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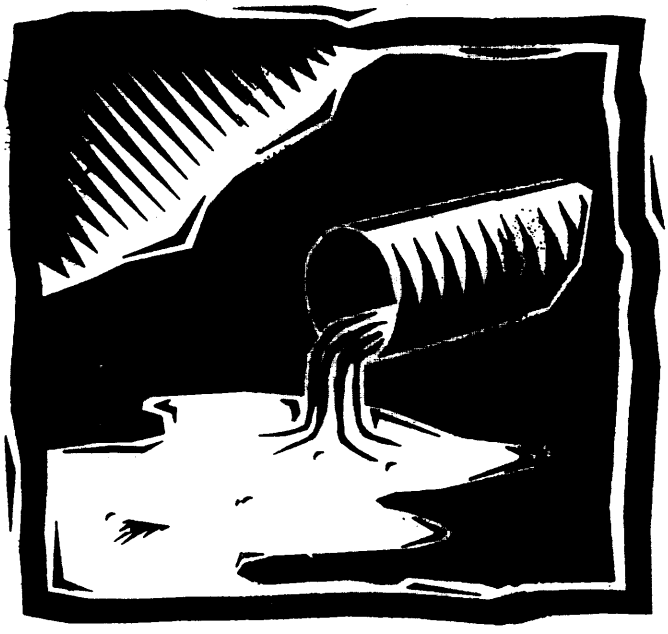
Stormwater Management

Volume One: Stormwater Policy Handbook

March 1997



Prepared by:

MA Department of Environmental Protection

MA Office of Coastal Zone Management

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Stormwater Management

Volume One: Stormwater Policy Handbook

March 1997

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In keeping with our efforts to improve the efficiency and clarity of the permitting process, while increasing overall protection of our environment, The Department of Environmental Protection (the Department), in coordination with the Massachusetts Coastal Zone Management (MCZM), is issuing guidance and policy on the management of stormwater. This effort will result in direct benefits to water quality and quantity, while establishing clear lines of responsibility for stormwater management.

This is a turning point in terms of environmental protection. Even though mechanisms to control stormwater had previously existed, it is only now that we can provide performance-based standards and the tools necessary to undertake a stormwater control program. At this point, the *Stormwater Handbook and the Best Management Practices (BMP) Manual*, which were produced by the Department and MCZM in consultation with the Stormwater Advisory Committee, are to be used as guidance for controlling stormwater. In the next year or so, the Stormwater Management Policy and Management Standards will be evaluated, prior to adopting regulations for controlling stormwater.

These documents should be used by Conservation Commissions and Planning Boards, as well as project proponents, including Public Works Departments, and developers. Conservation Commissions are already using some of their authority in this area, and they have a track record of success in protecting wetland resources statewide. These documents should provide a strong framework for evaluating impacts from new or increased stormwater discharges within the jurisdiction of the Wetlands Protection Act.

The handbook will guide you through the Notice of Intent and wetlands approval process for new stormwater discharges, and explain the method for targeting remediation of existing stormwater discharges.

Over the next several months the Department and MCZM will be assessing where support and improvements in the stormwater program are needed. We will be supplementing these documents with an active outreach and training program. We will also be working closely with a subcommittee of the Stormwater Advisory Committee to evaluate this implementation effort. We encourage you to contact us with any questions or suggestions as well as any case studies. This information will assist us in evaluating

this approach and making changes prior to proposing regulations. Information should be sent to Richard Tomczyk, Department of Environmental Protection, One Winter Street, Boston, MA 02108.

Sincerely,

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Director
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April 1997

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INTRODUCTION

Stormwater runoff is the water from rain and snow melt that flows across land. Pollutants that have been deposited on land are carried by runoff into nearby rivers, streams, lakes, ponds, wetlands, marine waters, and groundwater. This contaminated runoff significantly degrades water quality and aquatic habitat. Stormwater runoff also may increase flooding and erosion.

Development increases stormwater runoff, which alters natural drainage features, increases flooding, and may reduce the groundwater recharge to support wetlands and maintain base flows in streams. Development also increases the concentration and types of pollutants that can be carried by runoff, including nutrients, solids, metals, salt, pathogens, pesticides, and hydrocarbons.

In Massachusetts, stormwater runoff and discharges from stormwater drain pipes are the largest contributors to water quality problems in the Commonwealth's rivers, streams, and marine waters. The state's surface water quality standards, which identify and protect water uses such as water supplies and fish and wildlife habitat, have not been met in many locations. Recent data show that urban runoff and stormwater are responsible for 46 percent of assessed river segments not supporting their designated use and 48 percent of assessed marine waters not supporting their designated use. (Massachusetts Department of Environmental Protection, Commonwealth of Massachusetts: Summary of Water Quality, 1995; based on assessment data on all principal mainstem rivers and their major tributaries, not all surface waters.)

Despite the overwhelming need to better manage stormwater, there is no clear, workable regulatory system for doing so. Although adequate authority exists to regulate stormwater, it is scattered among several programs with no efficient mechanism for ensuring compliance. The existing regulatory authority has created a jumbled patchwork of inconsistent and overlapping programs for both the regulated community and the Department of Environmental Protection (DEP). While many projects today are designed with stormwater controls, a more consistent, performance-based approach to stormwater management is necessary.

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An Overview of Stormwater Regulation

Early efforts to improve water quality in Massachusetts focused on controlling direct discharges of wastewater from municipal and industrial facilities. These point sources of pollution have been regulated under the National Pollutant Discharge Elimination System (NPDES) Program, which issues permits to municipalities and industries and sets limits for discharge concentrations of pollutants. Major reductions in point source pollution have been made by constructing wastewater treatment facilities and reducing sources of pollution.

In 1987, Congress amended the Clean Water Act, launching a phased approach to address impacts from stormwater. The first phase of the NPDES stormwater permit program set controls for storm discharges into state and federal waters from certain industrial activities, land disturbances over five acres, and municipal storm drains in highly populated areas. In 1990, Congress reauthorized the Coastal Zone Management Act and amended it to include new stormwater pollution control measures for coastal waters (Section 6217) in states with coastal zone management programs.

In addition to federal requirements, Massachusetts has several sets of regulations that address impacts from stormwater discharges. DEP has authority under the state Clean Waters Act to require facilities to obtain individual surface water discharge permits for stormwater. The permits require compliance with the Surface Water Quality Standards (314 CMR 3.00 and 4.00). Groundwater discharges of stormwater may be subject to similar permitting requirements and compliance with groundwater quality standards under the Groundwater Discharge Permit Program (314 CMR 5.00 and 6.00). Stormwater also may be regulated through an Order of Conditions under the state Wetlands Protection Act. A Chapter 91 license may be triggered for stormwater outfall structures. The 401 Water Quality Certification Program for filling and dredging activities in wetlands and waters also regulates stormwater effects on water quality and ensures compliance with Surface Water Quality Standards. In November 1996, DEP issued its Guidance for the Rivers Protection Act, further regulating stormwater discharges.

In response to environmental concerns and the need for a comprehensive and streamlined stormwater management program, DEP in 1992 began to examine the development of a stormwater management program. The Massachusetts Office of Coastal Zone Management (MCZM) simultaneously began a stormwater planning effort in response to its Section 6217 requirements. The two agencies joined forces in 1995 to move forward with efforts to improve water quality and established an external Stormwater Advisory Committee to assist in developing stormwater management standards and a strategy for their implementation. The Committee included representatives from environmental, consulting, legal, and development

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organizations statewide. (A list of committee members appears in the Acknowledgements at the beginning of this document.)

New Directions in Stormwater Management

DEP and MCZM have launched a new approach to address stormwater impacts. The approach has several components:

- A policy, establishing uniform performance standards and coordinating the requirements of several regulatory programs;
- The *Stormwater Policy Handbook*, to promote consistent implementation of the policy and performance standards;
- The *Stormwater Technical Handbook*, containing technical information about site planning and stormwater management techniques;
- Training, to assist agency staff, conservation commissions and other municipal officials, and consultants;
- Financial assistance, through loans and grants; and
- Phased implementation, from policy to regulatory revisions after an evaluation period of one to two years.

To protect the wetlands and waters of the Commonwealth from the adverse impacts of stormwater runoff, DEP issued a Stormwater Management Policy in November 1996, concurrently with its Guidance for the Rivers Protection Act. With the input of the state's Stormwater Advisory Committee, DEP developed the policy to address stormwater impacts through implementation of performance standards under existing environmental protection programs. The Stormwater Management Standards establish clear and consistent guidelines for stormwater management in Massachusetts while streamlining the regulatory process.

The Standards address both water quality (pollutants) and water quantity (flood control) by establishing the level of required controls which can be achieved through the use of site planning, nonstructural measures, and Best Management Practices (BMPs). BMPs reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site. The Standards are designed to meet the stormwater management requirements under various regulatory programs, and:

- Prevent untreated discharges to wetlands and waters;
- Preserve hydrologic conditions that closely resemble pre-development conditions;

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- Reduce or prevent flooding by managing the peak discharge and volumes of runoff;

- Minimize erosion and sedimentation;

- Reduce suspended solids and other pollutants to improve water quality; and

- Provide increased protection of sensitive natural resources.

For new development and redevelopment, conservation commissions (or DEP on appeal) should implement the Stormwater Management Standards through an Order of Conditions whenever jurisdiction is established under the Wetlands Protection Act. DEP has developed a one-page form for applicants to submit with their Notices of Intent under the Wetlands Act, describing how the project meets the Stormwater Management Standards. If stormwater is managed under the Wetlands Protection Act, DEP will presume that the discharge complies with all other state regulatory requirements for stormwater.

To address existing discharges, DEP will use watershed assessments to identify significant sources of stormwater pollution and require remedial action under the state's Clean Waters Act authority. Existing discharges include municipal storm sewer systems and drainage structures from developed areas with point sources to wetlands or water bodies. Discharges which cause water quality problems may be designated for permits or enforcement.

In addition to new efforts in stormwater management, a variety of grant and loan programs have been established with federal and state funds to help municipalities, counties, regional planning agencies, and nonprofit organizations address stormwater issues at the local and regional level. For more information about these programs, see Appendix C.

Stormwater Policy Handbook and Stormwater Technical Handbook

This Handbook is intended to help conservation commissioners and others effectively implement the Stormwater Management Standards, and to assist applicants in designing stormwater management systems that meet the requirements. The Handbook explains the Stormwater Management Standards and provides guidelines on how to meet the Standards. To provide a comprehensive review of stormwater management, these documents contain guidance that is necessary to meet the Stormwater Management Standards, as well as other material which is recommended or offered for informational purposes only. When reviewing the Handbook, please note the distinction in the text between the stormwater *requirements* versus *recommended practices*.

The *Stormwater Policy Handbook (Volume One)* addresses policy and regulatory issues and includes:

- Chapter One, the **Stormwater Management Standards** that have been developed to protect the waters of the Commonwealth from the adverse impacts of stormwater runoff, and

- Chapter Two, **Jurisdiction and Application of Stormwater Management Standards** under the Wetlands Protection Act and other state environmental programs.

The *Stormwater Technical Handbook (Volume Two)* includes:

- Chapter One, the basics of **Hydrology and Stormwater Runoff;**

- Chapter Two, **Site Planning and Nonstructural Approaches**: general, cost-effective strategies for meeting the standards through site planning, source controls, and pollution prevention; and

- Chapter Three, **Structural Best Management Practices**: general guidance on selecting and sizing a BMP technology that is appropriate for the site being developed or redeveloped. The chapter also provides background information about the design, implementation, and maintenance of these practices.

Appendices, which are included in Volume Two, provide additional information, including a glossary and resource contact information. Refer to the Table of Contents in Volume Two for the complete list of appendices.

This guidance is the first step towards revising the Wetlands Protection Act regulations to incorporate clear regulatory standards for stormwater. Acting as interim guidance, it will be used as the basis for decision making, but will be evaluated over the next 12 - 18 months and revised as necessary based on actual case experience. This approach gives all parties some flexibility in applying the standards instead of locking them into regulatory language which is much more difficult to change than guidance or policy.

CHAPTER 1: Stormwater Management Standards

Stormwater Management Policy

Purpose

The goal of the Stormwater Management Policy is to improve water quality and address water quantity problems by the implementation of performance standards for stormwater management. Urban runoff and discharges from stormwater outfalls are the single largest source responsible for water quality problems in the Commonwealth's rivers, lakes, ponds, and marine waters. The Stormwater Management Standards establish clear and consistent guidelines for stormwater management in Massachusetts. The Standards are designed for use under multiple statutory and regulatory authorities of the Department of Environmental Protection, including the Wetlands Protection Act, as amended by the Rivers Protection Act, and the Clean Waters Act.

Stormwater discharges occur as rainfall and snow melt carries pollutants to surface and groundwater. New and existing development increases impervious surfaces, which alters natural drainage features, increases peak discharge rates and volumes, and reduces recharge to maintain wetlands and baseflows in streams. Development also results in corresponding increases in the concentration and types of pollutant loadings, including nutrients, solids, metals, salt, pathogens, pesticides, and hydrocarbons. Best Management Practices (BMPs) reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site. The Stormwater Management Standards address both water quality (pollutants) and water quantity (flood control) problems by establishing the level of required controls through the use of BMPs.

The Stormwater Management Standards are intended to be applied during routine project review by issuing authorities under the Wetlands Protection Act. Use of the standards should prevent or minimize adverse environmental impacts due to unmanaged stormwater while limiting undue costs and recognizing site constraints. Applicants should submit the one-page form developed by DEP which presents in a simple and concise format how the Stormwater Management Standards have been met. The form will allow commissions and the Department easy access to the stormwater management components of the project, and should simplify the review process for the applicant.

Regulatory Authority

The basic approach to implement the Stormwater Management Standards is to rely on review by conservation commissions or the Department under the Wetlands Protection Act for new development and on the Department's authority under the state Clean Waters Act for remediation of existing discharges. The Standards support existing legal authority, serving as the

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Department's interpretation of its existing regulations[1].

For new development and redevelopment, conservation commissions or the Department should regulate stormwater through an Order of Conditions whenever jurisdiction is established under the Wetlands Protection Act. Unmanaged and untreated stormwater will alter resource areas and require conditions to meet certain performance standards and to protect the interests of the Act. The Guidance for Implementation of the Rivers Protection Act requires projects to manage stormwater according to these Standards.[2]

The regulations contain explicit jurisdiction over point source discharges, including stormwater. In the absence of an NPDES permit entitled to a presumption,[3] local conservation commissions or the Department should comply with 310 CMR 10.05(6) which instructs issuing authorities to impose conditions on the quality and quantity of discharges from either closed or open channel point sources to protect the interests of the Act provided the point source is within a resource area or the buffer zone. Even if the source of the stormwater discharge originates outside jurisdictional areas, issuing authorities should ensure that the Standards are met at the point of discharge, provided the discharge is within geographic jurisdiction.[4] In addition, by placing limitations on the quantity of the discharge from any point sources, commissions and the Department can ensure that the stormwater generated from future developments cannot simply be routed through existing drainage outfall pipes.

To address existing discharges, the Department will use watershed assessments and remedial action under its Clean Waters Act authority. Existing discharges include municipal storm sewer systems and drainage structures from developed areas with point sources to wetlands or water bodies.

[1]Applicable Regulations and Requirements
Administered by conservation commissions and the Department:
310 CMR 10.00 (Wetlands Protection Act)
Rivers Protection Act Amendments to the Wetlands Protection Act
Administered by the Department of Environmental Protection:
314 CMR 9.00 (401 Water Quality Certification)
314 CMR 3.00 (Surface Water Discharge Permit Program)
314 CMR 4.00 (Surface Water Quality Standards)
314 CMR 5.00 (Groundwater Discharge Permit Program)
314 CMR 6.00 (Ground Water Quality Standards)
401 Certification Conditions of EPA General Permits

[2]The performance standards also apply under the set back and BMP requirements for stormwater management in DEP's 401 Water Quality Certification program (314 CMR 9.06) and the state certification requirements for EPA's General and Multi-Sector Permits for Stormwater Discharges.

[3]Under 310 CMR 10.03, the effluent limits of an NPDES permit are presumed to protect the interests of the Act; this refers to individual rather than general permits. EPA has issued very few individual NPDES permits for stormwater discharges.

[4]For example, a developer proposes an overflow pipe within the buffer zone from a detention basin that is outside the riverfront area. The issuing authority can insist that the standards are met at the overflow pipe but cannot prescribe the BMP, such as the detention basin, used to achieve the standards. In order to evaluate whether the standards can be met, the issuing authority may require information about structures and practices beyond the riverfront area provided it is directly related to the discharge.

Massachusetts has regulations under the state Clean Waters Act specifying when a state surface water discharge permit for stormwater is required. Discharges that meet the Stormwater Management Standards do not need permits. Discharges that do not meet the Standards may be identified during water quality sampling conducted in each basin as part of the watershed assessment and planning process. The Department will promote voluntary compliance wherever possible. In some cases, DEP may designate a discharge as a significant contributor of pollutants which requires a permit or use enforcement mechanisms to achieve remediation of stormwater-impaired waterways.

Applicability

The Stormwater Management Standards apply to industrial, commercial, institutional, residential subdivision, and roadway projects, including site preparation, construction, redevelopment, and on-going operation.

The Stormwater Management Standards do not apply to:[5]

(1) Single-family house projects;
(2) Residential subdivisions with four or fewer lots, provided any discharge will not affect a critical area; or
(3) Emergency repairs to roads or their drainage systems.

The Stormwater Management Standards apply to the extent practi ble to:

(1) Residential subdivisions with four or fewer lots with a discharg potentially affecting a critical area; and
(2) Five to nine residential lots, provided any discharge will not affect a critical area.

BMPs for compliance "to the extent practicable" must, at a minimum, include: extended detention pond, water quality swale, dry well (rooftop runoff only), sand and organic filter, and/or pretreatment devices. Project proponents must demonstrate that they are implementing the highest practicable level of stormwater treatment. Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries, and recharge areas for public water supplies.

The Stormwater Management Standards apply to five to nine lot residential subdivisions with discharges potentially affecting critical areas and any subdivision of 10 or more lots, as well as other activities. Residential development that is part of a phased development project does not qualify for the exemption. These thresholds do not preclude these activities from meeting applicable state regulatory requirements not directly related to the stormwater discharge.

[5]For projects of any size, direct discharges of untreated stormwater from sites to wetlands or waters are not allowed. Erosion and sedimentation control during construction must be provided.

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Stormwater Management Standards

The Department will presume that projects meeting the Stormwater Management Standards satisfy regulatory requirements. When one or more of the Standards cannot be met, an applicant may demonstrate that an equivalent level of environmental protection will be provided.

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 must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

3. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge from the pre-development or existing site conditions, based on soil types.[6]

4. For new development, stormwater management systems must be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when:
   (a) Suitable nonstructural practices for source control and pollution prevention are implemented;
   (b) Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and
   (c) Stormwater management BMPs are maintained as designed.

5. Stormwater discharges from areas with higher potential pollutant loads require the use of specific stormwater management BMPs (see chart on page 1-8). The use of infiltration practices without pretreatment is prohibited.

6. **Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas (see list on page 1-8). Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.**

7. Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.

[6] "To the extent practicable" means the applicant has made all reasonable efforts to meet the standards, including evaluation of alternative BMP designs and their locations.

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8. Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.

9. All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.

Explanation of Standards

Untreated Stormwater (Standard 1)

Treated stormwater is defined to be stormwater that meets the requirements in Standards 2 through 9. Rooftop runoff, except from certain metal roofs, generally should be considered uncontaminated for the purposes of these Standards and therefore can be infiltrated directly without treatment.

Post-Development Peak Discharge Rates (Standard 2)

To meet Standard 2, controls must be developed for the 2-year and the 10-year 24-hour storm events. The 100-year 24-hour storm event must be evaluated to demonstrate that there will not be increased flooding impacts offsite.

Measurement of peak discharge rates must be calculated using the point of discharge or the downgradient property boundary. The topography of the site may require evaluation at more than one location 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.

Discharges to waters subject to tidal action do not need to maintain pre-development peak discharge rates. All other Standards must be met.

Recharge to Groundwater (Standard 3)

The prescribed stormwater runoff volume to be recharged to groundwater should be determined using the existing site (pre-development) soil conditions (from a U.S. Natural Resources Conservation Service (NRCS, formerly SCS) County Soils Survey, onsite soil evaluation, or other geologic information) and these rates:

Hydrologic Group	Volume to Recharge (x Total Impervious Area)
A	0.40 inches of runoff
B	0.25 inches of runoff
C	0.10 inches of runoff
D	waived

Different recharge values may be used, provided the proponent makes a clear showing demonstrating that the recharge rate differs from the listed values based upon soils, precipitation, and evapotranspiration.

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Water Quality (Standards 4-6)

The runoff volume to be treated for water quality is based on the following:

(1) For discharges to critical areas, the volume to be treated is calculated as 1.0 inch of runoff times the total impervious area of the post-development project site.

(2) For all other discharges, volume to be treated is calculated as 0.5 inches of runoff times the total impervious area of the post-development project site.

Using the impervious area as the basis for calculating stormwater runoff promotes the use of straight-forward volume calculations. The total impervious area of a site is determined based on final project site plans, not on pre-existing site conditions. Roof runoff (except from certain metal roofs) may be infiltrated, and any infiltrated volume may be subtracted from the total runoff volume.

Removal of 80% TSS (Standard 4)

BMPs must be selected so that a total of 80% TSS removal is provided by one or more BMPs as shown on the following chart. Use the column showing design rates for the projected removal rate, unless there is a demonstration that a higher or lower figure within the column showing the range of average TSS would be used. BMPs not listed below should be evaluated based on data on removal efficiencies provided by the applicant. The 80% TSS removal requirement[7] applies to post-development conditions after the site is stabilized. Monitoring should not be required.[8]

[7]Total suspended solids was selected as the target pollutant constituent for a removal standard because of its widespread contribution to water quality and aquatic habitat degradation, because many other pollutant constituents including heavy metals, bacteria, and organic chemicals sorb to sediment particles, and because the available data sets for BMP removal efficiency reveal that TSS has been the most frequently and consistently sampled constituent.

[8]Issuing authorities may impose sampling or monitoring requirements when developers propose alternative stormwater management techniques or in unusual circumstances where deemed necessary to protect sensitive ecological receptors or public health.

TSS Removal Rates (adapted from Schueler, 1996 & EPA, 1993)

BMP List	Design Rate	Range of Average TSS Removal Rates	Brief Design Requirements
Extended Detention Pond	70%	60-80%	Sediment forebay
Wet Pond (a)	70%	60-80%	Sediment forebay.
Constructed Wetland (b)	80%	65-80%	Designed to infiltrate or retain.
Water Quality Swale	70%	60-80%	Designed to infiltrate or retain.
Infiltration Trench	80%	75-80%	Pretreatment critical.
Infiltration Basin	80%	75-80% (predicted)	Pretreatment critical.
Dry Well	80%	80% (predicted)	Rooftop runoff (uncontaminated only)
Sand Filter (c)	80%	80%	Pretreatment.
Organic Filter (d)	80%	80%	Pretreatment.
Water Quality Inlet	25%	15-35% w/ cleanout	Off-line only; 0.1" minimum Water Quality Volume (WQV) storage
Sediment Trap (Forebay)	25%	25% w/ cleanout	Storm flows for 2 year event must not cause erosion; 0.1" minimum WQV storage
Drainage Channel	25%	25%	Check dams; non-erosive for 2 yr.
Deep Sump and Hooded Catch Basin	25%	25% w/ cleanout	Deep sump general rule = 4 x pipe diameter or 4.0' for pipes 18" or less
Street Sweeping	10%	10%	Discretionary non-structural credit; must be part of approved plan.

Notes:

(a) Includes wet extended detention ponds, wet ponds, multiple pond designs.
(b) Includes shallow marsh, extended detention wetlands, pocket wetland, and pond/wetland designs.
(c) Includes surface, underground, pocket, and perimeter designs.
(d) Includes compost, peat/sand, and bio/filtration designs.

Land Uses with Higher Potential Pollutant Loads (Standard 5)

Residential, office, and institutional development and roads normally will not yield high potential pollutant loads. However, certain land uses generate higher concentrations of pollutants than found in typical runoff, based

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on existing data. Source reduction is recommended. These areas are subject to the requirement of Standard 5:

(1) Stormwater discharges associated with Standard Industrial Classifications [NPDES stormwater permit program requirements apply]
(2) Auto salvage yards (auto recycler facilities)
(3) Auto fueling facilities (gas stations)
(4) Fleet storage areas (cars, buses, trucks, public works)
(5) Vehicle service, maintenance and equipment cleaning areas
(6) Commercial parking lots with high intensity use. Such areas typically include fast-food restaurants, convenience stores, high-turnover [chain] restaurants, shopping centers and supermarkets.
(7) Road salt storage and loading areas (if exposed to rainfall)
(8) Commercial nurseries
(9) Flat metal (galvanized metal or copper) rooftops of industrial facilities
(10) Outdoor storage and loading/unloading areas of hazardous substances
(11) SARA 312 generators (if materials or containers are exposed to rainfall)
(12) Marinas (service, repainting, and hull maintenance areas)

Required within areas with higher potential pollutant loads:
(1) Source reduction (pollution prevention, snow management); and
(2) Pretreatment (water quality inlets, sediment traps, drainage channels, water quality swales, and/or deep sump catch basins).

Prohibited within areas of higher potential pollutant loads if also a critical area:
(1) Infiltration trenches;
(2) Infiltration basins; or
(3) Dry wells.

Restrictions apply to certain BMPs:
Sand or organic filters, detention basins, wet ponds, or constructed wetlands may be used only if sealed or lined.

Critical Areas (Standard 6)
BMPs approved for use near critical areas, designed to treat 1.0 inch of runoff times the total impervious surface of the post-development project site, are generally limited to:

Extended detention basins
Wet ponds
Constructed wetlands
Water quality swales
Sand filters
Organic filters
Infiltration basins
Infiltration trenches
Deep sump and hooded catch basins (used with other BMPs)

1FC99-020

Stormwater management systems near public water supplies and other critical resources should incorporate designs which allow for shut-down and containment in the event of an emergency spill or other unexpected contamination event.

For the purposes of this standard, "near" means those locations where there is a strong likelihood of a significant impact occurring to a critical area, taking into account site specific factors.

Redevelopment (Standard 7)

"Redevelopment" projects are defined as follows:

(1) Maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, and correcting substandard intersections and drainage, and repaving; and

(2) Development, rehabilitation, expansion, and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area.

Components of redevelopment projects which include development of previously undeveloped sites do not fall under Standard 7.

Erosion and Sedimentation Controls (Standard 8)

Examples of BMPs for erosion and sedimentation control are staked hay bales, filter fences, hydroseeding, and phased development. Many stormwater BMP technologies (e.g., infiltration technologies) are not designed to handle the high concentrations of sediments typically found in construction runoff and must be protected from construction-related sediment loadings. Construction BMPs must be maintained.

Operation and Maintenance Plans (Standard 9)

An operation and maintenance plan (O&M Plan) should, at a minimum, identify:

(1) Stormwater management system(s) owner(s);

(2) The party or parties responsible for operation and maintenance;

(3) A schedule for inspection and maintenance; and

(4) The routine and non-routine maintenance tasks to be undertaken.

The owner of the BMP is generally considered to be the landowner of the property on which the BMP is located, unless other legally binding agreements are established with another entity. The Order of Conditions and Certificate of Compliance should be written to allow for routine maintenance during construction and post-development phases of the project as defined in the O&M Plan. A continuing condition in the Certificate of Compliance will ensure that maintenance can be performed without triggering further filings under the Wetlands Protection Act.

Wetlands Protection Program Policy
Issued November 18, 1996
(Minor Revisions March 1997)

1FC99-021

Stormwater Management Form

This form is intended to ensure that proposed stormwater control designs meet the stormwater management standards described in the Department of Environmental Protection's Stormwater Management Policy (November 1996 with minor revisions March 1997). The Department of Environmental Protection (DEP) recommends that applicants submit this form with the Notice of Intent, as well as supporting documentation and plans, to provide stormwater information for conservation commission review. If a particular stormwater management standard cannot be met, information should be provided to demonstrate how adequate water quality and water quantity protection will be provided by the project. DEP encourages engineers to use this form to certify that the project meets the stormwater management standards as well as acceptable engineering standards. This form should be completed by checking the appropriate boxes for each standard and by signing and stamping the back of this form.

Project Location:_____

☐ The proposed project is / is not (circle one) exempt from one or more of the stormwater management standards.

If project is exempt, explain why:_____

Stormwater runoff volumes to be treated for water quality are based on the following calculations:

(check one that applies)

☐ 1 inch of runoff x total impervious area of post-development site for critical areas (e.g., Outstanding Resource Waters and shellfish growing areas)

☐ 0.5 inches of runoff x total impervious area of post-development site for other resource areas

Standard #1: Untreated stormwater (See plan _____)

☐ The project is designed so that new stormwater conveyances (outfalls/discharges) do not discharge untreated stormwater into, or cause erosion to, wetlands or waters.

Standard #2: Post-development peak discharge rates (See plan _____)

☐ Post-development peak discharge rates do not exceed pre-development rates on the site either at the point of discharge or downgradient property boundary.

☐ N/A: project site contains waters subject to tidal action, so standard is not applicable.

☐ Stormwater controls have been designed for the 2-year and 10-year, 24-hour storms.

☐ The project's stormwater design will not increase flooding impacts offsite from the 100-year, 24-hour storm.

Standard #3: Recharge to groundwater (See plan _____)

☐ The annual groundwater recharge for the post-development site approximates annual recharge from existing site conditions.

☐ Soil types have been identified according to either the U.S. Natural Resources Conservation Service (NRCS) County Soils Survey or onsite soil evaluation. Calculations on stormwater flow are based on a soil hydrologic group of _____, and total impervious area of _____(square feet).

☐ Soil types at each planned point of stormwater runoff infiltration include:

☐ Infiltration Best Management Practices (BMPs) used for this project include:

Standard #4: 80% TSS removal (See plan _____)

☐ The proposed stormwater management systems will remove 80% of the post-development site's average annual load of Total Suspended Solids (TSS

☐ The BMPs selected for this project include (list BMPs with TSS removal rates)

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Standard #5: Higher potential pollutant loads (See plan _____)

☐ The project site does / does not (circle one) contain Land Uses with Higher Potential Pollutant Loads
If site contains such land uses, describe:_____

☐ If applicable, BMPs selected for controlling stormwater in these areas are designed to prevent infiltration of untreated stormwater and include:

Standard #6: Protection of critical areas (See plan _____)

☐ The project site does / does not (circle one) contain critical areas with sensitive resources.
If site contains critical areas, describe:_____

☐ If applicable, BMPs selected for stormwater discharges in these areas include:

Standard #7: Redevelopment projects (See plan _____)

☐ The proposed activity is / is not (circle one) a redevelopment project.
Note: Components of redevelopment projects which plan to develop previously undeveloped sites do not fall under the scope of Standard 7.

☐ If the project is a redevelopment project, the following stormwater management standards have been met:

☐ The standards which have not been met include:

☐ The proposed project will reduce the annual pollutant load on the site with new or expanded stormwater controls.

Standard #8: Erosion/sediment control (See plan _____)

☐ Erosion and sediment controls are incorporated into the project design to prevent erosion, control sediment movement, and stabilize exposed soils.

Standard #9: Operation/maintenance plan (See plan _____)

☐ An operation and maintenance plan for both construction and post-development stormwater controls has been developed. *The plan includes BMP owner(s); parties responsible for operation and maintenance; schedule for inspection and maintenance; routine and non-routine maintenance tasks; and provision for appropriate access and maintenance easements surrounding control(s) and extending to public right-of-way.*

I attest under the penalties of perjury that I have personally examined and am familiar with the information contained in this submittal, including any and all documents, accompanying this certification statement; and that I am fully authorized to make this attestation on behalf of the project applicant.

_____

Print Name Date

(Stamp/Signature)

1FC99-023

Applying the Stormwater Management Policy

Applicants should design projects in wetland resource areas or the buffer zone to meet the Stormwater Management Standards and should use the form developed by DEP (see page 1-10) with supporting calculations and plans to provide stormwater information for the conservation commission's review. An engineer or other competent professional should use the form to certify that the project's stormwater management plan meets the Stormwater Management Standards. When reviewing Notices of Intent for stormwater management, conservation commissions should consider the following questions and information to evaluate whether the applicant has provided appropriate documentation and the project meets the Standards.

General:

Does the project require the filing of a Notice of Intent (NOI) under the Wetlands Protection Act?
The Stormwater Management Standards should be used for projects in all wetland resource areas (including the newly created riverfront area) and the buffer zone. However, the Standards do not expand jurisdiction under the Wetlands Protection Act. (See Chapter 2 for a discussion of jurisdiction.) Projects that receive a Determination of Applicability which does not require the filing of a Notice of Intent are not expected to meet the Standards.

What kinds of projects are subject to which Stormwater Management Standards?
Under the Wetlands Protection Act, the conservation commission or DEP will apply the Stormwater Management Standards to new discharges associated with new developments or to new or modified discharges associated with the redevelopment of a previously developed site. When reviewing new developments, conservation commissions and DEP will apply Standard 8 requiring erosion and sedimentation control to projects during the construction phase. The remaining Standards will apply to the operation phase of the project. For redevelopment, the project must meet Standard 7 for previously developed sites.

To address existing discharges, DEP will use watershed assessments and remedial action under its Clean Waters Act authority. Existing discharges include municipal storm sewer systems and drainage structures from developed areas with point sources to wetlands or water bodies.

Has the applicant identified any critical areas on or near the site that will receive the stormwater discharge?
Standard 6 defines critical areas as Outstanding Resource Waters (ORWs), shellfish growing areas, public swimming beaches, cold water fisheries, and recharge areas for public water supplies. The conservation commission should confirm the presence of critical areas at the site visit. See Appendix C for more information about the following resources

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- ORWs include surface drinking water supplies, certified vernal pools, and many Areas of Critical Environmental Concern (ACECs). A list of ORWs is published in the Surface Water Quality Standards (314 CMR 4.00) and in DEP's *Designated Outstanding Resource Waters of Massachusetts*.

- Shellfish growing areas are identified in the Surface Water Quality Standards. Information about shellfish growing areas also may be obtained from the local shellfish warden. Maps of these areas are available for purchase from the Massachusetts Geographic Information Systems (MassGIS).

- Public swimming beaches are identified by the municipality or through the State Comprehensive Outdoor Recreation (SCORP) Program; information available through MassGIS.

- Cold water fisheries are identified in the Surface Water Quality Standards.

- Recharge areas for public water supplies include Zone A (400 feet from a surface water reservoir) and 100 feet from its tributaries, and Zone II and Interim Wellhead Protection Areas for groundwater supplies. DEP maintains maps with drinking water supply information. Contact the Drinking Water Program in DEP's Boston or Regional Offices. Municipal and private suppliers of public drinking water may have maps that show the recharge areas of drinking water supplies. Maps also are available for purchase from MassGIS.

Does the project fall below the Stormwater Management Standards applicability thresholds?

Projects not subject to the Standards include:

___ single-family house projects;

___ residential subdivisions with four or fewer lots that do not discharge to critical areas; or

___ emergency repairs to highways/roadways or their drainage systems.

The Stormwater Management Standards do *apply* to certain subdivisions approved by the planning board or to a series of "Approval Not Required" (ANR) lots under the Subdivision Control Law, although usually ANR lots are developed individually as single lots. The Stormwater Management Standards *apply to the extent practicable* to: residential subdivisions with four or fewer lots with a discharge potentially affecting a critical area; and to five to nine residential lots, provided any discharge will not affect a critical area. The Standards apply to five to nine lot residential subdivisions with discharges potentially affecting critical areas and any subdivision of 10 or more lots, as well as other activities. (See the following table.)

1FC99-025

Table: Stormwater Management Standards Applicability for Subdivision Projects

Project Type	Not Affecting Critical Areas	Affecting Critical Areas
Single-Family House	Not Subject to Standards*	Not Subject to Standards*
2-4 Lot Subdivision	Not Subject to Standards*	Subject to the Extent Practicable•
5-9 Lot Subdivision	Subject to the Extent Practicable•	Must Meet Standards
≥10 Lot Subdivision	Must Meet Standards	Must Meet Standards

* still subject to other Wetlands Protection Act requirements
• see page 1-3 for clarification

An "exemption" from the Stormwater Management Standards does not exempt the project from all other performance standards in the Wetlands Protection Act regulations. For example, the Order of Conditions should still ensure appropriate erosion and sediment control during land disturbance activities and that no pipes are discharging stormwater directly to wetland resource areas.

Has the Stormwater Management Form been stamped and signed by an engineer or other competent professional and submitted with the Notice of Intent, or has the applicant otherwise provided supporting documentation?

Are the runoff volumes to be treated for water quality based on the correct calculations?
To determine the runoff volumes to meet the Standards for water quality, the following calculations must be used:

- 1.0 inch of runoff x total impervious area of post-development site for discharges to critical areas; and
- 0.5 inch of runoff x total impervious area of the post-development project site for all other resource areas.

Total impervious area of a site is based on final project site plans, not on pre-existing site conditions. Roof runoff (except from certain metal roofs) may be infiltrated, and any infiltrated volume may be subtracted from the total runoff volume.

Containment and treatment of the first half inch (first flush) of runoff during a rainfall event is a reasonably effective practice for controlling contaminants in stormwater. The rationale is that pollutants, which tend to accumulate on paved surfaces and the ground, wash off quickly at the beginning of a storm. Therefore, pollutant concentrations are expected to be higher in the first flush of runoff at the beginning of the storm. When a system is designed to capture and treat the first half inch of runoff from the early stages of the storm, most of the pollutant load will be controlled. However, a higher level of water quality treatment is required in critical areas; the first inch of runoff must be captured and treated.

No untreated stormwater (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.

Are any new stormwater conveyances (outfalls/discharges) proposed in wetlands or waters?

Is the stormwater runoff being treated prior to discharge?
This standard allows only discharges of treated stormwater. Treated stormwater is defined as a discharge that meets the requirements in Standards 2 through 9. "Treated" refers to the implementation of Best Management Practices (BMPs) which are specifically designed to achieve sediment and contaminant removal rates that adequately protect groundwater, surface waters, and wetlands. The level of required treatment is based on the nature of the receiving resource, with more stringent standards for critical areas.

Stormwater that must be treated includes runoff from all areas of a development or redevelopment site, excluding runoff from certain rooftops. Rooftop runoff from residential, office, institutional, and commercial development (but not flat industrial roofs made of galvanized metal or copper) generally should be considered uncontaminated for the purposes of the Standards, and therefore can be infiltrated directly or discharged to a resource area without treatment for TSS removal.

Will the discharge cause erosion or sedimentation in wetlands or waters?
The stormwater discharge must not cause erosion or sedimentation in a wetland or waterway, meaning that there should be no wearing away of the soil or land surface in excess of natural conditions. In addition, the treated discharge from the BMP and any related discharge structure should cause no erosion from uplands into a resource area. To prevent erosion and sedimentation, BMPs and associated pipes and other conveyances must be properly designed and installed. The use of level spreaders or other techniques at the point of discharge will minimize erosion. Discharge velocities from BMPs should take into account issues such as soils, slope, and the type of receiving resource. The conservation commission should confirm with the applicant that the discharge velocities will not cause erosion at the point of discharge or downstream.

While this standard does allow discharges of adequately managed stormwater (quantity and quality controls applied) to wetlands and waters, it is not intended to encourage discharge pipes directly to wetlands, water bodies, or banks. Generally, adequate space should be provided between the discharge and the resource area to site and implement structural and nonstructural controls. However, it is not always possible, nor is it desirable in every case, to set back a stormwater discharge from a water body.

1FC99-027

Applicants may demonstrate that in a particular situation a discharge (with appropriate velocity dissipation) to a wetland or water body may be less erosive than a discharge further away. Commissions should ensure that any direct discharge will be appropriately treated, so that water quality will not be degraded.

In certain coastal environments, it may be preferable to directly discharge treated stormwater to a tidal creek rather than setting back the discharge point so that the stormwater discharges into a salt marsh or brackish environment. In the latter case, overland flow and ponding of freshwater may encourage the intrusion of invasive plant species such as *Phragmites australis* (common reed).

Generally, BMPs must not be installed in resource areas, although in some circumstances it may be appropriate to site stormwater detention systems within the 100-year floodplain. BMPs may be installed in buffer zones to Bordering Vegetated Wetlands, but they should not be sited within the first 100 feet of the riverfront area, Zone I of a groundwater drinking supply, and within 400 feet of a surface drinking water supply.

Post-development peak discharge rates (Standard 2): Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Has the post-development peak discharge rate been controlled to match the pre-development rate on the site?
Applicants must calculate runoff rates from pre-existing and post-development conditions. The Stormwater Management Standards are based on the use of TR55, which is a guide for estimating the effects of land use changes on runoff volumes and peak rates of discharge published by U.S. Natural Resources Conservation Service (NRCS). Applicants also must calculate the volume of onsite storage that will be required to maintain pre-development runoff peaks. The conservation commission should confirm that the calculations for 2-year and 10-year storm events show that there will be no increase between pre-development and post-development, when storage is provided for the increased runoff.

Have stormwater controls been designed for the 2-year and 10-year, 24-hour storms?
The increase in rate must be controlled for the 2-year and 10-year, 24-hour storm so that the pre-development rate is maintained. In all cases, peak discharge rates for the 2-year and the 10-year frequency storm events must be maintained onsite to control downstream and offsite flooding and erosion. BMPs, such as extended detention basins and wet ponds, which slow runoff rate through storage and gradual release should be provided

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Has the 100-year, 24-hour storm been evaluated to determine if there will be increased flooding impacts offsite?
The 100-year, 24-hour storm event must be evaluated to demonstrate that there will not be increased flooding impacts offsite. There may be situations where retaining the 100-year storm event onsite may not be essential and may result in the construction of unnecessarily large or expensive stormwater quantity control structures. In some cases, retaining stormwater onsite may aggravate downstream impacts, because the project's location within the watershed and the timing of the release of stormwater may increase rather than decrease peak flooding. All downstream impacts should be carefully considered. The calculations should be used to decide if retention of increased stormwater from the 100-year storm is necessary.

Does the project site contain waters subject to tidal action?
Where there is unimpeded tidal flushing, the control of peak discharge rates is usually unnecessary. In these cases, stormwater management systems must still protect against erosion and turbidity resulting from the discharge, and the outlet should be designed and located to minimize surcharging (backup of ocean water into the outlet and stormwater management system). The treated stormwater discharging from the outlet should be directed over riprap or a comparable structure to dissipate energy from the water flow.

Have peak discharge rates been calculated using the point of discharge or downgradient property boundary?
The lowest point of discharge at the downgradient property boundary should be used as the design point. The topography of the site may require evaluation at more than one location if flow leaves the property in more than one direction. An applicant may demonstrate that a feature beyond the property boundary (e.g., culvert or other constriction) is more appropriate as a design point.

***Recharge to Groundwater (Standard 3):* Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge from the pre-development or existing site conditions, based on soil types.**

Does the annual groundwater recharge for the post-development site approximate the annual recharge from existing site conditions?
The intent of this standard is to encourage the maintenance of groundwater recharge rates (infiltration of precipitation into the ground) under post-development conditions, where feasible. It is unlikely that the recharge characteristics of an undeveloped site can be restored entirely in post-development. Soil types, soil depths, and other site characteristics (e.g., slope and vegetative cover) will be modified in post-development, limiting

the potential for infiltration. Therefore, Standard 3 requires an "approximate" restoration of pre-development annual recharge: to the maximum extent practicable, using infiltration measures and careful site design. "To the extent practicable" means the applicant has made all reasonable efforts to the meet the standard, including evaluation of alternative BMP designs and their locations. The conservation commission should evaluate the adequacy of the recharge volume proposed by the applicant on a case-by-case basis, considering the project site and its surroundings. In areas with low stream flow, drinking water supply, groundwater-dependent wetlands, and sensitive aquatic habitat (i.e. cold water fisheries), groundwater recharge may be critical and every effort to ensure adequate recharge should be made.

Have existing (pre-development) soil types been identified according to the U.S. Natural Resources Conservation Service (NRCS) County Soils Survey or onsite soil evaluation?

Soil surveys are often available at municipal planning departments, regional planning commissions, and NRCS offices (see Appendix C). For a small number of Massachusetts towns, NRCS Soils Surveys have not been completed. For these sites, project proponents should use the U.S. Geological Service (USGS) Surficial Geology Maps (see Appendix C) or conduct site specific investigations.

Have appropriate calculations been made based on soil hydrologic group?

Hydrologic Group	Volume to Recharge (x Total Impervious Area)
A	0.40 inches of runoff
B	0.25 inches of runoff
C	0.10 inches of runoff
D	waived

The infiltration standard is based on soil permeability. The NRCS classifies soils into four hydrologic groups, A through D. A soils are very sandy/gravelly with good percolation rates and D soils are clays with poor percolation rates. Fill soils, designated as Ub on NRCS County Soils Surveys, should be investigated to determine recharge rates and the feasibility of stormwater infiltration. The volume of runoff to be recharged is per storm, not per year. The runoff volumes to be infiltrated (during each storm) relate to the average annual recharge volumes for hydrologic soil groups A, B, and C. Therefore, when infiltration systems are sized in accordance with the applicable volume to recharge calculations (and designed correctly), the average annual recharge in post-development should approximate the pre-development recharge conditions.

Different recharge values may be used, provided the proponent makes a clear showing demonstrating that the recharge rate differs from the listed values based upon soils, precipitation, and evapotranspiration.

Total impervious area of a site is based on final project site plans, not on pre-existing site conditions. Roof runoff (except from certain metal roofs) may be infiltrated, and any infiltrated volume may be subtracted from the total runoff volume.

Have soil types been verified at locations where stormwater infiltration is planned?
Site specific analysis of soils must verify adequate permeability at the points of infiltration, taking into consideration the possibility of inclusions (different soil types with different characteristics) within mapped NRCS soil units, and the adequacy of depth to groundwater and bedrock to ensure that infiltration will be effective.

Have appropriate infiltration measures been proposed?
Infiltration basins remove suspended solids by immobilizing the particles within the soil, as the stormwater drains into the groundwater below the basin. Unfortunately, because these systems are efficient, they clog quickly without pretreatment. Once the voids between the soil are filled with solids, there is little capacity for infiltration of water. Without pretreatment, most infiltration basins fail in a relatively short time; instead of exfiltrating stormwater through the bottom of the basin, they retain it. These failed systems often need to be retrofitted to provide proper treatment of stormwater. When infiltration measures are used in areas where stormwater is high in suspended solids, the stormwater must be treated to remove suspended solids before it is routed into the infiltration basin. This pretreatment will minimize maintenance costs and extend the longevity of the infiltration basin. In addition, site conditions, upslope and downslope, should be considered when locating infiltration basins to ensure that system failures will not adversely impact resource areas.

To prevent potential groundwater contamination, treatment of stormwater prior to infiltration may be required. Specifically, infiltration of stormwater from areas with higher potential pollutant loads is prohibited without pretreatment (see discussion for Standard 5).

The infiltration of runoff in close proximity to some roads and bridges may affect their integrity by weakening the substructures. In these circumstances, opportunities for infiltration will be limited.

Note: Volumes of stormwater which have been treated and infiltrated count towards requirements for both the water quality and quantity control volumes. Therefore, the total water quality volume to be treated and water quantity volume to be controlled can be reduced by the amount of stormwater runoff that is infiltrated.

1FC99-031

80% TSS removal (Standard 4): For new development, stormwater management systems must be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when:

(a) Suitable nonstructural practices for source control and pollution prevention are implemented;

(b) Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and

(c) Stormwater management BMPs are maintained as designed.

Will the proposed stormwater management system(s) remove 80% of the post-development site's average annual load of Total Suspended Solids?

Removal of 80% of the Total Suspended Solids will not occur for every storm, since removal efficiency will vary with each individual storm. It is the average removal over the year which is required to meet the standard and does not include the construction phase of the project.

Have appropriate BMPs been selected and sized correctly?

The 80% removal standard can be met by sizing BMPs for a suitable volume (0.5 inch or 1.0 inch rule), meeting appropriate design criteria, and demonstrating with calculations that 80% of the sediment loadings can be captured over the course of an average year using the performance values in the chart on page 1-7. The chart provides a design rate for each category of BMP that should be used to determine if the stormwater system provides 80% removal. The range of average TSS removal rates of various BMPs also is summarized in the chart.

Compare the BMPs and TSS removal rates proposed by the applicant with the design rates in the chart. Verify that any BMP design requirements or restrictions noted on the chart have been addressed. For example, if a selected practice requires pretreatment of the runoff, verify that a pretreatment technique has been planned.

Review the calculations submitted by the applicant to verify that the stormwater management system meets the 80% removal requirement. In many cases, it will be necessary to use more than one BMP to meet the 80% standard. Typically, a stormwater drainage system will have several BMPs through which stormwater will be conveyed to control flow rates and retain contaminants. In this BMP "process train," more than one BMP may be removing TSS. The goal is to ensure that all the BMPs together will remove a total of 80% of the annual average TSS load. When there is more than one TSS removal BMP per site, the goal should be to treat stormwater through each train or system of BMPs for 80% TSS removal prior to discharge. In limited situations, where 80% cannot be achieved in each process train, averaging of removal rates may be acceptable, but only when all discharges are within the same subbasin.

1FC99-032

The Standard has been designed in a way that makes it unnecessary for conservation commissions to verify a TSS load for the site in order to confirm removal rates. When the recommended BMPs (and associated design removal rates) in the chart are used, and the percent removal of each BMP is computed in the order in which each BMP will be used in the stormwater system, it is possible to estimate the percentage of TSS removal by the entire system.

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 20% removal, adding 60% and 20% will not achieve the desired 80% TSS removal; only 68% of the TSS would 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 the example, after the stormwater was routed through the first BMP, 60% of the sediment was removed, 40% of the sediment remained. The remaining 40% was routed to the second BMP, which removed 20% of that 40% (not 20% of the entire initial load). The second BMP removed an additional 8%, leaving 12% of the TSS still to be removed (60% + 8% = 68%; 80% - 68% = 12%). Examples are provided in Chapter 3 of the *Stormwater Technical Handbook (Volume Two)*, showing how to calculate and verify 80% TSS removal.

Has the applicant used a higher projected removal rate than the design rate assigned in the chart?
With design modifications or alternate sizing to individual BMPs or the overall system, it may be possible to achieve a higher removal rate. The applicant must document why a higher rate is justified. Review the documentation.

Has the applicant proposed an alternative technology not listed on the chart?
The Stormwater Management Standards and selected BMPs have been developed from studies and data in other states that demonstrate that the stormwater management practices are sound. However, the increasing attention paid to stormwater management by the federal and state governments has sparked the development of new technologies and products. New technologies may be proposed for different aspects of stormwater management projects. The most common is likely to be when a new technology is proposed for TSS removal at a rate higher than those of standard BMPs, based on evidence that the technology can effectively remove more TSS than standard systems. New technologies or products also may be proposed for infiltration systems or for installation at sites with higher potential pollutant loads or critical areas. New technologies often can provide better environmental protection at lower costs and using less land area, and DEP supports their use in situations where they meet the Standards.

1FC99-033

DEP encourages manufacturers of innovative technologies to have the operating parameters verified by the Massachusetts Strategic Envirotechnology Partnership (STEP). If an innovative system has received verification through STEP, the conservation commission shall presume the technology will function as proposed, provided the conditions under which it is to be used are similar to those in which its performance was verified. If the technology has not been reviewed by STEP, it can be difficult to know when a technology without a long track record will provide the same level of stormwater control as those which have been in place for a number of years. However, the commission should evaluate the data provided by the applicant, using the guidance in Appendix D to assess the technology's performance and potential for meeting the Stormwater Management Standards.

Has source reduction been planned?
Source reduction often involves pollution prevention plans that identify ways to reduce contaminants where they are generated (i.e., at the source). These plans are described in Chapter 2 of the *Stormwater Technical Handbook (Volume Two)*. Generally, a pollution prevention plan establishes goals for stormwater control, based on site conditions, proposed use, and the designated use or sensitivity of the receiving water. The plan should identify source controls and an implementation strategy.

While the use of structural BMPs to meet this standard is emphasized, nonstructural controls may be given limited credit toward meeting the 80% removal standard, if there is a means of guaranteeing performance. A 10% credit for street sweeping may be allowed by a conservation commission. The commission may want to verify, however, that the applicant has secured funding for this activity, there is adequate equipment available, and a schedule for a maintenance plan has been developed.

Should monitoring be required?
Generally, specific monitoring requirements should not be required. Monitoring or sampling may be appropriate, however, for alternative techniques with limited data about long-term performance or when necessary to ensure protection of drinking water supplies and other sensitive resources. See Chapter 2 for a discussion on sampling and monitoring. If the project requires an NPDES Stormwater Permit, state and federal agencies will determine whether monitoring should be required (see Appendix E for more information about NPDES permits).

1FC99-034

Higher potential pollutant loads (Standard 5): Stormwater discharges from areas with higher potential pollutant loads require the use of specific stormwater management BMPs (see page 1-8). The use of infiltration practices without pretreatment is prohibited.

Does the project site contain areas with higher potential pollutant loads?

Land Uses with Higher Potential Pollutant Loads

- Stormwater discharges associated with Standard Industrial Classifications
- Auto salvage yards (auto recycler facilities)
- Auto fueling facilities (gas stations)
- Fleet storage areas (cars, buses, trucks, public works)
- Vehicle service and maintenance areas
- Vehicle and equipment cleaning facilities
- Commercial parking lots with average trip generation rates of 1,000 or greater per day, such as fast-food restaurants, convenience stores, high-turnover [chain] restaurants, shopping centers, and supermarkets
- Road salt storage and loading areas (if exposed to rainfall)
- Commercial nurseries
- Flat metal (galvanized metal or copper) rooftops of industrial facilities
- Outdoor storage and loading/unloading areas of hazardous substances
- SARA 312 generators (if materials or containers are exposed to rainfall)
- Marinas (service, repainting, and hull maintenance areas)

If any of these areas are present, have appropriate BMPs been selected to prevent infiltration of untreated stormwater?
The potential concentrations and types of contaminants found where these land uses and activities occur necessitate that only certain BMPs be recommended for treating runoff. The structural BMPs recommended for runoff from these areas are listed in the table on page 1-24.

Treated runoff from areas with higher potential pollutant loads is still subject to the requirements in Standard 3 for infiltration. However, untreated infiltration is prohibited within a mapped Zone II or Interim Wellhead Protection Area for a public groundwater drinking supply. Site imperviousness can be minimized to reduce the volume of runoff to be treated. See Chapter 2 of the *Stormwater Technical Handbook (Volume Two)*.

What part of the project site must meet this higher standard?
For the purposes of these standards, areas with higher potential pollutant loads are the specific drainage or subdrainage areas where an activity or land use occurs. Stormwater which comes in contact with these areas is considered contaminated. However, runoff from other areas of the project site that does not come in contact with these specific land uses or activities, and does not mix with runoff from these areas, is not considered contaminated. For example, on the site of a fleet cleaning business, runoff from any grassed open space or other parking area which is separate from the actual

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cleaning area does not need to be treated through the BMPs specified in Standard 5.

As noted in the policy, rooftop runoff from residential, office, commercial, and institutional development is considered to be relatively clean and should not be subject to Standard 5 for higher potential pollutant loads.

Has source reduction been planned?
See discussion under Standard 4 and in Chapter 2 of the *Stormwater Technical Handbook (Volume Two).*

Has an appropriate pretreatment BMP been planned?
Verify that an appropriate BMP has been selected and any design requirements or restrictions noted in the table below have been met.

Restrictions on BMP Technologies by Resource Type

Legend: YES Required
RST Restricted use
NO Not allowed

Land Uses with Higher Potential Pollutant Loads

BMP Category	BMP Technology	Use?	Considerations and Restrictions
Source Control	Pollution Prevention Snow Management	YES	Develop and implement Pollution Prevention and Snow Management Plans.
Pretreatment	Water Quality Inlets Water Quality Swales Sediment Traps Drainage Channels Deep Sump Catch Basins	YES	Pretreatment required for use with all technologies.
Detention/ Retention and	Detention Basin Wet Pond Constructed Wetland	RST	Seal or lined bottom to prevent recharge.
Infiltration	Infiltration Trenches Infiltration Basins	RST	Do not use near critical areas. Pretreatment required.
	Dry Wells	NO	Avoid use.
Filtration	Sand Filters Organic Filters	RST	Recommended with sealed or lined bottoms.

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Protection of critical areas (Standard 6): Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas (see list on page 1-8). Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.

Does the project site contain critical areas?
The conservation commission should confirm the presence of critical areas at the site visit. See Appendix C for more information about the following resources:

- ORWs include surface drinking water supplies, certified vernal pools, and many Areas of Critical Environmental Concern (ACECs), which are areas designated for their unique features, environmental significance, and geographic diversity. A list of ORWs is published in the Surface Water Quality Standards (314 CMR 4.00) and in DEP's *Designated Outstanding Resource Waters of Massachusetts*.

- Shellfish growing areas are identified in the Surface Water Quality Standards. Information about shellfish growing areas also may be obtained from the local shellfish warden. Maps of these areas are available for purchase from the Massachusetts Geographic Information Systems (MassGIS).

- Public swimming beaches are identified by the municipality or through the State Comprehensive Outdoor Recreation (SCORP) Program; information available through MassGIS.

- Cold water fisheries are identified in the Surface Water Quality Standards.

- Recharge areas for public water supplies include Zone A (400 feet from a surface water reservoir) and 100 feet from its tributaries, and Zone II and Interim Wellhead Protection Areas for groundwater supplies. DEP maintains maps with drinking water supply information. Contact the Drinking Water Program in DEP's Boston or Regional Offices. Municipal and private public drinking water suppliers may have maps that show the recharge areas of drinking water supplies. Maps are available for purchase from MassGIS.

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If any critical areas are present, have appropriate BMPs for stormwater discharges to these areas been selected and design requirements or restrictions been met? [See tables below.]

Has the correct runoff volume calculation been used?
Critical areas require the use of 1.0 inch of runoff x total impervious area of the post-development site. This higher volume, as opposed to the half inch for noncritical areas, ensures greater protection.

Does the selected BMP allow for emergency shut-down or containment?
Stormwater management systems near public water supplies and other critical resources should incorporate designs which allow for shut-down and containment in the event of an emergency spill, release, or other unexpected contamination event.

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Restrictions on BMP Technologies by Resource Type

Legend: YES Required
RST Restricted use
NO Not allowed

Surface and Ground Drinking Water Supplies

BMP Category	BMP Technology	Use?	Considerations and Restrictions
Source Control	Pollution Prevention Snow Management	YES	Implement Pollution Prevention Plans; proper storage of road salt; minimize use.
Pretreatment	Water Quality Inlets Sediment Traps Drainage Channels Deep Sump Catch Basins	RST	Use as pretreatment only. Setback outside Zone I and Zone A of reservoir and first 100 feet from the tributary. Required use with infiltration BMPs.
Detention/ Retention and Vegetated Treatment	Extended Detention Basin Wet Pond Constructed Wetlands	YES	Setback outside Zone I/Zone A of reservoir and first 100 feet from the tributary.
	Water Quality Swales	YES	After full water quality treatment, can be utilized within Zone I or Zone A of reservoir and first 100 feet from the tributary, when there are no practicable alternatives.
Infiltration	Infiltration Trenches Infiltration Basins	YES	Setback outside Zone I/ Zone A of reservoir and first 100 feet from the tributary. Pretreatment mandatory. Not for use with runoff from land uses with higher potential pollutant loads.
	Dry Wells	RST	Uncontaminated rooftop runoff only.
Filtration	Sand Filters Organic Filters	YES	Use as pretreatment before infiltration. Therefore, setback outside Zone I/Zone A of reservoir and first 100 feet from the tributary.

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Restrictions on BMP Technologies by Resource Type

Legend: YES Required
RST Restricted use
NO Not allowed

Shellfish Growing Area or Public Swimming Beach

BMP Category	BMP Technology	Use?	Considerations and Restrictions
Source Control	Pollution Prevention Snow Management	YES	Pollution Prevention Plans recommended; minimize road salt.
Pretreatment	Water Quality Inlets Sediment Traps Drainage Channels Deep Sump Catch Basins	RST	Pretreatment only. Required for use with infiltration technologies; recommended for use with other technologies.
Detention/ Retention and Vegetated Treatment	Constructed Wetland	YES	Pretreatment recommended.
	Extended Detention Basin Wet Pond Water Quality Swales	RST	Not strongly recommended; insufficient data or poor values.
Infiltration	Infiltration Trenches Infiltration Basins	YES	Pretreatment required. Not for use with runoff from land uses with higher potential pollutant loads.
	Dry Wells	RST	Uncontaminated rooftop runoff only.
Filtration	Sand Filters Organic Filters	YES	Pretreatment recommended.

Cold Water Fishery

BMP Category	BMP Technology	Use?	Considerations and Restrictions
Source Control	Pollution Prevention Snow Management	YES	Pollution Prevention Plans recommended; minimize road salt.
Pretreatment	Water Quality Inlets Sediment Traps Drainage Channels Deep Sump Catch Basins	RST	Pretreatment only. Required for use with infiltration technologies; recommended for use with other technologies.
Detention/ Retention and Vegetated Treatment	Extended Detention Basins Water Quality Swales	RST	Recommended with careful design.
	Wet Ponds Constructed Wetlands	RST	Caution: possible downstream warming effects.
Infiltration	Infiltration Trenches Infiltration Basins	YES	Pretreatment required. Not for use with runoff from land uses with higher potential pollutant loads.
	Dry Wells	RST	Uncontaminated rooftop runoff only.
Filtration	Sand Filters Organic Filters	YES	Pretreatment recommended.

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Redevelopment projects (Standard 7): Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.

Is the activity a redevelopment project?
Redevelopment projects include:

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

Components of redevelopment projects which include development of previously undeveloped sites do not meet the definition. The portion of the project located in a previously developed area must meet Standard 7, but project components within undeveloped areas must meet all the Standards.

Does the redevelopment project meet the Stormwater Management Standards?
Standard 7 requires that redevelopment projects meet the other Stormwater Management Standards **to the maximum extent practicable**. "To the extent practicable" means that proponents of redevelopment projects have made all reasonable efforts to meet the Stormwater Management Standards. The Standards should be met onsite if possible, and, if they cannot be met, the applicant must show what can be done.

Evaluation of practicable alternatives to project designs, site layouts, and BMPs are examples of reasonable efforts. 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 also may 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.

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Has the applicant adequately documented why one or more of the Standards cannot be met?
Where redevelopment projects cannot meet all the Standards, the project proponent must document why specific standards cannot be met.

Does the project incorporate new or expanded stormwater controls that reduce the annual pollutant loads?
For all redevelopment projects, new stormwater controls (retrofitted or expanded) must be incorporated into the design and result in an improvement to water quality through a reduction in annual pollutant loads. On constrained redevelopment sites, it may not always be possible to treat the entire water quality volume (i.e., 0.5 inch or 1.0 inch rule). In these cases, the TSS removal of the BMP will be lower than the design rates in the chart, because the BMP will not be capturing all of the peak contaminant load in the first flush.

For road and highway projects, what is the difference between emergency, new, and redevelopment projects?
The Stormwater Standards do not apply to emergency road projects. These projects include pothole and frostheave repair, repair of washouts, and other unanticipated activities. The construction of new roads and highways requires full compliance with the Standards.

Road or highway redevelopment projects include widening of a single lane or less, adding shoulders, correcting substandard intersections, repaving, and projects that involve alterations to drainage systems on existing roadways. A Notice of Intent must be filed for portions of these projects within the jurisdiction of the Wetlands Protection Act and the stormwater portions of these projects must meet the Standards to the maximum extent practicable or at a minimum improve existing conditions.

However, the filing of a Request for Determination should not normally trigger the application of the Stormwater Management Policy. Some roadwork and bridgework, such as cold planing and resurfacing, is often conducted under a negative Determination because the work will not alter a resource area. Other routine roadwork will not generate a stormwater discharge and also is commonly handled under a Determination of Applicability, such as traffic signalization, tree pruning along rights-of-way or the installation of highway lighting, signs, guardrails, barriers, rumble strips, utilities, and fence installation.

When a highway department is proposing repair work to small portions of the roadway or bridge, such as catch basin or manhole repair, headwall repair, and scupper repair, commissions should understand that there will be little opportunity for extensive improvements to the drainage from the entire roadway; Standard 7 may be met simply by improving the existing conditions. The Stormwater Management Policy should not create a disincentive to minor repairs that will produce water quality benefits.

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However, when roadwork includes resurfacing or changes to the drainage system and there is a critical resource or evidence of impacts from stormwater runoff from an inadequate drainage system, commissions may chose to require a Notice of Intent and compliance with Standard 7 for redevelopment.

There may be little opportunity to control peak discharges or treat pollutants in bridge runoff since bridges are usually at the low point in a road's vertical alignment. Runoff must be removed from the bridge deck efficiently to prevent hydroplaning and icing conditions. In limited instances, moving water from the bridge surface to the embankment area by gravity flow may be possible. However, stormwater management for bridges often must be achieved through measures along other segments of roadway.

Erosion/sediment control (Standard 8): Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.

Have erosion and sediment controls for construction and land disturbance activities been incorporated into the project design?
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. Erosion and sediment controls should be applied in both coastal and inland locations.

Comprehensive technical information on erosion and sediment control practices is available in the Massachusetts Executive Office of Environmental Affairs' document, *The Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas: A Guide for Planners, Designers, and Municipal Officials*. See Appendix C for how to obtain a copy of the document.

Operation/maintenance plan (Standard 9): All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.

Has an operation and maintenance (O&M) plan for both construction and post-development stormwater controls been developed?

Does the plan identify:
- Stormwater management system owner(s);
- Party or parties responsible for operation and maintenance;
- Schedule for inspection and maintenance; and

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- Routine and non-routine maintenance tasks?

The plan also may include:
- Source(s) of funding for continued operation and maintenance;
- Provision for appropriate access and maintenance easements surrounding control(s) and extending to a public right-of-way; and
- Description and delineation of public safety features.

BMPs have specific maintenance requirements to ensure long-term effectiveness. Unless maintenance requirements are specified (see Chapter 3 of the *Stormwater Technical Handbook - Volume Two*), it is recommended that the plan provide for routine inspections conducted on a monthly basis during the first six months of operation (a portion of that time period must be in the growing season) and thorough investigations conducted twice a year. Thereafter, the monthly maintenance requirements may be adjusted based on the results of the first year of operation.

To promote proper O&M, BMPs for roads should be relatively easy to inspect and offer low frequency maintenance. Examples are water quality swales, vegetated buffer strips, detention basins, wet ponds, constructed wetlands, and deep sump catch basins. With proper selection of roadway BMPs, annual or semiannual maintenance may be sufficient with greater effort near sensitive resources.

Construction BMPs and post-development BMPs should be considered separately in the O&M plan. Requirements for construction BMPs should end with the final stabilization of the site and removal of temporary siltation and erosion controls. Post-development BMPs have ongoing operation and maintenance requirements that should be incorporated into an Order of Conditions and as continuing conditions in the Certificate of Compliance.

Is the operation and maintenance plan reasonable?
A realistic assessment of the O&M plan should consider factors such as cost, access to the BMP for maintenance, complexity of BMP design, and adequacy of the maintenance commitment. For example, municipalities and highway departments typically have limited funds for drainage system maintenance. BMPs that are visually and physically inaccessible may require special maintenance considerations that are not reasonable.

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CHAPTER 2: Jurisdiction and Application of Stormwater Management Standards

The goal of the Stormwater Policy is to improve water quality and control runoff volume by comprehensive and coordinated implementation of the Stormwater Management Standards. To consistently address stormwater discharges, the Standards are to be used within multiple regulatory authorities of the Department of Environmental Protection (DEP). New and modified stormwater discharges within wetland resource areas will be addressed under the state Wetlands Protection Act Program and, where applicable, the state 401 Water Quality Certification Program. Existing stormwater discharges will be evaluated by DEP under its Clean Waters Act authority on a case-by-case basis within a watershed assessment approach. The Standards support existing legal authority, as DEP's interpretation of existing regulations.

Applicable Regulations and Requirements

Administered by conservation commissions and DEP:

310 CMR 10.00 (Wetlands Protection Act Regulations)

Rivers Protection Act and Guidance

(Note: The Rivers Guidance states that stormwater must be managed in accordance with the Stormwater Management Standards to meet the "no significant adverse impact" standard in the Rivers Act.)

Administered by DEP:

314 CMR 9.00 (401 Water Quality Certification)

314 CMR 3.00 (Surface Water Discharge Permit Program)

314 CMR 4.00 (Surface Water Quality Standards)

314 CMR 5.00 (Groundwater Discharge Permit Program)

314 CMR 6.00 (Ground Water Quality Standards)

401 Certification Conditions of EPA NPDES General Permits

Summary of Jurisdiction

Discharges from New Development and Redevelopment Areas

For new development and redevelopment, local conservation commissions or DEP should regulate stormwater through an Order of Conditions when jurisdiction is established under the Wetlands Protection Act. Development within wetland resource areas, including the riverfront area, or the buffer zone may generate stormwater discharges that can alter wetlands if left unmanaged and untreated. Although the wetland regulations have no specific provisions for stormwater, discharges located within a resource area, buffer zone, or riverfront area may require conditions to meet certain performance standards and to protect the interests of the Act.

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Discharges from Existing Development

Existing discharges include municipal storm sewer systems, road and highway drainage systems, and drainage structures from developed areas with point sources to wetlands or water bodies. A point source is a pipe or channel, as compared to diffuse nonpoint sources of pollution which generally involve overland flow. To address existing discharges, DEP will rely on watershed assessments and remedial action. DEP will use water quality assessments in watersheds to identify and prioritize stormwater discharges.

Massachusetts has regulations under the state Clean Waters Act specifying when state surface water discharge and groundwater discharge permits for stormwater are required. Facilities that are identified through water quality assessments may be designated by DEP to obtain individual surface or groundwater discharge permits for stormwater, a process which is similar to NPDES/MA industrial and sanitary wastewater permitting. Federal and state funding sources may be available to assist with the cost of implementation of BMPs for remedial stormwater management projects. However, existing discharges that meet the Stormwater Management Standards do not need such permits. Stormwater dischargers who do not meet the Standards should not submit a permit application to DEP, but are encouraged to upgrade their stormwater management to avoid the potential for designation.

DEP will encourage the use of consistent standards by planning boards and other state and local agencies after it revises its regulations. Consistent implementation of the standards by other groups will extend the water quality and quantity improvements and will benefit dischargers by avoiding the imposition of conflicting requirements.

The following guidance explains how the Stormwater Management Standards will be applied using existing state regulatory authority. Descriptions of statutory authority and regulatory frameworks are followed by specific notes about jurisdiction and application of the Standards.

Stormwater and the Wetlands Protection Act

Under the Wetlands Protection Act (Massachusetts General Laws Chapter 131, Section 40), local conservation commissions and DEP protect wetlands through the issuance of permits for activities in floodplains and in or near wetlands. Resource areas include freshwater and coastal wetlands, banks, beaches, and dunes bordering on estuaries, streams, ponds, lakes, or the ocean; land under any of these water bodies; the riverfront area; and land subject to tidal action, coastal storm flowage, or flooding. Resource areas are presumed to be significant to one or more of the public interests listed in the Act. The interests listed in the Act are the protection of public and private water supplies, groundwater supply, prevention of pollution, flood control, protection of land containing shellfish, protection of fisher-

ies, storm damage prevention, and protection of wildlife habitat. Proposed work in a resource area or the 100-foot buffer zone requires an Order of Conditions if it will alter any resource area. Resource areas are protected by specific regulatory performance standards that must be met to obtain project approval.

Stormwater discharges can alter wetland resource areas by changing drainage characteristics, sedimentation patterns, flow patterns, flood detention areas, and water temperature, and can affect the physical, chemical, or biological characteristics of the receiving water. Accordingly, stormwater discharges clearly can affect most of the public interests that the Wetlands Protection Act is designed to safeguard. The authority to regulate stormwater is implicit in the statute and regulations. In addition, the performance standards often require control of stormwater discharges. For example, the performance standards for work on banks (310 CMR 10.54) and land under water (310 CMR 10.56) prohibit the impairment of surface water quality; the performance standards for bordering land subject to flooding (310 CMR 10.57) require control of peak rates. The regulations contain explicit jurisdiction over point source discharges, including stormwater.

If a conservation commission denies an Order of Conditions on the grounds that the applicant has not met the Stormwater Management Standards, the applicant may appeal to DEP in the same way as any other Order of Conditions. If a commission approves a project that does not meet applicable requirements, DEP may intervene to issue a Superseding Order.

Note: It should be emphasized that implementation of the Stormwater Management Standards does not reduce or supersede any other requirements in the regulations for the Wetlands Protection Act.

Jurisdiction under Wetlands Protection Act Regulations

1. *Work in a Resource Area, including the Riverfront Area, or Buffer Zone*

Proposed work, including installation of stormwater management structures and alterations that result in a stormwater discharge within a resource area, will require an Order of Conditions. Activities within the 100-foot buffer zone also require an Order if they will alter any resource area. The Stormwater Management Standards must be applied to these activities. Most subdivisions, commercial developments, and industrial facilities involve stormwater management systems (e.g., culverts, detention basins), which will be subject to the Stormwater Management Standards under the Wetlands Protection Act regulations when the structures or discharges are located in the buffer zone or floodplains.

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2. *Point Source Discharges within a Resource Area, including Riverfront Area, or Buffer Zone*

In the absence of an NPDES permit entitled to a presumption (see #4), local conservation commissions or DEP should comply with 310 CMR 10.05(6), by imposing conditions on the quality and quantity of discharges from either closed or open channel point sources to protect the interests of the Act, provided the point source is within a resource area or the buffer zone. Because stormwater contributing to a new point source within a regulated resource area can originate outside these regulated areas, conditions imposed on the quality and quantity of the discharge may indirectly result in the need for stormwater management BMPs outside regulated areas. Although the local conservation commission or DEP may not directly regulate activities outside geographic jurisdiction, they should ensure that the Stormwater Management Standards will be met at the point of discharge, when the discharge itself is within jurisdiction.

For example, a developer proposes an overflow discharge pipe within the buffer zone from a detention basin that is outside the buffer zone. The commission or DEP can insist that the Stormwater Management Standards are met at the overflow pipe, but cannot prescribe the BMP, such as the detention basin, to be used to achieve the Standards. As a practical matter, developers are expected to select stormwater control measures that meet the Standards and are listed in the Handbooks. To evaluate whether the Stormwater Management Standards can be met, the issuing authority may require information about structures and practices beyond the buffer zone, but the information should be directly related to the discharge within the buffer zone.

3. *Work or Discharges Beyond the 100-ft. Buffer Zone or Riverfront Area: After-the-Fact Jurisdiction*

Jurisdiction under the Wetlands Protection Act does not extend beyond resource areas, including the riverfront area, and the 100-foot buffer zone unless and until an activity outside this area actually causes an alteration of a resource area. If an alteration from activities outside geographic jurisdiction occurs, the activity may be regulated (after-the-fact jurisdiction). For example, a conservation commission or DEP does not have jurisdiction over a stormwater discharge pipe located 105 feet away from a wetland or 205 feet from a perennial stream. However, a prudent developer would implement stormwater management practices to avoid after-the-fact jurisdiction, since the first heavy rainstorm is likely to erode a channel to and thereby alter the resource area. After-the-fact jurisdiction may be more costly to the developer if site redesign is necessary to accommodate stormwater BMPs.

Commissions and DEP also may assert jurisdiction over activities outside the buffer zone when additional stormwater is routed through an existing outfall pipe and results in an alteration of a wetland resource area. Depending on the nature and location of the activity, there may be practical prob-

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lems in determining whether there has been an alteration and who is responsible. Commissions should not assert jurisdiction over development remote from resource areas, where the stormwater enters a storm sewer system. DEP will address these existing discharges under its Clean Waters Act authority. Both project proponents and other municipal boards are encouraged to avoid this situation by identifying stormwater discharge outfalls from development that contribute to existing storm drainage systems and recognizing the importance of BMPs prior to connection.

4. *NPDES Presumption*

DEP may issue an individual surface water discharge permit in conjunction with an EPA NPDES permit, which includes effluent limitations, for a new point source. Under the wetland regulations (310 CMR 10.03), the effluent limitations set in the NPDES permit are presumed to protect the interests of the Act from the effects of the discharge on water quality. However, the permit does not cover any construction impacts, which must be addressed through an Order of Conditions. To date, NPDES permits have been infrequently issued for stormwater discharges.

The NPDES permit should be referenced in the Order. The presumption can be overcome by credible evidence from a competent source that the effluent limitations will not protect the interests of the Act. If the presumption does not apply, the point source discharge should be reviewed on its merits, with conditions imposed on the quantity and quality of the discharge to protect the interests.

Application of Stormwater Management Standards by Conservation Commissions

1. Demonstrating the Stormwater Management Standards Have Been Met

By complying with the applicable Stormwater Management Standards, a stormwater system design is presumed to protect the interests of the Act. Applicants must submit plans and calculations for the system design along with the Notice of Intent to conservation commissions for review. The conservation commission or DEP will assess the information during routine project review to verify that the Stormwater Management Standards have been met. When one or more of the Standards cannot be met, an applicant may demonstrate that an equivalent level of environmental protection will be provided.

Although not a regulatory requirement, applicants are encouraged to submit a one-page form developed by DEP with the Notice of Intent, or otherwise present in a simple and concise format how the Stormwater Management Standards have been met. The form gives commissions and DEP a simple and consistent way to become informed about the stormwater management components of the project. Having this information in a predictable format also should benefit applicants.

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Sampling or monitoring requirements should not be necessary. Commissions and DEP may decide to impose sampling or monitoring requirements, however, when developers propose alternative stormwater management techniques not included in these documents or in unusual circumstances where deemed necessary to protect sensitive resources or public health. DEP and MCZM intend to evaluate the Standards and BMPs recommended in these documents as they are implemented in Massachusetts rather than imposing oversight requirements on dischargers.

2. Continuing Conditions in the Certificate of Compliance
Commissions and DEP can ensure the effectiveness of the stormwater systems over time by including conditions in the Order of Conditions that are continued in the Certificate of Compliance. First, operation and maintenance must continue after the project is completed. Commissions or DEP should check stormwater BMPs periodically to ensure long-term maintenance is being provided, according to the operation and maintenance plan.

Second, any constructed wetlands or other areas which may have the potential to become jurisdictional wetland resources should be identified and conditioned specifically so that maintenance can be accomplished without triggering a Notice of Intent requirement. Conservation commissions should be able to restrict the use of the wetland/pond in accordance with its design.

Third, commissions and DEP should place limitations on the quantity of the discharge from any point sources to ensure that the stormwater generated from future developments cannot simply be routed through existing drainage outfall pipes.

Stormwater and the State Clean Waters Act

Remediation of water quality impacts from existing stormwater discharges will be addressed by DEP as point sources under the Clean Waters Act rather than the Wetlands Protection Act. Where watershed assessments show water quality degradation from stormwater, DEP will require compliance with the Stormwater Management Standards through voluntary compliance, designation for a permit requirement, or enforcement action.

The state Clean Waters Act (Massachusetts General Laws Chapter 21, Sections 26-53) prohibits the discharge of pollutants to waters of the Commonwealth without a permit unless exempted by regulation. Stormwater discharges are subject to regulation when two criteria are met under 314 CMR 3.04(2). First, there must be "a conveyance or system of conveyances (including pipes, conduits, ditches and channels) primarily used for collecting and conveying stormwater runoff." 314 CMR 3.04(2)(a). Second, the stormwater runoff must be "contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, or oil and grease," or, be designated on a case-by-case basis. Such designa-

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tions must be made when the "stormwater discharge" is subject to effluent or toxic pollutant limitations, is located in an industrial plant area, or may be a significant contributor of pollution to waters of the Commonwealth. DEP has historically relied on case-by-case designations as significant pollution sources to implement these regulations.

Any discharge meeting these criteria must obtain a surface water discharge permit. Any discharge not meeting this regulatory definition is exempt from permitting requirements as "stormwater runoff" under 314 CMR 3.05(7). Because the regulations do not define "contaminated" or otherwise set more precise quantitative or qualitative thresholds, DEP will use compliance with the Stormwater Management Standards as constituting a discharge which is not "contaminated." In the case of stormwater, technology-based limitations will usually be BMPs such as those described in these documents. The Stormwater Management Standards will serve as the basis for the technology-based limitations. Stormwater discharges that meet the Standards do not require a permit. The Groundwater Discharge Permit Program sets parallel criteria for stormwater discharges to groundwater at 314 CMR 5.04, and will be implemented in the same way, relying on case-by-case designation.

Application of Stormwater Management Standards

1. *Existing Stormwater Discharges which Meet the Standards*
Stormwater is not contaminated if it meets the Stormwater Management Standards, and therefore is exempt from surface and groundwater discharge permit requirements. In addition, the Standards should not be applied to existing development that falls below the thresholds and does not need to comply with the Standards for new development; therefore, residential "approval not required" lots and small subdivisions are exempt from these permitting requirements. (See page 1-3 for thresholds.)

2. *Existing Stormwater Discharges which Do Not Meet the Standards*
Discharges that do not meet the Standards may be identified during water quality sampling conducted in each basin as part of DEP's watershed assessment and planning process. These assessments will be used to identify water quality degradation from various causes, including poorly controlled stormwater runoff. When a stormwater discharge is determined to be priority problem within a watershed, DEP may provide support for remediation, require a permit, or take enforcement action.

3. *Designation of New Discharges to Require a Permit*
Although DEP has relatively broad discretionary authority to designate which stormwater discharges require a permit, the Stormwater Policy has been designed to rely on the Wetlands Protection Act to apply the Stormwater Management Standards and avoid unnecessary permitting for new development. Large proposed projects will be designated for state surface water/stormwater permits only where DEP has determined that the Wetlands Protection Act process is inadequate to address potential impacts or

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where Wetlands Protection Act jurisdiction is absent.

4. *Municipal Separate Storm Sewer Systems*
Municipalities or other owners of stormwater sewer systems are responsible for the impacts of their discharges to wetlands or water bodies. Historically, many municipalities have been concerned about the capacity of the system, but generally have not addressed water quality issues. Where DEP determines that water quality impairment is caused by municipal storm drain systems, municipalities will be expected to take remedial actions to improve the quality of the discharge. Municipalities should consider exercising greater control over both proposed and existing discharges to their systems, by requiring facilities tied in to their systems to comply with the Stormwater Management Standards before the stormwater enters the storm drain system.

Stormwater and 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 (Corps) most 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 pilings when it has the effect of fill. Waters of the United States include navigable waters and their tributaries, adjacent wetlands, and isolated wetlands. States 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 Wetlands Protection Act do not need further state review under the 401 Program. These projects would already meet the Stormwater Management Standards through the Wetlands Protection Act. Some types of projects, however, including those with potentially large wetland impacts and those that are not subject to the Wetlands Protection Act, require an individual 401 certification. For these projects, the 401 Water Quality Certification regulations include specific provisions for stormwater discharges at 314 CMR 9.06(5) and (6). These provisions are consistent with the Stormwater Management Standards. All stormwater discharges must be set back from the receiving water or wetland and Best Management Practices must be implemented. Furthermore, fill in an Outstanding Resource Water (ORW) for any stormwater management purpose is prohibited, and discharges must be removed or set back using the highest and best practical method of treatment. A permit is required for any stormwater discharge to an ORW which meets the regulatory definition in 314 CMR 3.04(2). These waters

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include public surface water supplies, coastal and some inland Areas of Critical Environmental Concern (ACECs), and certified vernal pools. Consult the Surface Water Quality Standards (314 CMR 4.06) for more information.

In March 1995, the Corps issued a Programmatic General Permit (PGP) for Massachusetts. This permit replaces the system of "nationwide" general permit categories used in most other states with a simpler framework coordinated with the state Wetlands Protection Act. Generally, there is a nonreporting category of projects proposing less than 5,000 square feet (sq. ft.) of fill, a screening category of 5,000 sq. ft. to an acre of proposed fill, and an individual permit requirement for projects involving the loss of more than one acre of wetlands. DEP certified the PGP with the condition of compliance with its state regulations related to wetlands and waterways, as well as the revised 401 Water Quality Certification Program. Information on the PGP can be obtained from the Corps of Engineers at 1/800/362-4367.

Application of Stormwater Management Standards

Projects subject to Section 404 jurisdiction that require an individual 401 Water Quality Certification should comply with the Stormwater Management Standards. Compliance with the Standards will meet the requirements for setbacks and BMPs in the 401 regulations (314 CMR 9.06).

NPDES General Permits for Stormwater Discharges

The U.S. Environmental Protection Agency (EPA) administers a general permit program for certain stormwater discharges. The General Permits cover new and existing stormwater discharges from certain industrial activities and construction sites over five acres. On submission of a one-page information sheet to EPA, a facility is covered by the General Permit, which imposes conditions to reduce the pollutant load in the discharge through Best Management Practices (BMPs). Prior to use in Massachusetts, EPA requested Section 401 certification by DEP to ensure that the General Permit would not result in violations of state water quality standards. DEP has imposed conditions that limit the applicability of the permit and set specific requirements for discharges to certain water bodies. These state 401 Water Quality Certification requirements are conditions of EPA's General Permit.

Specifically, the DEP 401 certification conditions require that new discharges be set back from high quality receiving waters (generally, all waters which are not Outstanding Resource Waters) as site conditions allow or from existing outfalls undergoing drainage system changes. A new or increased discharge to an ORW that would require a permit under the state stormwater regulations is not eligible for the General Permit. When discharges are to Outstanding Resource Waters (ORWs), they are reviewed individually by DEP. New or increased discharges to coastal Areas of

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Critical Environmental Concern also are ineligible for coverage. All discharges to ORWs must implement BMPs to protect these waters. New stormwater discharges to ORWs can be allowed, without an individual permit, only if the outfall is set back from the receiving water and BMPs are employed. Existing discharges must be set back from the receiving water when the site stormwater drainage system is changed or the discharge is increased. Dischargers to these waters also are required to send a copy of their General Permit submission (the one-page information sheet, also called a "Notice of Intent") to DEP.

EPA issued a new "multi-sector" general permit for stormwater discharges from industrial facilities in 1995. Specific conditions have been developed for 29 industry groups; pollution prevention plans are required for all facilities, including identification of pollution sources, personnel responsible for the plan, implementation of BMPs, and evaluation of the plan's efficacy. The contents of the plans vary for each industry. Monitoring is required for some types of facilities. DEP issued a 401 Water Quality Certification with conditions requiring compliance with its state regulations.

Application of Stormwater Management Standards

Activities subject to the EPA General Permits should comply with the state 401 certification requirements by meeting the Stormwater Management Standards to be in compliance with setbacks and BMP requirements. Dischargers to Outstanding Resource Waters must notify DEP.

Note: EPA's General Permits were issued for five years in 1992, and therefore will expire in 1997. DEP expects to issue 401 certification on any renewal of the General Permits to assure compliance with the Stormwater Management Standards.

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