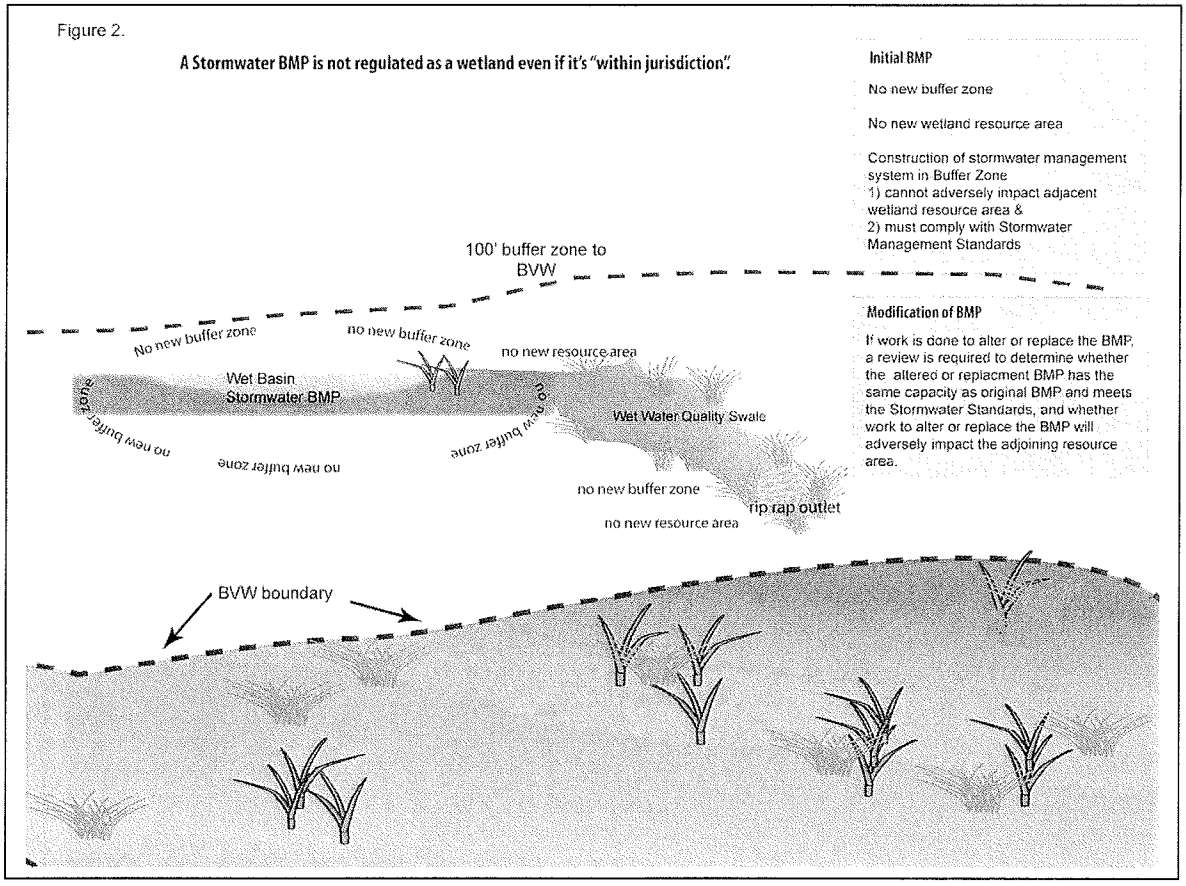
For example, a stormwater management system that includes a water quality swale, an infiltration basin, and a riprap outlet is designed and constructed in accordance with the Stormwater Management Standards on or after January 2, 2008 in a portion of the site that is outside any wetland resource area and outside the Buffer Zone. No additional wetland resource area or Buffer Zone is created solely as a result of the installation of the stormwater management system. Ten years later, the project proponent proposes to fill in the infiltration basin and replace it with a subsurface structure also located outside a wetland resource area or Buffer Zone. The project proponent can fill in the infiltration basin and replace it with a subsurface structure without filing a Notice of Intent, Notice or

Resource Area Delineation or Request for Determination of Applicability, since both the infiltration basin and the subsurface structure are located in upland. See Figure 1.



Alternatively, suppose the entire stormwater management system, including the water quality swale, infiltration basin, and riprap outlet, is constructed for stormwater management purposes in the Buffer Zone in accordance with the Stormwater Management Standards on or after January 2, 2008. As with the earlier example, no additional wetland resource area or Buffer Zone is created solely as a result of the installation of the stormwater management system. See Figure 2.

Ten years later, the project proponent proposes to fill in the infiltration basin and replace it with a subsurface structure outside a wetland resource area or Buffer Zone. The project proponent is required to file a Notice of Intent, Notice of Order for Resource Area Delineation, or Request for Determination of Applicability, since the original stormwater management system is located in the Buffer Zone. As part of this filing, the project proponent has to show that the water quality swale, infiltration basin and riprap outlet are components of a stormwater management system constructed in the Buffer Zone on or after January 2, 2008, in accordance with the Stormwater Management Standards.

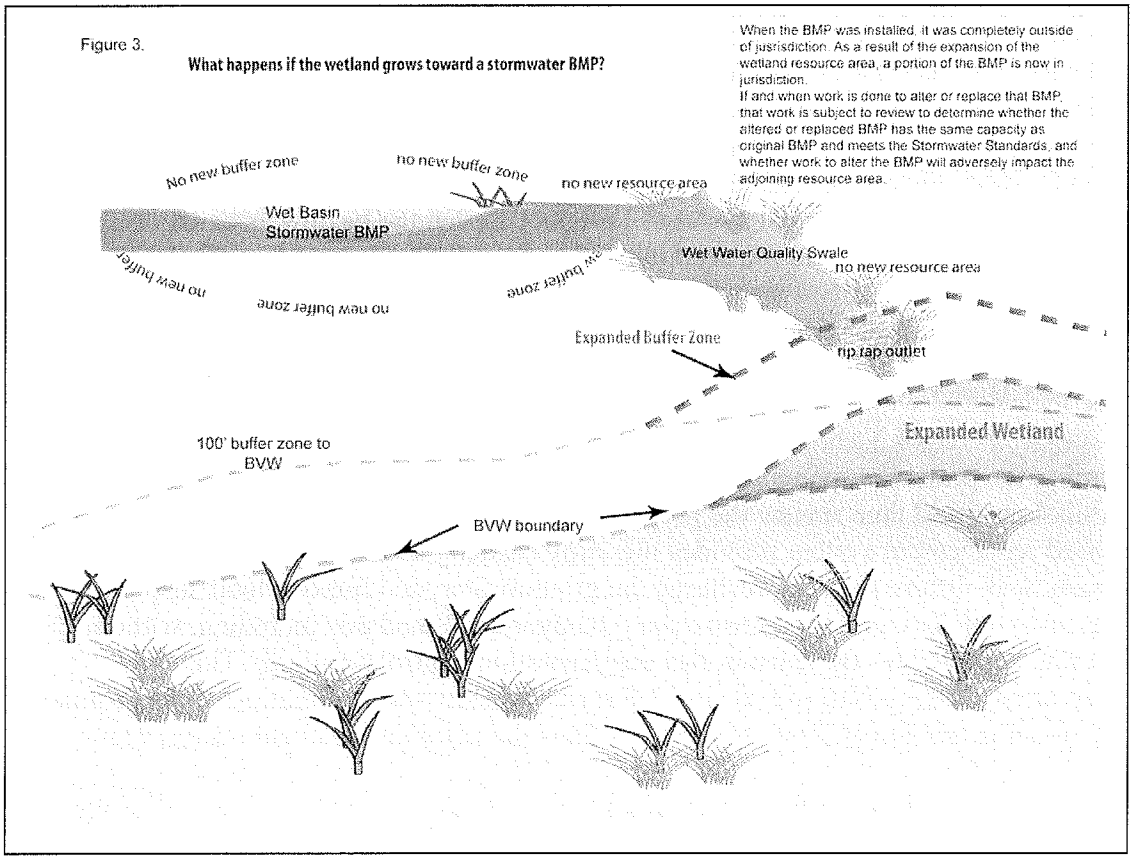


In this case, it should be easy for the proponent to meet this burden by submitting the Order of Conditions permitting the installation of the original stormwater management system and the plans referenced therein[2]. The Conservation Commission would then review the proposed change to determine whether (a) the replacement system provides the same design capacity as the initial system to attenuate the peak discharge rate, recharge the groundwater and remove total suspended solids; (b) the replacement system complies with the Stormwater Management Standards to the extent they are applicable including, without limitation, Standard 8 - the erosion and sedimentation control standard; and (c) whether the alteration of the system located in the Buffer Zone adversely affects the adjacent wetland resource area.

Additionally, suppose a proponent designs and constructs, in accordance with the Stormwater Management Standards on or after January 2, 2008, a stormwater management system that includes a water quality swale, infiltration basin, and riprap outlet located on a portion of the site that is outside a wetland resource area and outside the Buffer Zone. The construction of the infiltration basin and water quality swale does

[2] A continuing condition providing that the stormwater management system may not be changed without the approval of the issuing authority must be included in the Order of Conditions and Certificate of Compliance.

not by itself create any additional wetland resource area or Buffer Zone subject to regulation under the Wetlands Protection Act. Over time, however, the wetland resource area expands, moving the wetland boundary and the boundary of the Buffer Zone. The entire wetland resource area, including the expansion, is an Area Subject to Protection Under M.G.L .c. 131, § 40, and any work in that area and associated Buffer Zone requires the Filing of a Notice of Intent, Request for Determination of Applicability, or Notice of Resource Area Delineation. See Figure 3



Ten years later, the proponent proposes to fill in the water quality swale, infiltration basin, and riprap outlet, and replace it with a vegetated filter strip, subsurface structure, and riprap outlet, all located outside the boundaries of the expanded wetland resource area and associated Buffer Zone. Because the wetland resource area has expanded, the original riprap outlet is within the Buffer Zone at the time of the proposed work. The alteration of the original riprap outlet within the Buffer Zone requires the filing of a Notice of Intent, Request for Determination of Applicability, or Notice of Resource Area Delineation. See Figure 3.

Once again, the project proponent has the burden of proving that the stormwater management system was constructed on or after January 2, 2008 in accordance with the Stormwater Management Standards and that the system was originally constructed

outside any wetland resource area or Buffer Zone. It would be easy for the proponent to meet this burden if, prior to constructing the stormwater management system, s/he had obtained a Negative Determination of Applicability, an Order of Resource Area Delineation (ORAD), or an Order of Conditions for any work on the project that occurred within a resource area or Buffer Zone.

In the absence of a Negative Determination, ORAD, or Order of Conditions, the project proponent would have to rely on whatever credible evidence is available to prove that the original water quality swale, infiltration basin and riprap outlet is a stormwater management system that was originally constructed on or after January 2, 2008 in accordance with the Stormwater Management Standards in a portion of the site that was outside a wetland resource area or associated Buffer Zone. Obtaining the necessary credible evidence may not be easy. To establish that the system was designed on or after January 2, 2008, the project proponent may be able to rely on the local approvals, if any, for the stormwater management system. To establish that the basin was constructed outside wetlands jurisdiction, the proponent may be able to rely on other available information, such as wetland maps prepared by MassDEP or other state or local agencies, any Orders or Determinations issued for the site prior to the project or subsequent to the project, any Orders or Determinations for nearby sites, and existing conditions (soils, plants, hydrology) within the portion of the site surrounding the infiltration basin.

Assuming the project proponent meets the required burden of proof, the Conservation Commission would then review the proposed alteration to determine whether the proposed replacement system provides the same capacity as the original design to attenuate peak discharge rates, recharge the groundwater, and remove total suspended solids, and complies with the Stormwater Management Standards including, without limitation, Standard 8 - the erosion and sedimentation control standard. The Conservation Commission would also determine whether the elimination of the original riprap outlet in the Buffer Zone adversely affects the adjoining wetland resource area

The Right to Appeal the Order of Conditions

Conservation Commissions and MassDEP issue Orders of Conditions that require compliance with the Stormwater Management Standards. Applicants and others may appeal these conditions to MassDEP in the same way as they appeal any other requirements of the Order of Conditions. Moreover, if a Commission issues an Order of Conditions that is inconsistent with the Stormwater Management Standards, MassDEP may intervene unilaterally and issue a Superseding Order that requires compliance with the Standards[3].

Underground Injection Control Program

The Underground Injection Control Regulations, 310 CMR 27.00, require the registration of certain infiltration best management practices. As of the date of publication of this

[3] Applicants and others may appeal a Superseding Order issued by MassDEP by requesting an adjudicatory hearing. The rules for requesting an adjudicatory hearing are set forth in 310 CMR 10.05(7)(j).

manual, all dry wells, infiltration trenches, subsurface structures, and leaching catch basins must be registered. Depending on the design, bioretention areas may have to be registered. [4]

Stormwater, the Federal Clean Water Act, and the State Clean Waters Act.

Stormwater and the 401 Water Quality Certification

Under Section 401 of the federal Clean Water Act, an applicant for a federal permit for any activity resulting in a discharge to waters of the United States must obtain certification that the discharge will comply with state water quality standards and other appropriate requirements of state law. Section 404 permits for the discharge of dredged or fill material issued by the U.S. Army Corps of Engineers frequently trigger the state's 401 jurisdiction. Discharges include the filling of wetlands, the redeposit of dredged or excavated material from activities such as mechanized land clearing or ditching, and the placement of piling when it has the effect of fill. Waters of the United States include navigable waters, their tributaries, wetlands adjacent to navigable waters, and other wetlands that possess a significant nexus with navigable waters. States may add conditions to certify that state water quality standards will be met.

The 401 Water Quality Certification Program has been coordinated with the state's Wetlands Protection Act Program. As a result, most projects approved by the Conservation Commission under the Wetland Protection Act do not need further state review under the 401 Program. These projects meet the Stormwater Management Standards through compliance with the Wetlands Protection Act. Some types of projects, including those with potentially large wetland impacts and those that are not subject to the Wetlands Protection Act, require an individual 401 certification. Projects requiring an individual 401 Water Quality Certification include activities that will result in the loss of more than 5,000 square feet of bordering and isolated vegetated wetlands and land under water, the discharge of dredged or fill material to Outstanding Resource Waters, real estate subdivisions unless there is a recorded deed restriction providing notice to subsequent purchasers limiting the amount of fill, and the discharge of dredged or fill material to a salt marsh or to rare and endangered species habitat in an isolated vegetated wetland.

For these projects, the 401 Water Quality Certification regulations include specific provisions for stormwater discharges. The Water Quality Certification Regulations, 314 CMR 9.06(5), provide:

[4] For information on the UIC program and its application to infiltration BMPs, see http://www.epa.gov/npdes/pubs/sw_class_v_wells_fs.pdf. See also http://www.mass.gov/dep/water/laws/uicqa.htm.

- No discharge of dredged or fill material is permitted for the impoundment or detention of stormwater for purposes of controlling sedimentation or other pollutant attenuation.

- Discharge of dredge or fill material may be permitted to manage stormwater for flood control purposes only where there is no practicable alternative and provided that best management practices are implemented to prevent sedimentation or other pollution. No discharge of dredged or fill material is permitted for the impoundment or detention of stormwater in Outstanding Resource Waters for any purposes

The Water Quality Certification Regulations, 314 CMR 9.06(6), provide that stormwater discharges shall be provided with stormwater best management practices to attenuate pollutants and to provide a setback from the receiving water or wetland in accordance with the Stormwater Management Standards. The Water Quality Certification Regulations, 314 CMR 9.06, incorporate the Stormwater Management Standards.

Designation of Stormwater Discharges

Under the Surface Water Discharge Regulations, 314 CMR 3.00, stormwater discharges other than discharges from municipal separate storm sewer systems that require coverage under the MS4 general permit, are exempt from the requirement to obtain an individual or general surface water discharge permit unless MassDEP has made a designation in accordance with 314 CMR 3.04(2). [5] MassDEP may make a designation if it determines that: (1) the discharge is or may be a significant contributor of pollution to waters of the Commonwealth, (2) the discharge is contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil or grease, and does not meet the Stormwater Management Standards, (3) the discharge is subject to effluent limitation guidelines or toxic pollutant effluent standards, or (4) the discharge is located in an industrial plant or plant-associated area and there is a potential for significant discharge of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants or hazardous substances, and the discharge has not obtained coverage under a general permit. Any stormwater discharge designated by MassDEP will be required to obtain a discharge permit or to take other corrective action. Designated stormwater discharges may be permitted by an individual permit, a general permit or an alternative general permit.

Stormwater Discharges and Total Maximum Daily Loads

A total maximum daily load (TMDL) is the greatest amount of a pollutant that a water body can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, swimming, recreation, and fishing. A TMDL specifies how much of a specific pollutant can come

[5] MassDEP has similar authority to require certain stormwater discharges to the groundwater to obtain a permit. See 314 CMR 5.04.

from various sources, including stormwater discharges, and identifies strategies for reducing the pollutant discharges from these sources. MassDEP has prepared TMDLs that indicate that in many watersheds action is needed to reduce the concentrations of bacteria, phosphorus, and nitrogen in stormwater discharges, including, without limitation, implementation of specific stormwater BMPs.

Proper selection of non-structural and structural stormwater management practices is an essential component of any plan to reduce these pollutants. These non-structural BMPs begin with environmentally sensitive site design, pollution prevention and source control. By reducing impervious surfaces and allowing stormwater to infiltrate into the ground and by selecting a landscape design that minimizes the need for fertilizers and pesticides, developers can substantially reduce the concentration of pollutants in stormwater runoff from development and redevelopment projects. Once a project is complete, ongoing action is needed to prevent additional pollutants from entering the stormwater management system. Raw materials and wastes should be stored inside or under cover with adequate containment. Snow, sand, deicing chemicals, fertilizers, pesticides, and solid waste should be properly managed. An effective street-sweeping program should be implemented. Structural BMPs that can remove the pollutants of concern must be designed, constructed, operated and maintained. Infiltration BMPs, bioretention areas, constructed stormwater wetlands, and filter systems may be effective tools for reducing the concentration of nutrients and bacteria in stormwater discharges.

If a proponent is proposing a project that is in the watershed of a water body with a TMDL, and if the project is subject to wetlands jurisdiction, the proponent must select structural BMPs that are consistent with the TMDL. Because pollution prevention is an interest identified in the Wetlands Protection Act, conservation commissions and MassDEP may require use of such BMPs when reviewing projects subject to jurisdiction under the Act. The TMDL may contain information on appropriate BMPs. See http://mass.gov/dep/water/resources/tmdls.htm.

Stormwater and the National Pollutant Discharge Elimination System (NPDES) Permitting Program

The federal Clean Water Act authorizes the United States Environmental Protection Agency (the EPA) to regulate point sources that discharge pollutants into waters of the United States, including stormwater runoff from drainage systems. Under the NPDES Phase 1 Stormwater Program, the EPA, since 1990, has issued general permits for municipal separate storm sewer systems in cities and counties with populations of 100,000 or more, stormwater runoff from specific industrial activities, and stormwater runoff from construction sites that disturb 5 acres or more of land. In 2003, the NPDES Phase II Stormwater Program took effect, and EPA began regulating municipal separate storm sewer systems in additional urbanized areas, and stormwater runoff from construction activities that disturb one acre or more of land, through a general permit.

Stormwater and the NPDES General Permit for Municipal Separate Storm Sewer Systems (the MS4 Permit)

MassDEP and EPA jointly issue the permit for municipal separate small sewer systems or MS4 Permit. See 314 CMR 3.06(11)(b). The MS4 general permit requires the development and implementation of a stormwater management plan that includes six specified minimum measures.

These measures are as follows:

- **Public education and outreach.** The public education program must provide information on the impact of stormwater discharges and identify steps the public can take to reduce pollutants in stormwater, such as actions to ensure the proper use and disposal of landscape and garden chemicals including fertilizers and pesticides, protecting and restoring riparian vegetation, and properly disposing of used motor oil or hazardous waste.

- **Public involvement and education.** The public involvement program shall be done in compliance with all applicable state and local public notice requirements, including, without limitation, the Open Meetings Law and the Public Records Act. The public must be involved in developing, implementing and reviewing the stormwater management program.

- **Illicit discharge detection and elimination.** An illicit discharge is any discharge to a municipal separate storm sewer that is not comprised entirely of stormwater, discharges from fire-fighting activities, and certain designated non-stormwater discharges. An illicit discharge detection and elimination program requires a map of the storm sewer system that identifies the location of all outfalls and the names of all surface waters that receive discharges from those outfalls. As part of this program, there must be a regulatory mechanism that prohibits non-stormwater discharges into the municipal separate storm sewer system and provides for appropriate enforcement. The program must include a plan to detect and address non-stormwater discharges, including illegal dumping, and to inform public employees, businesses and the general public of the hazards associated with illicit connections and improper waste disposal.

- **Construction site runoff control program.** The construction site runoff control program must reduce pollutants from construction activities that result in a land disturbance of greater than or equal to one acre. The construction site runoff control program must include a regulatory mechanism that requires proper management of construction sites, with sanctions to ensure compliance. The program shall require (a) sediment and erosion controls including BMPs and LID techniques to minimize land disturbance; (b) proper management of wastes, including construction debris, concrete truck wash-out chemicals, litter and sanitary wastes; (c) procedures for site plan review that examine water quality impacts; (d) procedures for public input; and (e) procedures for inspection and

enforcement of control measures. The program may rely on Standard 8 of the Stormwater Management Standards for construction site runoff control. To apply Standard 8 to areas outside the jurisdiction of the Wetlands Protection Act requires a local ordinance, bylaw or regulation.

- **Post-Construction stormwater management.** The post-construction stormwater management program must apply to projects that disturb one acre or more. The program must include a regulatory mechanism with sanctions, requirements for the long-term operation and maintenance of best management practices, and controls to prevent or minimize impacts to water quality. The program may rely on the Stormwater Management Standards for post-construction stormwater management. To apply those standards to areas outside the jurisdiction of the Wetlands Protection Act requires a local ordinance, bylaw, or regulation.

- **Pollution prevention and good housekeeping in municipal operations.** The pollution prevention and good housekeeping program must include the development and implementation of a program for preventing and reducing the concentration of pollutants found in stormwater runoff from municipal operations, including parks and open space, fleet maintenance, building maintenance, new construction and land disturbance, roadway drainage system maintenance, and the stormwater system.

The MS4 permit requires the permittee to develop measurable goals for the implementation of the stormwater management program and to report on its progress on meeting those goals. Based on a Total Maximum Daily Load or equivalent water quality assessment, the MS4 permit may require the implementation of measures in addition to the six minimum controls, if EPA and/or MassDEP determine that such additional measures are necessary to protect water quality.

The first MS4 general permit was issued in 2003 and is due to expire in 2008.[6] In Massachusetts, 237 cities and towns have applied for and obtained coverage under the 2003 MS4 general permit. For a map showing Massachusetts municipalities covered by the MS4 Permit, see EPA's site at http://www.epa.gov/region1/npdes/stormwater/ma.html.

To comply with the MS4 general permit, many cities and towns have enacted local ordinances, bylaws, and regulations that apply to existing stormwater discharges as well as stormwater discharges from new development and redevelopment, both during and after construction. These local requirements include construction and post-construction controls on development and redevelopment projects that disturb one acre or more of land, including projects outside the jurisdiction of the Wetlands Protection Act, and regulations requiring the removal of illicit connections to the municipal separate storm

[6] Through the State's Water Quality Certification, the 2003 MS 4 Permit requires compliance with the Stormwater Management Standards and the Surface Water Quality Standards. The 2003 permit required permittees in high and medium stressed basins to meet the recharge standard in areas outside of jurisdiction under the Wetlands Protection Act.

sewer system. If a TMDL has been established, these regulations may address pollutants other than TSS. Proponents of projects located in municipalities that are covered by the MS4 permit must comply with these local requirements.

Stormwater Discharges from Construction Activities (Construction General Permit)

Construction sites that disturb one or more acres and that discharge stormwater to a surface water of the United States, or to a municipal separate storm sewer system that discharges to a surface water of the United States, are required to obtain coverage under the NPDES General Permit for Storm Water Discharges from Construction Activities (also known as the "Construction General Permit" or "CGP") issued by the EPA. Although the state has not joined with EPA in issuing the construction general permit, Massachusetts has issued a 401 Water Quality Certification for the permit. The Water Quality Certification requires compliance with certain state regulations and policies, including the Massachusetts Clean Waters Act, the Massachusetts Water Quality Standards, the Surface Water Discharge Permit Program Regulations, the Wetlands Protection Act, the Wetlands Regulations, Final Orders of Conditions issued pursuant to the Wetlands Protection Act, the Massachusetts Stormwater Management Policy, and the Massachusetts Endangered Species Act. If the requirements of the water quality certification are violated, MassDEP has the authority to require that the violations be corrected and to take any action authorized by the General Laws of the Commonwealth, the Massachusetts Clean Waters Act, and the regulations promulgated thereunder.

The CGP requires the preparation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must include a plan to implement both pollution prevention and erosion and sedimentation control during construction. If the permit covers a stormwater discharge to a water body for which a TMDL has been developed, the SWPPP must document compliance with the TMDL. If the permit covers a discharge to an Outstanding Resource Water, the SWPPP must be submitted to MassDEP so that the Department may review it for compliance with the surface water quality standards.[7] The Construction General Permit is scheduled to expire in 2008[8].

Stormwater Discharges from Construction Dewatering

Stormwater and/or groundwater discharges that are pumped and drained from excavations or other points of accumulation are required to obtain an individual or general NPDES permit from EPA and MassDEP. A notice of intent must be submitted to both EPA and MassDEP at least 30 days prior to the discharge. MassDEP reviews and approves all discharges into Class A or Class SA waters. If the discharge is to an impaired water, an individual permit is required. If EPA or MassDEP believes that the

[7] The SWPPP should be submitted along with BRP WM09. See http//www.mass.gov/dep/water/approvals/wm09.pdf.

[8] . For information on the latest Construction General Permit see http://www.epa.gov/region1/topics/water/stormwater.html and http://cfpub2.epa.gov/npdes/stormwater/cgp.cfm.

general permit does not adequately protect actual environmental conditions, including the preservation of endangered species, it may require an individual permit for other discharges. For discharges to the Fort River in Amherst, the Mill River in Easthampton, and the Mill River in Whately, EPA and MassDEP are required to make a case-by-case determination of whether a general permit is sufficient to protect the federally listed endangered dwarf wedge mussel.

The general permit prohibits the discharge of materials or chemicals in amounts that would be toxic and discharge that violates state or federal water quality standards. The general permit requires that all discharges pass through settling basins or other treatment systems to remove total suspended solids. The general permit establishes specific effluent limitations and monitoring requirements for Total Suspended Solids, oil and grease, and pH.

Stormwater Discharges from Industrial Activities

Stormwater discharges associated with certain industrial sectors are required to obtain an individual NPDES permit or coverage under the NPDES Storm Water Multi-Sector General Permit. This permit is issued only by EPA and requires that the discharger comply with the surface water quality standards, 314 CMR 4.00 and prepare a SWPPP. If there are stormwater discharges to an Outstanding Resource Water, the discharger must submit the SWPPP to MassDEP.[9]

The SWPPP must identify potential sources of pollutants that may reasonably be expected to affect the quality of the stormwater discharges, describe and ensure implementation of practices to reduce pollutants in stormwater discharges, and ensure compliance with the permit. The SWPPP must include BMPs to minimize pollutants in the discharge so that the discharge will not cause or contribute to violations of water quality standards. The BMPs should be a suite of stormwater controls that prevent pollution and are economically reasonable and appropriate in light of current industry practice[10].

If a TMDL has been approved for the receiving water, the SWPPP must be consistent with the TMDL. If at any time after authorization under a general permit, EPA determines that the discharge may cause or have the reasonable potential to cause or contribute to a violation of water quality standards, EPA may require the permittee to develop a supplemental action plan to address the water quality concerns or to apply for an individual permit.

The Multi-Sector General Permit provides that the discharges must comply with 314 CMR 3.00, 314 CMR 4.00, 314 CMR 9.00 and 310 CMR 10.00. New development and

[9] The SWPPP should be submitted along with BRP WM09. See http//www.mass.gov/dep/water/approvals/wm09.pdf.

[10] EPA has developed guidance on preparing a SWPPP for the Multi-Sector General Permit. Proponents preparing long-term pollution prevention plans for sites with land uses with higher potential pollutant loads may find this information helpful. See http://cfpub2.epa.gov/npdes/stormwater/msgp.cfm.

the redevelopment of existing industrial facilities subject to the multi-sector general permit must comply with the state regulations and policy, including the Massachusetts Stormwater Standards. Existing discharges subject to the multi-sector general permit do not need to obtain an individual or general state discharge permit unless the discharge is designated by MassDEP in accordance with 314 CMR 3.04(2).