UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION I
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FACT SHEET

DRAFT GENERAL PERMITS FOR STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS IN MASSACHUSETTS

NPDES PERMIT NUMBERS:

MAR041000 –Traditional cities and towns

MAR042000 – Non-traditional state, federal, county and other publicly owned systems

MAR043000 – Non-traditional transportation systems

PUBLIC COMMENT PERIOD: September 30, 2014 – December 29, 2014

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I. INTRODUCTION AND PROGRAM BACKGROUND

The Director of the Office of Ecosystem Protection EPA-Region 1 is proposing to reissue three (3) National Pollutant Discharge Elimination System (NPDES) general permits for the discharge of stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) to waters within the Commonwealth of Massachusetts. The General Permit will apply to traditional cities and towns; state and federal MS4s; and state transportation agencies (except for MassDOT-Highway Division). The Draft General Permit consists of the following parts:

Part 1: Introduction
Part 2: Non-Numeric Effluent Limitations
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A. Program Background

The goal of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Clean Water Act (CWA) § 101(a), 33 U.S.C. § 1251(a); *see also id.* §§ 1251(a)(1) ("national goal that the discharge of pollutants into the navigable waters be eliminated by 1985"), (a)(2) ("national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983").

In 1987, Congress amended the Clean Water Act to better regulate stormwater discharges. Congress enacted Section 402(p) of the Clean Water Act, which requires that "[p]ermits for discharges from municipal storm sewers . . . shall include a requirement to effectively prohibit non-stormwater discharges into the storm sewers; and shall require controls to reduce the discharge of pollutants to the maximum extent practicable...and such other provisions as the Administrator …determines appropriate for the control of such pollutants." CWA §§ 402(p)(3)(B)(ii)-(iii).
EPA"s "Phase II" stormwater regulations, among other things, set forth requirements for stormwater discharges from small municipal separate storm sewer systems, ("small MS4s") which are defined at 40 CFR § 122.26(b)(16) as follows:

> Small municipal separate storm sewer system means all separate storm sewers that are:
> (i) Owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over

> disposal of sewage, industrial wastes, stormwater, or other wastes including special districts under State law such as a sewer, flood control district or drainage district, or similar entity or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of United States.
> (ii) Not defined as "large" or "medium" municipal separate storm sewer systems pursuant to [40 CFR § 122.26(b)(4) or (b)(7)] or designated under [40 CFR § 122.26(a)(1)(v)].
> (iii)This term includes systems similar to separate storm sewer systems in municipalities such as military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

Additional examples of municipal systems that could be subject to regulation include regional school districts and state universities located within an urbanized area.

Part 2.3 of the Draft Permit sets forth the requirements for the MS4 to "reduce pollutants in discharges to the maximum extent practicable, including management practices, control techniques, and system, design and engineering methods…" CWA § 402(p)(3)(B)(iii). Maximum extent practicable (MEP) is the statutory standard that describes the level of pollutant reduction that MS4 operators must achieve, but also includes a recognition that the effort may be increased under some circumstances. EPA believes implementation of best management practices (BMPs) designed to control stormwater runoff from the MS4 is generally the most appropriate approach for reducing pollutants to satisfy the MEP standard. Pursuant to 40 CFR § 122.44(k), the Draft Permit requires permittees to control stormwater discharges through BMPs, including development and implementation of a comprehensive stormwater management program (SWMP) as the mechanism to achieve the required pollutant reductions.

Neither the CWA nor the stormwater regulations provide a specific definition of MEP. The lack of a detailed definition allows flexibility in MS4 permitting. EPA views the MEP standard in the CWA as an iterative process. MEP should continually adapt to current conditions and BMP effectiveness. EPA believes that compliance with the MEP requirements (Part 2.3) of this Draft Permit will meet the MEP standard of the CWA and the stormwater regulations. The iterative process of MEP consists of a municipality developing a program consistent with specific permit requirements, implementing the program, evaluating the effectiveness of BMPs included as part of the program, revising those parts of the program that are not effective at controlling pollutants, implementing the revisions, and then evaluating again. This process continues until water quality standards are attained. The changes contained in the draft general permit from the previous permit reflect the iterative process of MEP. Accordingly, the draft general permit contains more specific tasks and details than the previous MS4 permit. These specific changes are discussed later in the fact sheet.

Section 402(p)(3)(B)(iii) of the CWA also authorizes EPA to include in an MS4 permit "such other provisions as [EPA] determines appropriate for the control of …pollutants." This provision forms a basis for imposing water quality-based effluent limitations (WQBELs), s*ee Defenders of Wildlife v. Browner*. 191 F.3d 1159 (9th Cir. 1999): *see also* EPA's preamble to the Phase II regulations, 64 Fed. Reg. 68722, 68753, 68788 (Dec 8, 1999).

In New England generally, and certainly in Massachusetts, stormwater is a substantial contributor to exceedances of water quality standards in many waterbodies. Implementing MEP-level controls will make substantial progress towards reducing or eliminating many of these exceedances. Absent evidence to the contrary, EPA presumes that a small MS4 program that implements the six minimum measures as required by this permit does not require more stringent limitations to meet water quality standards. However, in a significant number of circumstances, MEP-level controls alone will not suffice to eliminate stormwater-based exceedances of water quality standards. Consequently, EPA has determined that it is necessary and

"appropriate" to include WQBELs in this permit. The full explanation of this determination is set forth in Part II.D of this Fact Sheet. Accordingly, Parts 2.1 and 2.2 of the Draft Permit contain the water quality-based effluent limitations, also expressed in terms of BMPs, which EPA has determined are necessary and appropriate under the CWA.

EPA – Region 1 issued its first general permit to address stormwater discharges from small MS4s in Massachusetts on May 1, 2003 (MS4-2003 Permit). The MS4-2003 general permit, which expired in 2008, required small MS4s to develop and implement stormwater management programs (SWMP) designed to control pollutants to the MEP and protect water quality. Prior to the issuance of this Draft Permit, EPA issued two Draft Permits in Massachusetts. The North Coastal Draft Permit was available for public comment from February 4, 2010 to March 31, 2010. A public hearing was held on March 18, 2010. The Interstate, Merrimack and South Coastal Draft Permit was available for public comment from November 4, 2010 to March 11, 2011. A public hearing was held on March 9, 2011. EPA received significant comments on both permits. Many of the comments resulted in changes to the originally proposed Draft Permits. EPA has decided, in its discretion, to issue a new Draft Permit pursuant to 40 CFR §124.10. The new Draft Permit combines the two previous draft permits into one permit and includes changes made in response to public comments on the first Draft Permits; changes made to provide for the changed circumstances since issuance of the previous Draft Permits (e.g. newly approved TMDLs and additional impaired waters listings); and changes made in the scope of coverage and the number of MS4s due to issuance of updated urbanized area delineations based on the results of the 2010 Census.

B. Consideration of Other Federal Programs

When EPA undertakes an action, such as the reissuance of an NPDES permit, that action must be consistent with other federal laws and regulations. Regulations at 40 CFR § 122.49 contain a listing of Federal laws that may apply to the issuance of NPDES permits. This section discusses four federal Acts that apply to the reissuance of this general permit: the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA), the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA which addresses Essential Fish Habitat (EFH)), and the Coastal Zone Management Act (CZMA). The requirements of these Acts and EPA's obligations with regard to them are discussed in the following paragraphs.

1. Endangered Species

The ESA of 1973 requires federal agencies, such as EPA, to ensure through consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) (also known collectively as the Services) that any actions authorized, funded, or carried out by the Agency are not likely to jeopardize the continued existence of any federally-listed endangered or threatened species or adversely modify or destroy critical habitat of such species. 16 U.S.C 1536(a)(2), 50 CFR § 402 and 40 CFR § 122.49(c)). Section 7 of the ESA provides for formal and informal consultation with the Services. For NPDES permits issued by EPA, Draft Permits and fact sheets are routinely submitted to the Services for informal consultation prior to issuance. EPA initiated an informal consultation with the Services during the previous public notice period of the General Permits. EPA will provide the Services with the new Draft General Permit and fact sheet and will reinitiate informal consultation.

In order to meet its obligations under the CWA and the ESA, and to promote the goals of those Acts, EPA seeks to ensure the activities regulated by this general permit are not likely to adversely

affect endangered and threatened species and critical habitat. The Draft Permit contains one set of requirements pertaining to species under the jurisdiction of the USFWS and a separate set of requirements for species under the jurisdiction of NMFS. These requirements are contained in Appendix C of the draft general permit.

Currently, there are 20 species of concern for applicants applying for permit coverage, namely the Dwarf wedgemussel *(Alasmidonta heterodon)*, Northeastern bulrush (*Scirpus ancistrochaetus*), Sandplain gerardia *(Agalinis acuta)*, Piping Plover (*Charadrius melodus*), Roseate Tern (*Sterna dougallii*), Northern Red-bellied cooter (*Pseudemys rubriventis)*, Bog Turtle (*Glyptemys muhlenbergii*), Small whorled Pogonia (*Isotria medeoloides*), Puritan tiger beetle (*Cicindela puritana*), American burying beetle (*Nicrophorus americanus*), Northeastern beach tiger beetle (*Cicindela dorsalis*), Atlantic Sturgeon *(Acipenser oxyrinchus*), Shortnose Sturgeon *(Acipenser brevirostrum)*, North Atlantic Right Whale (*Eubalaena glacialis*) Humpback Whale *(Megaptera novaengliae)*, Fin Whale (*Balaenoptera physalus)*, Kemp's Ridley Sea Turtle *(Lepidochelys kempii)*, Loggerhead Sea Turtle *(Caretta caretta)*, Leatherback Sea Turtle *(Dermochelys coriacea)*, and the Green Turtle *(Chelonia mydas).* The Atlantic Sturgeon, Shortnose Sturgeon, North Atlantic Right Whale, Humpback Whale, Fin Whale, Loggerhead Sea Turtle, Kemp's Ridley Sea Turtle, Leatherback Sea Turtle and Green Turtle are listed under the jurisdiction of NMFS. The Dwarf wedgemussel, Northeastern bulrush, Sandplain gerardia, Piping Plover, Northern Red-bellied cooter, Bog Turtle, Small whorled Pogonia, Roseate Tern, Puritan tiger beetle, Northeastern beach tiger beetle, and American burying beetle are listed under the jurisdiction of the U.S. Fish and Wildlife Service.

For informal or formal consultation under Section 7 of the ESA for species under the jurisdiction of USFWS, EPA has designated the applicants seeking authorization under this general permit as non-federal representatives for the purposes of completing informal consultation initiated by EPA (See 50 CFR §402.08 and §402.13). In order to be eligible for this draft general permit, all applicants must certify that none of their stormwater discharges, allowable non-stormwater discharges, or discharge related activities (such as BMPs) are likely to affect a threatened or endangered species under the jurisdiction of USFWS. Prior to obtaining general permit authorization, small MS4s must assess the impacts of their stormwater discharges and discharge-related activities on federally listed endangered and threatened species ("listed species") and designated critical habitat ("critical habitat") under the jurisdiction of USFWS to ensure that the goals of ESA are met. The applicant must document its eligibility determination based on one of the criteria found in Section C of Appendix C, and maintain the documentation as part of the stormwater management program. The applicant must also certify eligibility as part of the NOI requirements. In order to be eligible for permit coverage, MS4 operators must implement any conditions imposed by USFWS during consultation (Part 1.9.1 of the Draft Permit). Appendix C also requires a permittee to re-initiate consultation with the USFWS if, during the permit term, the permittee is planning to construct a BMP not identified in the permittee's NOI and the BMP is located in the vicinity of threatened or endangered species or critical habitat under the jurisdiction of the USFWS. EPA strongly recommends that small MS4s follow the guidance in Appendix C of the general permit at the earliest possible stage to ensure eligibility requirements for general permit authorization are complete upon NOI submission. Failure to certify eligibility will result in denial of permit authorization. Small MS4s that cannot meet any of the eligibility criteria in Appendix C must apply for an individual permit.

To facilitate informal or formal consultation with the USFWS, the following general information should be noted:

- This permit is a reissuance of a general permit for municipal stormwater discharges which

was originally issued in 2003 with concurrence/informal consultation by USFWS.

- The requirements of this permit are more stringent than the original 2003 general permit.
- This general permit authorizes stormwater discharges from municipal separate storm sewer systems which consist of runoff from precipitation events that is collected from streets, parking lots, sidewalks and other impervious areas and discharged to a surface water.
- Stormwater from small MS4s may contain bacteria, nutrients, sediment, chloride, oil and grease (hydrocarbons), and heavy metals.
- The general permit excludes authorization to small MS4s whose discharges are likely to adversely affect any species that is listed as endangered or threatened under the ESA or result in the adverse modification or destruction of habitat that is designated as critical under the ESA.
- The requirements in this permit are consistent with information previously provided by the Services to EPA during the development of other recently-issued general permits.
- EPA's permit action requires the permittees to implement and enforce a SWMP designed to reduce pollutants discharged from their MS4s to the Maximum Extent Practicable and, for some permittees, to take additional steps beyond MEP to protect water quality. The required SWMP activities to be implemented by permittees under the Massachusetts' small MS4 permit will reduce the levels of environmental contaminants in stormwater discharges to receiving waters. Implementation of this permit will improve water quality in stormwater discharges from small MS4s in the state of Massachusetts.

For NMFS, EPA has initiated informal consultation under Section 7 of the ESA on behalf of all permittees whose discharges could potentially impact endangered species under the jurisdiction of NMFS. This includes all permittees discharging to the Merrimack River, the Taunton River, the Connecticut River, and discharges to coastal embayments and marine waters. EPA has chosen not to designate applicants as non-federal representatives during informal consultation at the request of NMFS and due to the narrower scope of potentially impacted species. The USFWS has an online tool to help applicants through the informal consultation process while NMFS does not have such a tool to help applicants at this time. EPA submitted a supplemental ESA supporting document to NMFS to facilitate informal consultation. This document is available upon request from EPA.

All small MS4s also have an independent ESA obligation to ensure that their activities do not result in any prohibited "takes" of listed species[1]. Many of the measures required in this general permit may assist in ensuring that the MS4's activities do not result in a prohibited take of species in violation of section 9 of the ESA. If the permittee has plans or activities in an area where endangered and threatened species are located, it may wish to ensure that it is protected from potential takings liability under ESA section 9 by obtaining an ESA section 10 permit or by requesting formal consultation under ESA section 7. Small MS4s that are unsure whether to pursue a section 10 permit or a section 7 consultation for takings protection should confer with the appropriate USFWS office or the NMFS office.

2. Essential Fish Habitat

[1] Section 9 of the ESA prohibits any person from "taking" a listed species (e.g. harassing or harming it) unless: (1) the taking is authorized through an "incidental take statement" as part of completion of formal consultation according to ESA section 7; (2) where an incidental take permit is obtained under ESA section 10 (which requires the development of a habitat conversion plan; or (3) where otherwise authorized or exempted under the ESA. This prohibition applies to all entities including private individuals, businesses, and governments.

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)(16 USC Sections 1801 et seq. (1998)), EPA is required to consult with NMFS if EPA's action or proposed actions that it funds, permits or undertakes, "may adversely impact any essential fish habitat." 16 USC Section 1855(b). The Amendments broadly define "essential fish habitat" (EFH) as "waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 USC Section 1802(10). "Adverse impact" means any impact that reduces the quality and/or quantity of an EFH. 50 CFR Section 600.910(a). Adverse impacts may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative or synergistic consequences of actions.

An EFH is only designated for fish species for which federal Fisheries Management Plans exist. 16 USC Section 1855(b) (1) (A). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. 1 In a letter dated October 10, 2000 to EPA, NMFS agreed that for projects authorized through the NPDES permit process, EPA may use its existing procedures regarding consultation/environmental review to satisfy the requirements of the MSFCMA. According to the agreement between NMFS and EPA, EFH notification for purposes of consultation can be accomplished in the EFH Section of the fact sheet for the Draft Permit or *Federal Register* notice.

To satisfy the requirements of an EFH assessment, the following section includes 1) a description of the proposed area, 2) list of EFH species and life history stages that may be affected by the proposed action, 3) an analysis of the effects, 4) mitigation measures, if applicable, and 5) the federal agency's determinations of effect.

Proposed Action: EPA is proposing to reissue the NPDES general permit for the discharge of stormwater from Small Municipal Separate Storm Sewer Systems located in the state of Massachusetts.

EFH Species and Life History Stages that May be Affected by the Action: The following is a list
of the EFH species and applicable lifestage(s) for the action area that includes the coastal and inland waters of Massachusetts.

Species	**Eggs**	**Larvae**	**Juveniles**	**Adults**
American plaice *(Hippoglossoides platessoides)*	X	X	X	X
Atlantic cod *(Gadus morhua)*	X	X	X	X
Atlantic halibut *(Hippoglossus hippoglossus)*	X	X	X	X
Atlantic (sea) herring *(Clupea harengus)*	X	X	X	X
Atlantic salmon *(Salmo salar)*	X	X	X	X
Atlantic sea scallop *(Placopecten magellanicus)*	X	X	X	X

Haddock *(Melanogrammus aeglefinus)*	X	X	X	X
monkfish *(Lophius americanus)*	X	X	X	X
ocean pout *(Macrozoarces americanus)*	X	X	X	X
offshore hake *(Merluccius albidus)*				
pollock *(Pollachius virens)*	X	X	X	X
red hake *(Urophycis chuss)*	X	X	X	X
redfish *(Sebastes fasciatus)*	n/a	X	X	X
white hake *(Urophycis tenuis)*	X	X	X	X
whiting *(Merluccius bilinearis)*	X	X	X	X
windowpane flounder *(Scopthalmus aquosus)*	X	X	X	X
winter flounder *(Pseudopleuronectes americanus)*	X	X	X	X
witch flounder *(Glyptocephalus cynoglossus)*	X	X	X	X
yellowtail flounder *(Limanda ferruginea)*	X	X	X	X
Atlantic mackerel *(Scomber scombrus)*	X	X	X	X
black sea bass *(Centropristis striata)*	n/a	X	X	X
bluefish *(Pomatomus saltatrix)*			X	X
Atlantic butterfish *(Peprilus triacanthus)*	X	X	X	X
short finned squid *(Illex illecebrosus)*	n/a	n/a	X	X
long finned squid *(Loligo pealeii)*	n/a	n/a	X	X
ocean quahog *(Artica islandica)*	n/a	n/a	X	X
scup *(Stenotomus chrysops)*	n/a	n/a	X	X
spiny dogfish *(Squalus acanthias)*	n/a	n/a	X	X
summer flounder *(Paralichthys dentatus)*	X	X	X	X
surf clam *(Spisula solidissima)*	n/a	n/a	X	X
tilefish *(Lopholatilus chamaeleonticeps)*				

Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
cobia *(Rachycentron canadum)*	X	X	X	X
king mackerel *(Scomberomorus cavalla)*	X	X	X	X
Little Skate	n/a	n/a	X	X
Smooth Skate	n/a	n/a	X	
Thorny Skate	n/a	n/a	X	X
Winter Skate	n/a	n/a	X	X
sand tiger shark *(Carcharias taurus)*		X		
blue shark (*Prionace glauca)*		X	X	X
dusky shark *(Charcharinus obscurus)*			X	X
shortfin mako shark *(Isurus oxyrhyncus)*			X	
sandbar shark *(Charcharinus plumbeus)*			X	X
bluefin tuna *(Thunnus thynnus)*			X	X

http://www.nero.noaa.gov/hcd/efhtables.pdf ; Source for Skates: http://www.nero.noaa.gov/hcd/skateefhmaps.htm; Additional Source for Sharks: NMFS. 2009. Amendment 1 to the Consolidated Highly Migratory Species Fish Management Plan (Chapter 5: Essential Fish Habitat). June 2009. Available for download at: http://www.nmfs.noaa.gov/sfa/hms/EFH/index.htm

Major estuaries, bays, and rivers along the Massachusetts coast which include essential fish habitat include Boston Harbor, Buzzards Bay, Cape Cod Bay, Massachusetts Bay, the Merrimack River, and Waquoit Bay (NMFS website: http://www.nero.noaa.gov/hcd/est.htm).

Analysis of Effects and EPA's Opinion of Potential Impacts: Discharges from small MS4s contain stormwater runoff from urban environments including areas such as rooftops, driveways, sidewalks, and roads. Typical pollutants in urban stormwater runoff include sediments, nutrients, bacteria, metals, chloride and oil & grease. This NPDES permit is a reissuance of a general permit for municipal stormwater discharges which was originally issued in 2003 with concurrence/informal consultation by NMFS. In addition, the requirements of this permit are more stringent than the original 2003 permit. EPA expects that EFH will be protected through the following permit conditions:

MS4s are required to implement and enforce SWMPs designed to reduce pollutants discharged from their MS4s to the maximum extent practicable and to protect water quality. Implementation of a program to these standards should ensure the protection of aquatic life and maintenance of the receiving water as an aquatic habitat. Implementation of the SWMP includes:

1) **Illicit Discharge Management:** EPA's permit requires that the permittees prohibit the discharge of non-precipitation flows ("illicit" or "non-stormwater" flows) to the MS4s. Permittees must conduct aggressive, thorough, and systematic illicit discharge investigations and removal of illicit connections. The Draft Permit requires permittees to develop a written Illicit Discharge Detection and Elimination (IDDE) protocol that includes specific requirements and procedures for implementation of the IDDE program. Examples of these requirements are a detailed map, a written prioritization of areas with a potential of illicit discharges, dry weather screening, wet weather outfall monitoring, record keeping, and thorough and complete storm drain network investigations that systematically and progressively evaluate manholes in the storm system to narrow the location of a suspected illicit connection or discharge to an isolated pipe segment (see Part 2.3.4 of the permit).

A thorough, and systematic IDDE program and enforcing local requirements that prohibit illicit discharges will remove any existing illicit connections to the MS4 and prevent the discharge of pollutants associated with illicit connections including bacteria/pathogens, nutrients, heavy metals and oil and grease from the MS4s. This will improve water quality resulting in beneficial effects on all receiving waters and improved conditions for EFH for the species above.

2) **Construction Site Runoff Control**: EPA's permit requires the permittees to implement a construction site runoff control program, which includes enacting and enforcing requirements for control of pollutants from construction sites, preconstruction plan review and approval, site inspections, and education for construction site operators. (See Part 2.3.5 of the permit).

The permittees' implementation of this requirement will directly reduce the discharge of sediment and other construction related pollutants to fresh and marine waters. The improved water quality will result in beneficial effects on all receiving waters, including those designated as EFH in the state of Massachusetts.

3) **Storm Water Management for New Development and Redevelopment**: This EPA permit requires that permittees manage stormwater for areas of new development and redevelopment disturbing 1 or more acres. The long-term objective of this measure is to have the hydrology associated with new development closely mirror the pre-development hydrology and to improve the hydrology of redevelopment sites through required onsite retention/infiltration or treatment of stormwater. Permittees must also conduct preconstruction plan review and approval for all new development and redevelopment projects; ensure proper operation and maintenance of permanent stormwater management controls; conduct site inspections; and enforce local requirements within their jurisdictional powers (See Part 2.3.6 of the permit).

Onsite retention will decrease the direct discharge of runoff from MS4 systems, thereby preventing adverse water quality impacts to receiving waters from new and redevelopment projects. Onsite retention standards and the use of LID techniques in all municipalities will reduce the volume of stormwater discharges and reduce the loads of sediment, bacteria/pathogens, heavy metals, nutrients, and other pollutants found in stormwater. This will protect fresh and marine water, including the EFH for the species listed above, and the improved water quality will result in beneficial effects on all such receiving waters.

4) **Good Housekeeping/Operations and Maintenance Program for Municipal Operations**:

Permittees must properly operate and maintain their stormwater infrastructure to reduce discharges of pollutants. All permittees must ensure that catch basins do not become more than 50% full and sweep their streets a minimum of one time per year. Permittees must create operation and maintenance programs for all properties exposed to stormwater runoff and enact programs to reduce stormwater pollutants through appropriate application of pesticides, herbicides, and fertilizers in all permittee areas, as well as enacting pollution prevention actions at material storage facilities, maintenance yards, and salt storage sites. Additional measures are required at waste handling facilities to reduce pollutants associated with those facilities. (See Part 2.3.7 of the permit).

> *Through requiring good housekeeping efforts to reduce the discharge of pollutants from wash-off from impervious areas and locations considered to be significant sources of pollutants, EPA's action to reissue the permit will reduce sediment, heavy metals, oil and grease, chloride, bacteria/pathogens and nutrients in urban stormwater discharges, This will protect fresh and marine water and the improved water quality will result in beneficial effects on all receiving waters which support the designated EFH.*

5) **A Public Education Program:** EPA's permit requires that the permittees implement a public education program to distribute educational materials to the populations within the MS4 or conduct other outreach activities about the impacts of stormwater discharges on water bodies within the MS4 jurisdiction and steps the public can take to reduce pollutants in stormwater runoff (See Part 2.3.2 and 2.3.3 of the permit).

> *Education and involvement in stormwater management activities ensures that local audiences are knowledgeable about how their day-to-day activities may impact water quality. Public education efforts will increase public understanding, which will lead to pollutant reductions and will result in increased water quality and beneficial effects on receiving waters which will improve EFH in the state of Massachusetts.*

These requirements, which are discussed in further detail in Part II.E of this fact sheet, have been designed to reduce the amount of stormwater and associated pollutants that is currently being discharged to receiving waters.

In addition, the Draft Permit prohibits violations of state water quality standards and imposes a variety of additional conditions on discharges to impaired waters which are found in Appendix F and Appendix H.

The conditions of this general permit also aim to achieve and maintain water quality standards through the antidegradation provisions contained within the Clean Water Act (CWA). This will result in the protection of EFH areas within the Commonwealth of Massachusetts.

The permit contains requirements for structural BMP installation within watersheds that stormwater eventually discharges to EFH waters. These BMPs are intended to reduce the pollutants found in stormwater before entering EFH areas. None of these BMPs will be installed within the waterbodies themselves and the construction of the BMPs is not expected to affect any EFH species, their habitat or forage.

Proposed Mitigation: Mitigation for unavoidable impacts associated with issuance of the Draft Permit is not warranted at this time because it is EPA's opinion that impacts will be negligible if permit conditions are followed. Authorization to discharge under the general permit can be revoked

if any adverse impacts to federally managed or protected species or their habitats do occur either because of noncompliance or from unanticipated effects from this activity. Should new information become available that changes the basis for EPA's assessment, then consultation with NMFS under the Magnuson-Stevens Fishery Conservation and Management Act will be reinitiated.

EPA's Determination of Effect on EFH: Implementation of the SWMP, which includes the aforementioned minimum control measures (Part 2.3 of the Permit) and measures to protect water quality (Part 2.2 of the Permit), as required by the general permit EPA proposes to issue for the discharge of stormwater from Small Municipal Separate Storm Sewer Systems in Massachusetts, will result in a reduction of pollutants to EFH waters. Therefore the permittees' adherence to the terms and conditions of the Draft Permit will have a beneficial effect on the receiving waters, which includes fresh and marine waters that serve as EFH. **EPA concludes that there will not be adverse effects on EFH, or fisheries managed species, as a result of the reissuance of this permit. EPA will seek written concurrence from the National Marine Fisheries Service on this assessment.**

3. Historic Preservation

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of federal "undertakings" on historic properties that are listed on, or eligible for listing on, the National Register of Historic Places. The term federal "undertaking" is defined in the NHPA regulations to include a project, activity, or program of a federal agency including those carried out by or on behalf of a federal agency, those carried out with federal financial assistance, and those requiring a federal permit, license, or approval. 36 CFR § 800.16(y). Historic properties are defined in the NHPA regulations to include prehistoric or historic districts, sites, buildings, structures, or objects that are included in, or are eligible for inclusion in, the National Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within such properties. 36 CFR § 800.16(1).

EPA's reissuance of the Small MS4 General Permit is a federal undertaking within the meaning of the NHPA regulations. To address any issues relating to historic properties in connection with reissuance of the general permit, EPA has included eligibility criteria in Appendix D of the Draft Permit for permittees to certify that potential impacts of their activities covered by this permit on historic properties have been appropriately considered and addressed. Although individual NOIs for authorization under the general permit do not constitute separate federal undertakings, the screening criteria and certifications provide an appropriate site-specific means of addressing historic property issues in connection with EPA's reissuance of the general permit. MS4s seeking authorization under this general permit are thus required to make certain certifications regarding the potential effects of their stormwater discharge, allowable non-stormwater discharge, and discharge-related activities on properties listed or eligible for listing on the National Register of Historic Places. An applicantmust meet one or more of the following three criteria (A-C) to be eligible for authorization under this permit:

Criterion A: The discharges and discharge-related activities (e.g., BMPs) do not have the potential to cause effects on historic properties.

Criterion B: A historic survey was conducted. The survey concluded that no historic properties are present. Discharges and discharge related activities do not have the potential to cause effects on historic properties.

Criterion C: The discharges and discharge-related activities have the potential to have an effect on historic properties, and the applicant has obtained and is in compliance with a written agreement with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (TPHO), or other tribal representative that outlines measures the applicant will carry out to mitigate or prevent any adverse effects on historic properties and include documentation of all written correspondence with the Notice of Intent. The Notice of Intent must also include any terms and conditions resulting from this evaluation and interaction that the applicant must follow to mitigate or prevent adverse effects due to activities regulated by this permit.

Authorization under the General Permit is available only if the applicant certifies and documents permit eligibility using one of the eligibility criteria listed above by following the steps in Appendix D of the general permit. Permittees are reminded that they must comply with applicable State, Tribal, and local laws concerning protection of historic properties and include documentation supporting the determination of permit eligibility in the Stormwater Management Program.

Electronic listings of National and State Registers of Historic Places are maintained by the National Park Service - http://www.nps.gov/nr/ and Massachusetts Historical Commission - http://www.sec.state.ma.us/mhc/

4. Coastal Zone Management Act

The Coastal Zone Management Act (CZMA), 16 U.S.C Sections 1451 et seq., and its implementing regulations (15 CFR § 930) require that any federally licensed activity affecting a state's coastal zone be consistent with the enforceable policies of approved state management programs. In the case of general permits, EPA is responsible for making the consistency determination and submitting it to the state for concurrence.

EPA must certify that the activities authorized by this permit comply with the enforceable policies of the state's approved program and that the activities authorized by the permit will be conducted in a manner consistent with the program. The Mass CZM program has established enforceable polices that address natural, cultural, social, and economic resources. Mass CZM has eight categories of enforceable policies: water quality, habitat, protected area, coastal hazard, port and harbor infrastructure, public access, energy, and ocean resources. A complete description of the enforceable policies is available at http://www.mass.gov/czm. EPA believes that the conditions in the Draft General Permit are consistent with the enforceable policies because they require MS4s to develop and implement a program that controls pollutants to the MEP and also protects water quality. The permit contains requirements to address water quality (Parts 2.1, and 2.2) and requirements to control pollutants to the MEP through non- numeric effluent limitations (Part 2.3). EPA has requested concurrence from Mass CZM with this determination.

C. General Permit Authority

Section 301(a) of the CWA, 33 U.S.C. § 1311(a), prohibits the discharge of pollutants into waters of the United States, except in compliance with certain sections of the Act including, among others, CWA § 402, 33 U.S.C. § 1342. Section 402 of the Act provides that the Administrator of EPA may issue NPDES permits for discharges of any pollutant into waters of the United States according to such specific terms and conditions as the Administrator may require. Although such permits are generally issued to individual discharges, EPA's regulations authorize the issuance of "general permits" to cover one or more categories or

subcategories of discharges, including stormwater point source discharges, within a geographic area. 40 CFR §122.28(a)(1) and (2)(i). EPA issues general permits under the same CWA authority as individual permits. Violations of a general permit condition constitute a violation of the CWA and may subject the discharger to the enforcement remedies provided in Section 309 of the Act, including injunctive relief and penalties.

D. Comment Period, Hearing Requests, and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the Draft Permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period to Newton Tedder, U.S. Environmental Protection Agency, 5 Post Office Square, Suite 100 (OEP06-4), Boston, MA 02109. EPA will accept comments on all aspects of the new Draft Permit. A public hearing will also be held; information is provided in the Federal Register Notice of Availability of this Draft Permit and Fact Sheet.

The new Draft Permit completely supersedes the previous Draft Permits covering Massachusetts, and EPA is providing an entirely new comment period under 40 CFR § 124.10. Consequently, all persons who believe any condition of the new Draft Permit is inappropriate must raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position during this public comment period (including the public hearing). All comments must pertain to this new Draft Permit, and the Region will not consider in this proceeding comments that were submitted in response to the previous draft permits.

In reaching a final decision on the Draft Permit, EPA will respond to all significant comments submitted during this comment period and make these responses available to the public at EPA's Boston office and on EPA's web site.

Following the close of the comment period, and after the public hearing, EPA will issue a final permit decision, publish a Notice of Availability of the Final Permit in the Federal Register, and notify each person who has submitted written comments or requested notice of the final permit decision. EPA will also provide as much notice as possible to the facilities to be covered by the General Permit.

E. EPA Contact

Additional information concerning the Draft Permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m. Monday through Friday excluding holidays from:

Newton Tedder
U.S. Environmental Protection Agency
5 Post Office Square, Suite 100 (OEP06-4)
Boston, MA 02109
Telephone: (617) 918-1038
Email: tedder.newton@epa.gov

II. BASIS FOR CONDITIONS OF THE DRAFT NPDES GENERAL PERMIT

A. Statutory Requirements

Section 301(a) of the Act, 33 USC 1311(a), makes it unlawful to discharge pollutants to waters of the United States without a permit. Section 402 of the Act, 33 USC 1342, authorizes EPA to issue NPDES permits allowing discharges that will meet certain specified requirements. Section 402(p) of the Act addresses sources of stormwater that require an NPDES permit as well as the conditions that must be included in permits issued to these discharges. Section 402(p) (3) (B) (ii) and (iii) of the CWA, and implementing regulations in 40 CFR §§ 122.26 and 122.34, require NPDES permits for stormwater discharges from MS4s to effectively prohibit non-stormwater discharges into the sewer system; and to require controls to reduce pollutant discharges to the maximum extent practicable including BMPs, and other provisions as EPA determines to be appropriate for the control of such pollutants. EPA interprets this latter clause to authorize the imposition of water quality based effluent limitations. A complete discussion of the water quality based effluent limitations is in Part II.D of this fact sheet.

B. Authorization Under the Permit

This permit is three (3) separate general permits, referred to collectively as "the Permit" or "Draft Permit" in this document: one for systems owned by cities and towns; one for systems owned by a state, county or the United States; and one for systems owned by state transportation agencies (except MassDOT-Highway Division). Each general permit is applicable to particular entities within Massachusetts. Many of the Draft Permit's provisions contain language and conditions that are applicable across all regulated entities, and therefore are presented just once in Parts 1 through 4 and Appendices A through H. Other conditions are specific to a particular set of eligible entities; these terms and conditions are included in Parts 5 and 6.

The Draft Permit authorizes stormwater discharges from small municipal separate storm sewer systems meeting the definition of "small municipal separate storm sewer system" at 40 CFR § 122.26(b)(16) and described in 40 CFR § 122.32(a)(1) (applicable to small MS4s located in an urbanized area) or designated by EPA as needing a permit pursuant to 40 CFR § 122.32(a) (2) or 40 CFR § 122.26(f).

Most small MS4s that will be authorized by this permit are located entirely within an urbanized area as defined by the Bureau of the Census. On March 26, 2012, the Census Bureau published the final listing of urbanized areas for the 2010 census. An urbanized area encompasses a densely settled territory that consists of core census block groups or blocks that have a population of at least 1,000 people per square mile and surrounding census blocks that have an overall density of at least 500 people per square mile or are included to link outlying densely settled territory with a densely settled urban core[2]. Urbanized areas are not divided along political boundaries. Because of this non-political division, a municipality may be entirely in an urbanized area or partially in an urbanized area. The Phase II regulations require a small MS4 to implement its program in the urbanized area. If a small MS4 is only partially within the urbanized area, the MS4 may decide to implement the SWMP within its entire jurisdiction, or just in the urbanized area. Both approaches are acceptable under EPA's regulations. However, EPA encourages MS4s to implement the Storm Water Management Plan (SWMP) in the entire jurisdiction, especially for areas that discharge to waters that are subject to approved total maximum daily loads (TMDLs).

The regulations at 40 CFR § 122.32(a)(1) state that an MS4 is regulated by the program if the MS4 is located in an urbanized area as determined by the latest Decennial Census by the Bureau of the Census

[2] For a complete definition of Urbanized Area see Federal Register, August 24, 2011. Vol. 76 No. 164 p. 53030. http://www.census.gov/geo/reference/pdfs/fedreg/fedregv76n164.pdf

unless granted a waiver by the permitting authority. The latest Decennial Census was conducted in 2010. MS4s located in an urbanized area as determined by the 2010 Census will be subject to the stormwater requirements for small MS4s unless they receive a waiver in accordance with 40 CFR §122.32(c) or 40 CFR § 123.35(d). The 2010 Census delineated urbanized areas in municipalities that did not contain urbanized areas according to the 2000 Census, namely: Adams, Amherst, Ashburnham, Ashby, North Adams, Pelham, Ware, Wellfleet, and Westhampton. EPA has provided notification to any MS4 affected by the 2010 Census. MS4s located in an urbanized area as defined by the 2000 census remain subject to the stormwater regulation even if there is a change in the reach of "urbanized area" because of a change in census data. This is consistent with the preamble to the Phase II rule that states "...a small MS4 that is automatically designated into the NPDES program for stormwater under an urbanized area calculation for any given Census year will remain regulated regardless of the results of subsequent urbanized area calculations." 64 FR 68752, December 8, 1999.

As stated previously, the Draft Permit applies to small MS4s located in urbanized areas and those MS4s designated by EPA to need a permit. EPA has authority under the CWA to designate stormwater sources other than those that are specifically identified by the stormwater regulations as needing to obtain a permit when necessary to protect water quality or remedy localized water quality impacts, including small MS4s not in an urbanized area. If EPA decides to designate additional MS4s, EPA will provide public notice and an opportunity to comment on the designation. Once designated, such sources would be eligible for coverage under this general permit.

1. Limitations on Permit Coverage

The Draft Permit sets limitations on the discharges that are authorized by the permit. The Draft Permit does not authorize the following:

1. Stormwater discharges that are mixed with sources of non-stormwater unless the non-stormwater discharges are in compliance with a separate individual or other general NPDES permit. The Draft Permit requires illicit (non-stormwater) discharges to be prevented and eliminated except for the categories of non-stormwater discharges listed in 40 CFR §122.34(b)(3) and identified in Part 1.4 of the Draft Permit. These categories need not be addressed unless they are determined by the permittee or EPA to be significant contributors of pollutants to the MS4. Since this Draft Permit addresses stormwater discharges, requiring that sources of non-stormwater are addressed under separate NPDES permits ensures that the various sources of pollutants are addressed appropriately.
2. Stormwater discharges that are subject to other permits. This includes industrial stormwater discharges described at 40 CFR § 122.26(b)(14)(i)-(ix) and (xi); stormwater discharges related to construction described in either 40 CFR § 122.26(b)(14)(x) or 40 CFR § 122.26(b)(15); or discharges subject to an individual permit or alternative general permit for stormwater.
3. Stormwater discharges, or discharge-related activities, that are likely to adversely affect any species that are listed as threatened or endangered under the Endangered Species Act (ESA) or result in the adverse modification or destruction of habitat that is designated as critical under the ESA. The MS4 must follow the procedures detailed in Appendix C of the Draft Permit to make a determination regarding permit eligibility. A more detailed discussion of the Endangered Species Act and EPA's obligation under that Act are contained in Section I.B of this fact sheet.
4. Stormwater discharges whose direct or indirect impacts do not prevent or minimize any adverse effects on any Essential Fish Habitat (EFH). This topic is addressed in in Section I.B of this fact sheet.

5. Stormwater discharges or implementation of a stormwater management program that would adversely affect properties listed or eligible to be listed on the National Register of Historic Places. The MS4 must follow the procedures in Appendix D of the Draft Permit to make a determination regarding eligibility. This topic is addressed in Section I.B of this fact sheet.
6. Stormwater discharges to territorial seas, the contiguous zone and the oceans. (Territorial seas are waters located between the mean low water line and a line approximately twelve nautical miles from the mean low water line. The contiguous zone is from the edge of the territorial sea up to 24 nautical miles from the mean low water line.)
7. Discharges that are prohibited under 40 CFR § 122.4.
8. Stormwater discharges to the subsurface subject to Underground Injection Control (UIC) regulations. Although the permit includes provisions related to stormwater infiltration and groundwater recharge, structural controls that dispose of stormwater into the ground may be subject to UIC regulation requirements or other state regulations. Authorization for such discharges must be obtained from the relevant authority depending on the location of the discharge and/or conform to state regulations. NPDES permits are applicable for point source discharges to waters of the U.S.; discharges to groundwater are not addressed in the NPDES program and as such are not addressed by this permit.
9. Any Non-traditional MS4 facility that is a "new discharger" and discharges to a waterbody listed in category 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) due to nutrients (nitrogen or phosphorus), metals, solids, bacteria/pathogens, chloride or oil and grease (hydrocarbons), or discharges to a waterbody with an approved TMDL for any of those pollutants, is not eligible for coverage under this permit and shall apply for an individual permit.

2. Allowable Non-Stormwater Discharges

The Draft Permit lists sources of non-stormwater discharges contained in 40 CFR § 122.34(b)(3)(iii). These are sources of allowable non-stormwater into the MS4. However, if the permittee determines that these sources (either categorically or individually) are significant contributors of pollutants to the MS4, the permittee must control or prohibit these sources of non-stormwater as part of its illicit discharge detection and elimination (IDDE) program. The Draft Permit does not require any action by the permittee regarding these discharges if the permittee determines that these sources are not significant contributors of pollutants to the MS4. Other than language contained in the CWA regarding non-stormwater sources, the legislative history of the stormwater regulations is essentially silent on the issue of non-stormwater discharges, which makes determination of Congress' expectations regarding non-stormwater discharges subject to agency interpretation. EPA expects MS4s to examine the sources of non-stormwater discharges as categories and examine their potential to contribute pollutants to the MS4. For example, potable water may not contribute pollutants that affect the MS4 discharges because the source is associated with the water supply. However, foundation drains and crawl spaces may be within residential basements and the type of pollutants associated with the non-stormwater discharge may be unknown. In this situation, the MS4 may want to establish a registration program for such discharges and include education about proper storage of household chemicals, or the MS4 may choose to prohibit the discharge due to the unknown nature of the pollutants. The permittee must document its determinations on the categories of non-stormwater in its SWMP and must prohibit any sources identified as a significant contributor of pollutants. In accordance with 40 CFR § 122.34(b)(3)(iii), discharges or flows from

firefighting activities are excluded from the effective prohibition against non-stormwater and need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

3. Permit Compliance

Part 1.5 of the Draft Permit states that any failure to comply with the requirements of this permit constitutes a violation of the Permit and the CWA. For provisions specifying a time period to remedy non-compliance, the initial failure constitutes a violation of the Permit and the CWA, and subsequent failure to remedy such deficiencies within the specified time periods constitutes an independent and additional violation of the CWA.

EPA notes that the MS4-2003 permit remains in effect (by administrative continuance) during the pendency of this permit renewal process, and that EPA retains its authority to take enforcement action for violations of the MS4-2003 permit during and after the pendency of the present permit proceeding.

4. Continuation of the Permit

Part 1.6 of the Draft Permit describes the procedure that applies if EPA does not reissue the permit by its expiration date. If this permit is not reissued or replaced prior to its expiration date, existing discharges are authorized under an administrative continuance, in accordance with the Administrative Procedure Act and 40 CFR § 122.6, and the conditions of the Permit remain in force and in effect for discharges authorized prior to permit expiration. If authorization is provided to a permittee prior to the expiration of this permit, the permittee is automatically authorized by this permit until the earliest of: (1) the authorization under a reissuance or replacement of this permit, following timely and appropriate submittal of a complete NOI; (2) issuance or denial of an individual permit for the permittee's discharge; or (3) formal permit decision by EPA not to reissue this general permit, at which time the permittee must seek authorization under an alternative general permit or an individual permit.

5. Obtaining Authorization to Discharge

The regulations at 40 CFR § 122.33 require small MS4s who apply for a general permit to submit information on BMPs and measurable goals designed to meet the minimum control measures required by 40 CFR § 122.34(d). To obtain authorization to discharge, the operator of a small MS4 must submit a complete and accurate NOI containing the information in Appendix E of the Draft Permit. The NOI must be signed in accordance with the requirements of Appendix B-Sub-Paragraph 11 of the Draft Permit. The NOI must be submitted within 90 days of the effective date of the final permit. The effective date of the final permit will be specified in the Federal Register publication of the notice of availability of the final permit. Any small MS4 designated by EPA as needing a permit must submit an NOI for a permit within 180 days from the date of notification, unless otherwise specified. A small MS4 must meet the eligibility requirements of the Permit found in Part 1.2 and Part 1.9 prior to submission of the NOI. A small MS4 will be authorized to discharge under this permit upon the issuance of written authorization by EPA following a public notice of the NOI.

EPA has revised the suggested format for the submission of the NOI. Appendix E contains the new format, which is a fillable .pdf file in which the operator of the MS4 can enter data into fields and

use drop-down menus to answer questions. The document can easily be submitted to EPA electronically and concurrently with the hard copy submission that is required by 40 CFR § 3.000. Permittees that choose to submit the electronic .pdf form to EPA electronically will be able to download a partially filled out Storm Water Management Plan and Year 1 Annual Report from the EPA website that contains information provided in the electronic NOI. Although electronic submission is available, EPA has not mandated its use. Also, electronic submission does not obviate the need to submit the hard copy.

The MS4 operators should complete the information required in the NOI to the best of their knowledge. The NOI must contain the details of an MS4's planned approach to meeting the terms of the Permit. The NOI should detail milestones as well as interim steps. The BMPs identified in the NOI are not required to be in place at the time the NOI is submitted. The NOI does not require the development of technical or engineering reports for its submission. The Draft Permit does not incorporate the contents of the NOI into the permit as conditions. The permit conditions are those that are contained in the permit and those are the requirements the permittee is expected to meet. The NOI presents the BMPs that the MS4 intends to implement to meet the permit terms. Since the BMPs presented in the NOI are not incorporated into the permit, this means that a permittee is able to adjust the initially planned BMPs based on progress and circumstances encountered during program implementation. Part 4.1 of the Draft Permit describes the permittee's responsibility for evaluating the effectiveness of the selected BMPs.

All NOIs must be submitted to EPA-Region 1 **90 days from the effective date of the Final Permit.** During the previous public comment period, EPA received many comments requesting that the time frame for submittal of the NOI be longer than 90 days. EPA has not changed the time frame for the submittal of the NOI. EPA plans to set the effective date of the Final Permit to be a minimum of six months from the date of issuance of the Final Permit. The delayed effective date provides additional time for development and submission of the NOI.

The Draft Permit provides continued authorization for permittees authorized by the MS4-2003 permit whose authorization was effective upon the expiration of that permit (May 1, 2008) and who submit a complete and accurate NOI within 90 days of the effective date of the Final Permit. Permittees will remain authorized under the MS4-2003 permit until authorization under the newly issued permit is either granted or denied.

EPA will be responsible for placing the NOIs on public notice. NOIs will be available for public comment for a minimum of 30 days. Once EPA determines that an NOI is complete, the NOI will be posted on EPA's website: http://www.epa.gov/region1/npdes/stormwater/ma.html. Any comments on an NOI shall be submitted to EPA. EPA will work with the municipality to address public comments as appropriate. Following the close of the public comment period, EPA will authorize the discharge, request additional information from the MS4 operator, or deny authorization. An MS4 is not authorized to discharge until issuance of written authorization from EPA.

6. Individual and Alternative Permits

Any owner or operator of a small MS4 authorized by a general permit may request to be excluded from authorization under a general permit by applying for an individual permit. 40 CFR § 122.33(b)(2)(i) or (ii). This request shall be made by submitting a NPDES permit application together with reasons supporting the request. The Director may require any permittee authorized by a general permit to apply for and obtain an individual permit. Any interested person may petition

the Director to take this action. 40 CFR § 122.28(b)(3).

However, individual permits will not be issued for sources authorized by the general permit unless it can be clearly demonstrated that inclusion under the general permit is inappropriate or an individual permit is more applicable to the applicants system.

The Director may consider requiring an individual permit when:

a. The discharger is not in compliance with the terms and conditions of the general permit;
b. A change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the point source;
c. Effluent limitations guidelines are subsequently promulgated for the point sources covered by the general NPDES permit;
d. A Water Quality Management Plan or Total Maximum Daily Load (TMDL) containing requirements applicable to such point sources is approved;
e. Circumstances have changed since the time of the request to be covered so that the discharger is no longer appropriately controlled under the general permit, or either a temporary or permanent reduction or elimination of the authorized discharge is necessary; and
f. The discharge(s) is a significant contributor of pollutant or in violation of state water quality standards for the receiving water.

In accordance with 40 CFR § 122.28(b)(3)(iv), the applicability of the general permit is automatically terminated on the effective date of the individual permit.

Additionally, any interested person may petition the Director to require a NPDES permit for a discharge composed entirely of stormwater which contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States pursuant to 40 CFR § 122.26(f).

C. Stormwater Management Program (SWMP)

The Stormwater Management Program is a written document required by the permit. The SWMP is the mechanism used to document the practices the permittee is implementing to meet the terms and conditions of the Permit. The SWMP is expected to accurately reflect the permittee's activities. The document should be updated and/or modified during the permit term as the permittee's activities are modified or changed during the permit term or to incorporate additional BMPs to comply with permit conditions during the permit term.

The Draft Permit requires that the SWMP be a written document and signed in accordance with Appendix B-sub-paragraph 11. The SWMP must be available at the office or facility of the person identified on the NOI as the contact person for the SWMP. The SWMP must be immediately available to EPA, FWS, NMFS, and MassDEP. The permittee must also make the SWMP available to any member of the public who makes a request. EPA requires the permittee to post the SWMP online if a website is available for posting of documents under the control of the permittee, or make it available at a public location such as the library or town/city hall if the permittee does not have a website on which to make the SWMP available.

The SWMP must contain the following:

- The name and title of people responsible for implementation of the SWMP. If a position is currently unfilled, list the title of the position and modify with the name once the position is filled.
- Listing of all receiving waters, their classification under the applicable state water quality standards, any impairments, associated pollutants of concern, applicable TMDLs and WLAs, and the number of outfalls that discharge to each water. In addition to the receiving water, the permittee is encouraged to document in the SWMP all public drinking water sources, including both surface water and groundwater that may be impacted by MS4 discharges.
- Listing of all interconnected MS4s and other separate storm sewer systems receiving a discharge from the MS4, the receiving waterbody their classification under the applicable state water quality standards, any impairments, associated pollutants of concern, applicable TMDLs and WLAs, and the number of outfalls that discharge to each water. In this situation, the interconnected MS4 acts as the conveyance for the stormwater from the permitted MS4. Since the permitted MS4 is required to identify all water bodies that receive a stormwater discharge either directly or indirectly from its system, this information is necessary. The permitted MS4 should work with any interconnected MS4 to obtain this information.
- Documentation of permit eligibility regarding ESA. Documentation must include information and any documents supporting the criteria used by the permittee to determine eligibility. The SWMP must also contain documentation of any correspondence between the permittee and USFWS if informal consultation was re-initiated during the permit term.
- Documentation of permit eligibility regarding NHPA. Documentation must include information and any documents supporting the criteria used by the permittee to determine eligibility.
- The map of the separate storm sewer system required by Part 2.3.4.6 of the Draft Permit. The map may be a hard copy map or one that is available on a geographic information system. If available on a GIS system, the web address shall be included in the SWMP. The permittee should also update the map as new information becomes available.
- For each permit condition required by Part 2.2 and Part 2.3 of the Draft Permit, the permittee must identify a person responsible for ensuring implementation of the condition. The permittee must identify specific BMPs to address the permit condition and the measurable goals associated with the BMP. Other provisions related to the water quality requirements including a description of practices designed to achieve compliance with TMDL provisions (Part 2.2.1 and Appendix F), and any additional BMPs required by Part 2.2.2 and Appendix H.
- For each control measure listed in Part 2.3 of the Draft Permit, the permittee must identify a person responsible for ensuring its implementation. The permittee must identify specific actions or BMPs to address each control measure. The permittee must also identify measurable goals associated with the control measure.
- Description of measures to avoid or minimize impacts to public drinking surface water supplies. The permittee is encouraged to include provisions to notify public water suppliers in the event of an emergency. (For more information or assistance, contact: Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program, One Winter Street, Boston, MA 02108 – phone 617-292-5770.)
- Documentation of compliance with Part 3.0 – state requirements.
- An annual evaluation of the SWMP that contains the information required by Part 4.1 of the Draft Permit. The annual evaluation must be updated annually and maintained as part of the SWMP.

EPA believes that a written program provides a central, accessible source for all information relating to the SWMP. The SWMP required by this Draft Permit builds on the requirements of the MS4-2003 permit. While updating the SWMP required by this Permit, the permittee must continue to implement the SWMP that was required by the MS4-2003 permit. This permit does not provide additional time for completing the

requirements of the MS4-2003 permit. Permittees covered by the MS4-2003 permit must update their SWMP within 1 year of the effective date of the Permit.

The SWMP must document the actions the permittee has taken or will take to demonstrate compliance with the control measures and other conditions of the Permit. EPA has determined that implementation of the conditions required by Part 2.3 of this Draft Permit will meet the MEP standard of the CWA. EPA has determined that implementation of the conditions required by Parts 2.1 and 2.2 of the Draft Permit will be protective of water quality.

1. Funding

EPA recognizes that compliance with this permit will require substantial investment by permittees to reduce the discharge of pollutants from their systems and address water quality impacts of their discharges. This is in keeping with the national goal of the Clean Water Act "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). The small MS4 permit program, from its inception, was intended to be iterative in nature, with increasingly stringent requirements as permits are reissued. EPA received many comments on the cost burden associated with the previous draft permits and has made changes to the Illicit Discharge Detection and Elimination requirements and the Good Housekeeping requirements, and increased compliance schedules where warranted, in order to address these concerns. We recognize that additional funding sources or mechanisms will be necessary to comply with the provisions in this Draft Permit, and we note that many communities within Massachusetts have made the necessary investments that the Clean Water Act requires by funding a stormwater program through a utility or other means.

The Draft Permit encourages, but does not require, the permittee to maintain adequate funding to implement the SWMP. EPA believes that adequate funding ensures that monies will be available to the permittee for implementation of the Permit conditions. Adequate funding is the availability of a consistent and reliable revenue source.

EPA does not require or recommend a specific funding mechanism or funding alternative. These decisions rest with the operator of the MS4. There are several funding options available to permittees; these include service fees, formation of a stormwater utility, use of the general fund of the municipality, grants, and loans. Each mechanism has its own advantages or disadvantages and a municipality should choose the option that is right for it.

Fees are usually based on the size of the property and the amount of impervious area associated with that property. Typically, fees are one rate for residential homes and are varied for commercial and industrial facilities, usually based on the impervious area of a property. A fee is a fixed charge. For more information regarding the advantages, disadvantages, and legal aspects of various funding mechanisms, municipalities should seek advice from their attorneys and/or appropriate Massachusetts state agencies.

A stormwater utility is set up in a manner that is similar to a water or sewer utility. A stormwater utility is designed to raise funds specifically for stormwater management. Users within a utility district pay a fee. The fee supports the stormwater system. The fee structure is usually a flat monthly rate for residential users and a rate based on impervious cover for commercial and industrial users. Often a utility will allow for credits on the assessed charge based on a property decreasing its impervious cover. A benefit of an appropriately developed utility is that it creates a funding source that is adequate, stable, and equitable. Development and implementation of a utility

can take up to 24 months. Development of a utility involves a thorough examination of legal issues, community outreach and involvement, decisions on the management of the utility, decisions on how properties will be assessed, and setting appropriate rates. EPA recognizes that development of an effective utility does take time. EPA also recognizes that a stormwater utility may not be the most effective funding solution for all municipalities. Stormwater utilities exist in many parts of the country. Stormwater utilities are beginning to appear in the Northeast, including seven in Massachusetts alone. There are several resources available regarding the formation of a stormwater utility, including: MAPC (http://www.mapc.org/stormwater-utility-funding-starter-kit), PVPC (http://www.pvpc.org/web-content/docs/landuse/storm_util.pdf) and EPA (http://www.epa.gov/region1/npdes/stormwater/assets/pdfs/FundingStormwater.pdf)

Another funding mechanism is the general fund of the municipality. The revenue in the general fund usually comes from property taxes. This method of funding depends on the varying monetary demands within a municipality and may result in funding levels that are inconsistent from year to year and that may not keep pace with increases in the cost of SWMP implementation. Many comments on the previous Draft Permits raised Proposition 2 ½ as a limiting factor in use of the general fund as a means of funding the stormwater program. Proposition 2 ½ (M.G.L. Chapter 29 § 21c) establishes limitations on the total taxes which can be assessed by a municipality. That law states that the total taxes assessed "…shall not exceed two and one-half percent of the full and fair cash valuation in said city or town in any fiscal year." The comments stated that due to the existence of this regulation, municipalities cannot increase taxes by more than 2 ½ percent as a means to pay for the cost of stormwater management without an approval vote by the public. EPA recognizes that approval by voters to raise taxes is difficult to do, but EPA believes it is inappropriate to assume that an override is impossible in all cases. This method of funding should not be eliminated from consideration just because of the existence of Proposition 2 ½. The law limits the amount of an increase, but it also has exceptions which include "…solely for payment, in whole or in part, of water or sewer debt service charges, including service charges of an independent commission, authority or district and as part of any wholesale water and sewer charges…." Use of this exception could be an option for some communities. Bill S.2021, which was recently passed by the Massachusetts Senate, provides financial assistance in the form of low-interest loans and technical assistance to municipalities to deal with aging drinking water and stormwater infrastructure. Bill S.2021 also provides additional funds and technical assistance for the use of Green Infrastructure within the Commonwealth and the ability for municipalities to levy a water infrastructure surcharge up to 3 percent. This Bill is currently with the Massachusetts House Committee on Ways and Means for vote (See https://malegislature.gov/Bills/188/Senate/S2021 for more information). Due to the variability associated with tax revenues as well as the limitations on the magnitude of increases, sole reliance on the general fund may not represent an adequate long-term funding source.

Finally, stormwater projects may be eligible for low-interest loans. Loans are typically made through the State Revolving Fund. Many comments on the previous Draft Permits suggested that EPA establish a grant program similar to the grant programs of the 1970s and 1980s. During that time, the agency provided more than $60 billion grant dollars for the construction of publicly owned wastewater treatment facilities. In the 1987 amendments to the Clean Water Act, Congress set 1990 as the last year grant funds would be appropriated for the Construction Grants Program. The phasing out of the Construction Grants Program shifted the method of municipal financial assistance from grants to loans. The Clean Water Act State Revolving Fund (CWSRF) has replaced the Construction Grants Program. Through the CWSRF program, each state and Puerto Rico maintain revolving loan funds to provide independent and permanent sources of low cost financing for a wide range of water quality projects. The funds for the CWSRF are provided through federal

grants to the states and a state matching fund that is equal to 20 percent of the federal grant. The CWSRF monies are loaned to communities and loan payments are recycled back into the program to fund additional water quality projects. The revolving nature of the program allows for an ongoing funding source. The CWSRF may be a source of funding for some stormwater projects.

EPA does not have authority to appropriate monies for grants or loan programs. Congress has that authority. Since Congress has not provided in its appropriations to the Agency a grant program similar to the one used to fund the construction of wastewater treatment facilities for stormwater infrastructure projects, such a program does not exist. Furthermore, unless established by Congress, EPA does not have independent authority to appropriate funds for such a grant program. At this time, federal funding is limited to the mechanisms currently available.

Additional information on funding can be found at: National Association of Flood and Stormwater Management Agencies, *Guidance for Municipal Stormwater Funding* (http://www.nafsma.org/pdf/Guidance%20Manual%20Version%202X.pdf) and Indiana University-Purdue University Indianapolis, *An Internet Guide to Financing Stormwater Management* (http://stormwaterfinance.urbancenter.iupui.edu).

2. ***Qualifying Local Program (QLP)***

The Phase II stormwater program is designed to be flexible and build on existing state and local programs. Specifically, 40 CFR § 122.34(c) allows EPA to reference a state program that the municipality is already subject to as meeting the requirements of one or more of the control measures described in the Draft Permit. When recognized by EPA, compliance with the state requirement would constitute compliance with the requirements of the control measures.

MassDEP has incorporated the Massachusetts Stormwater Standards (the Standards) into the Wetlands Protection Act Regulations (310 CMR 10.05(6)(k)) and the Water Quality Certification Regulations (314 CMR 9.06(6)(a)). There are 10 standards that apply to stormwater discharges within the Commonwealth. The program is typically implemented by the local conservation commissions. EPA has not specially identified this state program as a QLP due to differences in the jurisdictional reach of applicable federal and state regulations.

3. ***Requirements for New Permittees***

The Draft Permit provides different deadlines for MS4s that are for the first time subject to the small MS4 permit program because of the updated 2010 census data. The different deadlines recognize that the MS4s authorized by the MS4-2003 permit have been implementing stormwater controls for over ten years while new permittees need additional time to understand and implement new requirements. New permittees have until year two of the Permit to complete the outfall inventory and an additional two years from that to complete the map required by the permit as part of the illicit discharge detection program. All other timeframes in the illicit detection and elimination program (Part 2.3.4.) and all timeframes relating to discharges to impaired waters (Part 2.2.2) have been extended by 2 years. Pursuant to 40 CFR § 122.34(a), EPA may provide up to the full permit term for MS4s to develop and implement the ordinances or other regulatory mechanisms required by Parts 2.3.4 (Illicit Discharges); 2.3.5 (Construction Runoff Management) and 2.3.6 (Stormwater Management in New Development). However, due to the availability of existing examples and templates of ordinances and other regulatory mechanisms, EPA is requiring development of local ordinances by the end of year three (3) of the Draft Permit term. New

permittees must meet all other deadlines as specified in the Draft Permit.

EPA is specifically looking for comments on the proposed deadlines for new permittees.

D. Non- Numeric Effluent Limitations

When EPA has not promulgated effluent limitation guidelines for a category of discharges, or if an operator is discharging a pollutant not covered by an effluent limitation guideline, permit limitations may be based on the best professional judgment (BPJ) of the agency or permit writer. For this permit, effluent limits are based on BPJ. The BPJ limits in this permit are in the form of non-numeric control measures, commonly referred to as best management practices (BMPs). Non-numeric limits are employed under limited circumstances, as described in 40 CFR § 122.44(k). EPA has interpreted the CWA to allow BMPs to take the place of numeric effluent limitations under certain circumstances. 40 CFR § 122.44(k), provides that permits may include BMPs to control or abate the discharge of pollutants when: "(1)[a]uthorized under section 304(e) of the CWA for the control of toxic pollutants and hazardous substances from ancillary industrial activities; (2) [a]uthorized under section 402(p) of the CWA for the control of stormwater discharges; (3) [n]umeric effluent limitations are infeasible; or (4) [t]he practices are reasonable to achieve effluent limitations and standards or to carry out the purpose of the CWA." The permit regulates stormwater discharges with BMPs. Due to the variability associated with stormwater, EPA believes the use of BMPs is currently the most appropriate method to regulate discharges of stormwater from municipal systems in accordance with the above referenced regulation.

1. Water Quality Based Effluent Limitations

a. Water Quality Standards

If an MS4 discharges into waters that are meeting water quality standards, and there is no specific evidence to suggest that a permittee's MS4 discharges would cause or contribute to exceedances of water quality standards, then the permittee is subject to the permit's MEP-based minimum control measures to protect water quality. "Absent evidence to the contrary, EPA presumes that a small MS4 program that implements the six minimum measures… does not require more stringent limitations to meet water quality standards." 64 FR 68752, December 8, 1999. However, as indicated above, in a significant number of circumstances, MEP-level controls alone will not suffice to eliminate stormwater-based exceedances of water quality standards. Consequently, EPA has determined that it is necessary and "appropriate" to include water quality based effluent limitations (WQBELs) in Parts 2.1 and 2.2 of this Draft
Permit. The purpose of these parts is to establish the broad inclusion of water quality-based effluent limitations for those discharges requiring additional controls in order to achieve water quality standards. The water quality-based effluent limitations supplement the permit's MEP-based limitations (see Part 2.3) that are discussed later section II.D.4 of this Fact Sheet.
The MS4-2003 permit also contained several conditions similar to the WQBELs contained in this Draft Permit. For example, discharges that would cause or contribute to an instream exceedance of water quality standards were not authorized (see Part I.B.2.k). Similarly, discharges into any water for which a Total Maximum Daily Load (TMDL)had been established were not authorized unless they were consistent with the TMDL (see Part I.B.2.l). Additional TMDL-related requirements are found in Part I.D. In addition,

permittees that discharge to water quality impaired waters are required to include in their SWMP a section describing how the program will control the discharge of pollutants of concern and ensure that the discharges do not cause an instream exceedance of water quality standards (see Part I.C.2). Permit conditions based on MassDEP's § 401 water quality certification are found in Part IX of the 2003 permit and include a requirement that discharges comply with the Massachusetts Surface Water Quality Standards. Furthermore, the permit conditions based on MassDEP's § 401 water quality certification provide that if any violation of the Standards or the conditions of the certification occur, DEP will direct the permittee to correct the violation(s). EPA has retained similar requirements in this Draft Permit, both in order to be consistent with the antibacksliding provisions in CWA § 402(o) and 40 CFR § 122.44(l), and because of EPA's determination that it is appropriate to require limits more stringent that MEP in the circumstances discussed below.

Since the issuance of the MS4-2003 permit, permittees have implemented SWMPs to comply with the conditions of that permit. This Draft Permit requires the permittees to implement an updated SWMP to comply with several additional and strengthened permit conditions, which should result in further water quality improvements.

The Draft Permit contains additional requirements where additional stormwater control is needed for discharges to certain waters (and in some cases, their tributaries) subject to EPA approved TMDLs. This is discussed further in Section II.D.2 of this Fact Sheet. In addition, the Draft Permit contains additional requirements where additional stormwater control is needed to control the discharge of pollutants commonly found in stormwater, namely: bacteria/pathogens, nutrients, chloride, sediment, heavy metals, and oil and grease (hydrocarbons) where the discharge is to a waterbody that is experiencing an excursion above water quality standards due to one of the aforementioned pollutants. This is discussed further in section II.D.3 of this Fact Sheet. The Draft Permit provides that discharges to waters subject to an approved TMDL (Part 2.2.1 of the Draft Permit) or discharges to waterbodies that are impaired due to bacteria/pathogens, nutrients, chloride, sediment, heavy metals, and/or oil and grease (hydrocarbons) (Part 2.2.2 of the Draft Permit) must adhere to the schedules and BMP implementation requirements applicable to that discharge as described in either Appendix F or H of the permit. Compliance schedules and BMP implementation requirements for discharges subject to an approved TMDL are found in Appendix F of the Draft Permit. Compliance schedules and BMP implementation requirements for discharges subject to Part 2.2.2 of the Draft Permit are found in Appendix H of the Draft Permit. All schedules set forth in Appendix F and Appendix H of the Draft Permit comply with applicable schedule requirements found at 40 CFR §122.47. A permittee's compliance with all applicable requirements and applicable BMP implementation schedules in Appendix F and/or H will constitute compliance with the requirement that discharges shall not cause or contribute to an exceedance of water quality standards (Part 2.1.1. of the Permit). All other discharges that cause or contribute to an exceedance of water quality standards due to the presence of pollutants not mentioned above, or are not subject to an EPA approved TMDL, must be rectified, removed or eliminated within 60 days of becoming aware of the exceedance.

b. New Dischargers

The NPDES regulations at 40 CFR § 122.4 impose strict requirements on "new dischargers" if they would cause or contribute to a violation of water quality standards.

The definition of "new discharger" and terms within that definition are found in 40 CFR § 122.2. "New Discharger" means "any building, structure, facility, or installation (a) from which there is or may be a 'discharge of pollutant'; (b) that did not commence the 'discharge of pollutants' at a particular 'site' prior to August 13, 1979; (c) which is not a 'new source'; and (d) which has never received a final effective NPDES permit for discharges at that 'site.'" The term "site" is defined to mean "the land or water area where any 'facility or activity' is physically located or conducted including adjacent land used in connection with the facility or activity." "Facility or activity" is defined to mean "any NPDES 'point source' or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program." Finally, the "discharge of pollutants" means "(a) any addition of any 'pollutant'… to 'waters of the United States' from any 'point source'…."

EPA has considered the applicability of the term "new discharger" in the context of MS4 permitting. When a traditional MS4 discharges stormwater from newly created impervious surfaces within its jurisdiction, EPA views it as appropriate to treat such discharge as an increased discharge by the MS4 rather than as a new discharger. This reasoning is based on a broad reading of the terms "site" and "activity" to apply to an MS4's entire system, including portions of the system constructed in the future. Such a reading is consistent with how traditional MS4s are currently permitted (i.e., authorization is not limited to discharges or outfalls in existence at the time of the filling of an NOI).

The same logic applies when an MS4 creates a new outfall within its jurisdiction. In this situation, that additional outfall is treated in the permit as an expansion of the existing MS4 system and does not constitute a "new discharger."

Similar to a traditional MS4, a non-traditional MS4 might add new stormwater discharges to its existing system through the expansion of its facility. For example, an existing highway may be expanded from two lanes to four lanes, increasing impervious cover and generating new stormwater that would be discharged through its existing system (or a connected expansion of that existing system). There is no reason to distinguish between traditional and non-traditional MS4s in this circumstance. In both cases, such expansions of the "facility" at the "site" would result in an increased discharge, not a new discharger.

However, in contrast with traditional MS4s, non-traditional MS4s may also engage in the development of entirely new separate storm sewer systems that are not connected to their existing systems. For example, a state may construct a new college campus, the federal government may construct a new military base, or a state highway department may construct a new highway alignment, all with associated separate storm sewer systems. Such a system should be considered a "new discharger" for purposes of 40 CFR § 122.4(i) where the new system is geographically separate from the owner's existing system(s). The basis for this position is that such a new separate storm sewer system is a new "facility" at a new "site" from which it has not previously discharged. In determining whether a discharge is geographically separate and, thus, subject to the requirements for a "new discharger," EPA thinks it is appropriate to consider a new system to be a new discharger where it is not physically located on the same or contiguous land as an existing system. Using the examples above, a new separate storm sewer system associated with a state college or highway expansion onto contiguous property would not be considered a new discharger, while a new system associated with an expansion on land that is not contiguous to the owner's previously permitted facility would be considered a "new discharger." This

approach relies on the common understanding of the word "adjacent" as used in the definition of "site" to share a common border.

"New dischargers" may be subject to more stringent water quality requirements than those contained in this Draft Permit when the discharge is to an impaired waterbody with or without an approved TMDL, and EPA believes these conditions would need to be developed on a case-by-case basis. EPA also believes that the circumstance of a non-traditional MS4 creating a "new discharger" as defined above would be infrequent. Therefore, EPA has decided not to include new dischargers under this general permit. The Draft Permit states that a non-traditional MS4 that is a "new discharger" and discharges stormwater to impaired waters with or without an approved TMDL is not eligible for authorization under this permit and must seek coverage under an individual permit consistent with 40 CFR § 122.33(b)(2)(i) or (ii).

c. Antidegradation

The Draft Permit includes additional requirements for increased discharges from existing MS4s to satisfy state antidegradation requirements. Increased discharges from existing MS4s include:

- Any proposed new activity that would result in new discharges of pollutants; and any proposed increase in loadings to a waterbody when the proposal is associated with existing activities.

A permittee is required to obtain authorization from MassDEP prior to commencement of increased discharges from existing MS4s. Permittees must provide MassDEP with a description of the discharge and documentation demonstrating that the discharge will satisfy the anti-degradation provisions of the 314 CMR § 4.04. The permittee must take into account in its anti-degradation analysis that Massachusetts evaluates whether a water is a "high quality" water on a pollutant-by pollutant basis. Thus, for anti-degradation purposes, a water may be high quality for some pollutants and not high quality for others. Documentation MassDEP's antidegradation review and increased discharge authorization shall be included as part of the SWMP. In the event that MassDEP produces guidance related to obtaining authorization for increased stormwater discharges the permittee shall adhere to that guidance for compliance with 314 CMR § 4.04.

Increased discharges to outstanding resource waters or special resource waters are not authorized under this permit and the permittee must seek authorization under an individual permit after satisfying the Massachusetts anti-degradation requirements. In such an instance, a permittee is advised to review the Massachusetts anti-degradation provisions at 314 CMR § 4.04 and any related state policy.

2. Discharges to Waterbodies with an Approved TMDL

EPA's regulations require that TMDLs be developed for water bodies listed pursuant to CWA § 303(d) as not meeting applicable standards (see 40 CFR § 130.7 for the regulations associated with TMDLs). A TMDL specifies the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. The TMDL allocates pollutant loadings to the impaired waterbody from all point and non-point pollutant sources. Regulations at 40 CFR § 130.2 define the TMDL as "the sum of the individual wasteload allocations (WLA) for point sources and load

allocations (LAs) for non-point sources." Mathematically, a TMDL is expressed as:

$$TMDL = \sum WLA + \sum LA + MOS$$

The MOS (margin of safety) takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality in determining an acceptable load of pollutants to a water. In addition to the MOS, WLAs and LAs make up portions of a receiving water's loading capacity. The TMDL forms the basis for an implementation plan to meet the loading capacity of the waterbody. Implementation of the plan should result in the achievement of water quality standards.

The TMDL may establish a specific waste load allocation (WLA) for a specific source, or, in the case of stormwater, may establish an aggregate WLA that applies to numerous sources. The Draft Permit contains specific additional measures which an MS4 must implement to be consistent with the assumptions and requirements of specific approved TMDLs. Information on approved TMDLs can be found at: http://www.epa.gov/region1/eco/tmdl/index.html
Information on the 303(d) lists can be found at:
http://www.epa.gov/region1/eco/tmdl/impairedh2o.html
Information on Massachusetts TMDLs can be found at:
http://www.mass.gov/dep/water/resources/tmdls.htm

For MS4 discharges into impaired waters (or in some cases their tributaries) for which there is an EPA approved TMDL as of the effective date of the Permit, the Permit includes effluent limits that are consistent with the assumptions and requirements of the TMDL for the MS4 discharges. The Permit separates the TMDLs into 2 sections -- those completed by MassDEP, referred to as "in-State TMDLs," and those completed by neighboring states but which identify Massachusetts MS4s as contributors to the impairment, referred to as "out of State TMDLs". As of the date of issuance of this Draft Permit there are four general categories for in-State TMDLs that are applicable to MS4 discharges. They are: (1) approved bacteria or pathogen TMDLs (fecal coliform, E. coli, and enterococcus bacteria) for certain waterbody segments in the Boston Harbor Watershed, Buzzards Bay Watershed, Cape Cod Watershed, Charles River Watershed, Narragansett Bay Watershed, North Coastal Watershed, South Coastal Watershed, Taunton River Watershed, Shawsheen River Basin, Blackstone River Watershed, Concord River Watershed, Ipswich River Watershed, and the Merrimack River Watershed; (2) approved TMDLs for nutrients (phosphorus) for the Lower Charles River Basin, Upper Charles River Basin and Assabet River; (3) approved lake and pond phosphorus TMDLs for lakes in the Northern Blackstone River Watershed, Chicopee Basin, Connecticut Basin, French Basin, Millers Basin as well as Bare Hill Pond, Flint Pond, Indian Lake, Lake Boon, Leesville Pond, Salisbury Pond, White Island Pond, Quaboag Pond and Quacumquasit Pond; (4) approved nitrogen TMDLs for certain waterbodies in Cape Cod Watershed and Buzzards Bay Watershed. Out-of-state TMDLs are also grouped into 4 general categories that are applicable to Massachusetts MS4 discharges. They are (1) the approved nitrogen TMDL for Long Island Sound applicable to Massachusetts MS4s in the Connecticut River Watershed, Housatonic River Watershed and Thames River Watershed; (2) approved phosphorus TMDLs for the Kickemuit Reservoir, Upper Kikemuit River, Kickemuit River, Ten Mile River, Central Pond, Turner Reservoir, Lower Ten Mile River, and Omega Pond; (3) approved bacteria TMDLs for the Kickemuit Reservoir, Upper Kikemuit River and Kickemuit River, Ten Mile River, Lower Ten Mile River and Omega Pond; (4) approved metals TMDLs for the Upper Ten Mile River, Lower Ten Mile River, Central Pond, Turner Reservoir and Omega Pond. Each TMDL report contains an individual waterbody description and problem assessment, identifies the receiving water's capacity for the pollutant at issue in order to meet water quality standards, and sets wasteload and load allocations and a margin of safety. TMDLs are typically supplemented with implementation plans which, while not a formal component of the TMDL, do serve as a road map to implementation.

They often contain recommended BMPs and actions to reduce the specific pollutant such that the discharges are consistent with established WLAs and LAs. EPA did consider the implementation plans in development of the conditions included in the Draft Permit. Requirements consistent with the pertinent TMDLs are included in the permit and in Appendix F.

a) Requirements for Discharges to Impaired Waters with an Approved MassDEP In-State TMDL

Charles River Basin Nutrient (Phosphorus) TMDL

On October 17, 2007, EPA approved *Final TMDL for Nutrients in the Lower Charles River Basin* (Lower Charles TMDL) (Massachusetts Department of Environmental Protection , 2007) and on June 10, 2011 EPA approved *Total Maximum Daily Load for Nutrients in the Upper/Middle Charles River* (Upper/Middle Charles TMDL) (Massachusetts Department of Environmental Protection, 2011). The two nutrient TMDLs address severe water quality impairments resulting from the excessive growth of algae caused by excessive amounts of phosphorus in discharges to the Charles River system. In summary, the TMDLs set WLAs (WLAs) that specify reductions for discharges of phosphorus throughout the entire Charles River watershed. Watershed-wide reductions are needed because of the severity and extent of phosphorus-related water quality impairments that exist in numerous impoundments throughout the Charles River system.

Based on the TMDLs, a 50% reduction in the average annual phosphorus load generated by stormwater drainage system discharges from developed lands is necessary to assure compliance with water quality standards and to achieve consistency with the assumptions and requirements of the WLAs in the TMDLs.

The Phosphorus TMDL analyses for the Charles River watershed (CRW) quantified phosphorus loadings to the Charles River and through the use of extensive data and modeling analyses estimated the average annual phosphorus load the river could receive and still comply with Massachusetts Surface Water Quality Standards. Both TMDLs quantified total phosphorus loading to their respective river segments (9 miles for the Lower Charles and 70+ miles for the Upper/Middle Charles) based on detailed watershed source characterizations and accounting of WWTF and CSO discharges.

A common geographic point between the two TMDL analyses is the Watertown Dam, the boundary separating the Lower and the Upper/Middle Charles. At this location, both TMDLs quantified the average annual phosphorus load discharging to the Lower Charles River for the data rich five year period of 1998-2002. This common point allows for the two TMDL analyses to be used in combination to derive community specific phosphorus reduction requirements for the entire CRW based on the WLAs established in the TMDLs. In developing the Draft Permit, EPA calculated phosphorus load reduction requirements specific to each community, as well as MassDOT, and DCR owned systems within each community in the CRW. EPA took an additional step to estimate the portion of the phosphorus load reduction that would be achieved through elimination of illicit discharges (required under the permit) and subtracted the illicit phosphorus load from the total watershed phosphorus load reduction to determine the stormwater-only phosphorus load reduction requirement for each municipality. EPA believes that removing illicit phosphorus load from the overall phosphorus load to the Charles River represents the fairest way to

estimate each permittee's stormwater phosphorus reduction requirement. This approach prevents any community that may have a disproportionally large amount of illicit load from not doing its fair share of stormwater phosphorus load reduction work. See Attachment 1 to this Fact Sheet for a detailed explanation of the derivation of community specific phosphorus load reduction requirements.

Basis for Phosphorus Control Plan Requirements

Appendix F A.I. of the Draft Permit requires permittees to develop and implement Phosphorus Control Plans (PCPs) to reduce their discharges of excessive phosphorus load to the Charles River and its tributaries. The PCP is a multi-step process that includes the implementation of non-structural and structural stormwater best management practices (BMPs) to achieve the stormwater phosphorus load reductions specified in Appendix F to the Draft Permit.

PCP Compliance Schedule: The Draft Permit requires that the PCP shall be completed and implemented as soon as possible but no longer than 20 years from the effective date of the final permit. The NPDES regulations at §122.47 mandate that, where appropriate, compliance schedules in permits must require compliance by the permittee "*as soon as possible."*[3] Based on the rationale discussed below, EPA has estimated that "as soon as possible" for most permittees in the CRW will be on the order of a 20 year timeframe. Because of the extended schedule, EPA has divided the PCP work into phases as shown below:

5 years after permit effective date	5-10 years after permit effective date	10-15 years after permit effective date	15-20 years after permit effective date
Create Phase 1 Plan	**Implement Phase 1 Plan**		
	Create Phase 2 Plan	**Implement Phase 2 Plan**	
		Create Phase 3 Plan	**Implement Phase 3 Plan**

Schedule of compliance for CRW permittees

EPA is aware that the reduction of stormwater pollutants from existing development within MS4s is a comprehensive and challenging undertaking for permittees. The steps in this process will likely include establishing new funding sources, obtaining funding, analyses of site suitability for structural and non-structural BMPs, coordinating work on MS4 and private properties, and/or the development of new bylaws/ordinances or other regulatory mechanisms. EPA anticipates that for many of the CRW communities the achievement of the required phosphorus load reductions will necessitate phosphorus load reductions being accomplished on private properties that drain to MS4s and the Charles River system. Consequently, implementation in these communities would also involve coordination with private property owners.

[3] Similarly, Massachusetts' water quality standards regulations mandate that compliance schedules, where appropriate, must require compliance at the "earliest practicable time." 314 CMR 4.03(b).

EPA has developed the phased PCP schedule of 20 years after considering numerous factors related to the **successful** implementation of comprehensive stormwater management programs in already developed landscapes. The factors that support the proposed schedule for the PCP include:

- Achieving stormwater pollutant load reductions from existing developed areas is not commonplace and represents a substantial shift in how stormwater management is currently approached. At present, stormwater management focuses on incorporating controls on new development and applying minimal non-structural controls to regulated watershed areas. Presently, applying stormwater structural controls to existing development is done mostly on a "demonstration" basis. Time will be needed for municipalities and the consultant community at large to shift from the "cookbook" stormwater standards approach used for new development and re-development to a more expansive and innovative approach needed for developing effective stormwater management plans for existing development (retrofit plans).
- Implementing structural stormwater controls and/or substantially expanded non-structural controls to existing development requires substantial baseline information, up-front planning and sustainable and sufficient funding sources. Currently, the baseline information that is needed for developing stormwater management retrofit plans is typically extremely limited and incomplete. Based on readily available information of current levels of stormwater program funding, significant increases in funding of stormwater management programs will be needed to carry out the PCPs.
- The estimated construction cost for communities to comply with the PCP requirements is not incidental. For example, the estimated range in construction cost for the three upper Charles River communities, Milford, Bellingham and Franklin, to fully comply with the proposed PCP requirements to achieve the needed stormwater related phosphorus reductions (assuming no controls in place – worst case) is $ 200 million to $350 million. The estimates are substantially reduced to a range of $85 million to $195 million if aggressive phosphorus source reductions and non-structural controls are implemented to remove the most challenging 15% of the total load reduction needed.
- Developing sustainable stormwater funding mechanisms (e.g., utilities) at the local community level is a time consuming process subject to a number of variables including the level of knowledge and understanding of the voting public, existing local government administrative schedules and the actual development of a program to assess and collect fees. Experience indicates that if such a process goes smoothly it will likely take a community two (2) to three (3) years to establish a program. Potential legal challenges and collection of the fees after a utility goes into to place could further delay implementation or adequate funding of the program.
- Development of the baseline information such as detailed storm water collection system and infrastructure mapping needed for developing adequate stormwater retrofit plans is beyond the immediate funding capacity of many communities and will require a special allocation that must be approved through the community's administrative process.
- Stormwater BMP optimization analyses look at the pollutant removal potential of a variety of BMPs with different water quality volumes and the relative cost of those

BMPs in order to identify a suite of BMPs that remove the most pollutant of concern for the lowest cost, often times leading to smaller controls spread throughout a watershed. In contrast, the more traditional approach in siting BMPs has been to size BMPs as large as possible in large open spaces to treat the largest volume of water for a given area without concern for the cost implications relative to the pollutant removal efficiency of a given BMP. Stormwater management optimization analyses conducted for the three Upper Charles River communities demonstrate that selecting the most effective control types with optimal sizing for the varied site conditions within the developed watershed would likely reduce the collective overall cost by a factor of up to 4. Furthermore, the results of these analyses indicate that traditional approaches for developing retrofit plans could result in plans that easily cost up to 2 times as much when compared to retrofit plans developed based a more fully optimized analysis. The cost ranges presented above represent the range in cost between fully optimized plans (low end of range) and more traditional plans (high end of range). In case of the three Charles River communities, the lower cost optimized approaches also are expected to yield significantly greater environmental benefits (increased groundwater recharge, more extensive bacteria removal, etc.) beyond achieving the target stormwater phosphorus load reduction.

- Taking the time and devoting resources to develop optimized retrofit plans is worthwhile since developing more cost effective plans will accelerate the rate of achieving phosphorus reductions because of lower unit cost factors (more phosphorus removed per dollar spent).
- Development of retrofit plans will most likely be accomplished by the large field of consultants that work in the stormwater field. Many of these consultants have limited experience in developing stormwater retrofit plans using the most effective practices with varying water quality volume capacities. Many will have little to no experience in developing plans based on conducting optimization analyses. EPA considers it to be vitally important for the implementation process to allow for sufficient time so that the stormwater consultant community can learn of the importance of developing optimized retrofit plans. Also, it is important that the consultant community have access to information and tools that would allow for ready development of optimized retrofit plans. Time is needed to develop such tools.
- Development of technically sound and fiscally responsible stormwater management retrofit plans is a rigorous process for which there are no shortcuts. Developing a feasible retrofit plan requires detailed assessments including field analysis throughout the watershed study area. Most of the communities in the Charles Watershed have large areas that drain to the Charles (overall ~ 300 sq. mi). For example, the three upper Charles communities have about 50 sq. mi in the watershed. Developing feasible optimized stormwater retrofit plans for large drainage areas will take time especially since the optimization analyses conducted to date indicate that the most cost effective and environmentally beneficial plan will involve implementation of relatively small capacity sized controls throughout the developed watershed.
- More research is needed to better quantify performance of the non-structural stormwater controls and time should be provided in the overall schedule to allow for the development of credible information that can be used to better inform the development of the future retrofit plans (Phase 2 plan due at 10 yrs. and Phase 3 plan at 15 yrs.). As indicated above for the three Charles communities, the

potential cost savings associated with not having to construct the most costly controls (i.e., least cost effective controls) is substantial and in the range of $100 million to $150 million. For example, refinement of the credits for effective leaf litter programs and high-efficiency sweeping could alter the scope of future retrofit plans (e.g., Phase 3). Allowing for adequate time in the overall schedule will allow for in-process corrections and adjustments needed for true adaptive management.

- In the interest of maximizing the use of limited financial resources and minimizing disturbance of developed areas and daily routines, it is desirable to allow for the opportunity for stormwater controls to be incorporated into other planned redevelopment and public work projects. It is expected that unit costs for reducing phosphorus will be significantly lower for such projects. Also, overall disruption to the community associated with construction activities can be reduced.
- The local permitting burden associated with stormwater related activities will be substantially increased as a result of implementing the PCP. Currently, most if not all communities implement MA stormwater regulations through the conservation commissions (Con Coms). The Con Coms are voluntary and have limited capacities to process permit applications. It will be important to apportion the overall permitting burden over a longer period in order to not overwhelm or incapacitate the local permitting process.
- Time is needed for EPA to work with MassDEP to identify and work through potential state regulatory requirements that may inhibit development and implementation of optimized retrofit plans. For example, MA stormwater performance standards may dictate sizing requirements that are significantly different than what might be identified through development of an optimized retrofit plan. Modifying MA stormwater standards or policies to specifically recognize retrofit projects will take time.
- Time should be allowed for assessing and modifying local planning zoning regulatory requirements that might present obstacles to implementing desired controls.
- Ramp-up time for implementation of the Phase 1 plan is desirable to ensure success of the program. Local consultants will need to gain experience in the design and construction oversight of innovative unique stormwater retrofits projects. Construction companies and/or municipality staff who may undertake construction of some work need to gain experience in the construction of retrofit projects. Finally, the local permitting process may need to develop additional capacity for processing permits. The successful performance of these controls depends greatly on well thought out designs and construction contractors closely following specifications during construction. These projects are not just a hole in the ground with a special outlet control device. Contractors will need to get use to the close supervision during construction. As experience is gained capacity to implement projects will increase and unit costs will likely decrease. and
- Like any structural control measure, adequate maintenance is critical for proper and successful operation to ensure these novel controls perform as designed. Even as we continue to better quantify estimated pollutant removal performance of LID control measures, actual performance and maintenance burdens remain less clear. Maintenance of LID controls will likely require additional resources, equipment and skills that municipalities will need to wisely invest in and acquire over time. In some instances LID controls may be more vulnerable to inadequate maintenance than more traditional controls, manifesting in poor or non-performance under some

circumstances or unintended consequences at worst. Ramp-up time will allow implementers to determine maintenance requirements that will facilitate educated decisions on the applicability and future selection of particular controls.

Phased PCP Approach: EPA is proposing that the PCP implementation work be divided into phases that will be implemented over a period of 20 years. EPA has selected the phased approach for the following reasons:

- The phased approach allows permittees to divide the total phosphorus load reduction amount into manageable amounts so that focused and intensive planning and implementation work can be carried out during a five year period following phased plan development. EPA considers it to be more prudent for permittees to develop phased plans that focus on implementation activities for the near term (5 years), rather than developing one master PCP that would be implemented over a significantly longer period (e.g., 20 years). The phased approach allows for the use of the best available information currently available at the time of developing each plan. and
- EPA considers it important that the implementation process include regular intervals for re-evaluation of all information related to phosphorus load reduction requirements. The phased approach provides the opportunity at each phase for the permittee to re-calculate outstanding stormwater phosphorus load reductions based on refinements to loading estimates and/or reduction credits for implemented BMPs that may be updated in future permit terms. Additionally, the permittee can consider new information regarding new stormwater BMPs and associated phosphorus load reduction credits during the development of each successive Phase PCP.

Phosphorus Control Plan Components: Section A.I in Appendix F of the Draft Permit includes several components that are required as part of the PCP. The magnitude of stormwater phosphorus load reductions requirements for most permittees will require extensive implementation of stormwater BMPs throughout their developed portion of the CRW. Development of an effective and successful PCP will likely require a multifaceted approach. EPA considers the PCP components required in the permit to be essential elements for developing and implementing a successful PCP. Several of these are required to be addressed in each phase of the PCP. Following is the basis for each of the requirements:

1. **Legal Analysis**: The Draft Permit requires that permittees conduct a legal analysis to assess the use and/or hindrance of existing and potential local by-laws/ordinances for carrying out the PCP. Because PCP implementation activities will likely take place throughout the communities' CRW areas, local by-laws will likely be triggered during the process. Local by-laws/ordinances may present both opportunities and hindrances to success in carrying out the PCP.

   Examples of opportunities include adopting more stringent re-development standards that would result in decreased stormwater phosphorus loads over time as redevelopment occurs; and modifying planning standards that would allow for less or smaller parking spaces for commercial and industrial operations, and thus, allowing for less impervious area and the associated stormwater phosphorus load. One of the most cost effective BMPs will be the elimination of un-needed impervious cover in the watershed.

An example of a hindrance could be by-laws that require the use of certain BMPs that are not necessarily the best performers for removing stormwater phosphorus load. By-laws that inhibit the use of LID practices, many of which have been estimated to be among the most effective BMPs for removing stormwater phosphorus load, may have unintended consequences of blocking local use of highly effective BMPs. Another potential hindrance is local requirements, such as mandating specific BMP design capacities, may prevent the development and implementation of an optimized PCP that calls for wide-scale implementation of varied sized BMPs including many small sized BMPs. EPA envisions that the most useful and cost effective PCPs will require flexibility in applying the most effective controls (based on type and sizing) in the best locations throughout the CRW as part of a master strategy. Ultimately, it will be important that local bylaws are able to accommodate the needed flexibility and even encourage use of the best practices as part of an overall master strategy. The legal analysis can be updated in each phase of the PCP as needed.

2. **Funding Source Assessment**: The permit requires permittees to describe known and anticipated funding mechanisms that will be used to implement the PCP. Developing and implementing a PCP likely goes beyond the resources currently available to most permittees' current stormwater management program. Ultimately, each permittee will need funding at levels adequate to satisfy the PCP requirements in order to be in compliance with the permit. This requirement is intended to have the permittee assess the overall long-term funding needs for completing the PCP and to evaluate options for generating sustainable funding sources that meet the needs. EPA encourages permittees to review the 2011 study, *Sustainable Stormwater Funding Evaluation for the Upper Charles River Communities of Bellingham, Franklin, and Milford, MA*, the Horsley Witten Group (Horsley Witten, 2011) for information on some potential options (http://www.epa.gov/region1/npdes/charlesriver/pdfs/20110930-SWUtilityReport.pdf).

3. **Scope of the PCP (PCP Area), Baseline Phosphorus Load, Phosphorus Reduction Requirement and Allowable Phosphorus Load:** The permit requires permittees to indicate the scope of the CRW area in which the permittee plans to implement the PCP and choose corresponding baseline stormwater phosphorus load and associated stormwater phosphorus load reduction as identified in Table F-2 or Table F-3 of Appendix F, Part A.I. This area is referred to as the "PCP Area." The permit allows each permittee to choose which areas of the permittee's jurisdiction it will implement the PCP in. EPA is aware that the entire CRW is not within the Urbanized Areas identified by the US Census, and therefore not all storm water discharges to the Charles River or its tributaries within the jurisdiction of each permittee may be subject to NPDES permit requirements. However, Permittees may find it more cost effective to implement BMPs outside of the regulated area within its jurisdiction. Therefore, the permittee is given the option to consider implementation of measures in non-regulated areas, especially where such implementation requires little or no additional resources; or where such implementation would have a significant and demonstrable effect on phosphorus loading. If the permittee chooses to implement its PCP in the entire portion of its jurisdiction from which there are storm water discharges to the Charles River and its tributaries (both regulated and non-regulated areas) as its PCP Area, then the permittee must use Table 2 in Appendix F to find its baseline stormwater phosphorus

load, phosphorus reduction requirement and allowable phosphorus load that will be used to calculate compliance with the phosphorus reduction milestones in Tables F-1, F-4, and F-5 of Appendix F, Part A.1. Any BMP (structural and non-structural) implemented or installed within the permittee's jurisdiction that is within the Charles River watershed may be used to calculate phosphorus reductions to demonstrate compliance with the phosphorus reduction milestones in Tables F-1, F-4, and F-5 of Appendix F, Part A.I. If the permittee chooses to implement its PCP in only the regulated portion of its jurisdiction that is within the Charles River watershed, then the permittee must use Table 3 in Appendix F to find its baseline stormwater phosphorus load, phosphorus reduction requirement and allowable phosphorus load that will be used to calculate compliance with the phosphorus reduction milestones in Tables F-1, F-4, and F-5 of Appendix F, Part A.1. In choosing to implement the PCP in the regulated area only, the permittee may only calculate phosphorus reductions for those BMPs implemented in the regulated area. Any BMPs (both nonstructural and structural) implemented within the permittee's jurisdiction but outside the regulated area may not be used to calculate phosphorus load reductions to comply with the milestones in Tables F-1, F-4, and F-5 of Appendix F, Part A.I.

In order to allocate stormwater phosphorus reduction requirements across the entire CRW and stay consistent with the TMDLs, EPA has calculated the baseline phosphorus load for each permittee based on 2005 land use information (see Attachment 1 to this Fact Sheet). This was done to provide certainty that each permittee's baseline phosphorus load was calculated consistent with the TMDL and to provide a consistent methodology across the watershed and one starting point from which to calculate phosphorus reductions and increases within the CRW due to BMP implementation and development, respectively. This consistency is necessary to be able to account for changes in phosphorus loading throughout the watershed and track progress in meeting the TMDL goals. For this reason, EPA is not allowing each permittee to calculate its own baseline phosphorus load and associated reduction requirements. In the event that a permittee believes it has better land use information from 2005 with which to calculate its specific baseline phosphorus load, it should provide that information to EPA with its year 4 annual report. EPA will use this updated land use information to recalculate baseline phosphorus loads and associated reduction requirements for permittees and will update this information in future permit terms. It should be noted that the first phosphorus reduction milestone in Table F-1 is 8 years after the permit effective date, and EPA will likely issue another permit before this milestone passes and can update baseline phosphorus loads and associated phosphorus reduction requirements based on land use information submitted. This submission of updated 2005 land use information is voluntary and not required in the Permit.

4. **Description of Planned Non-Structural and Structural Controls**: Each permittee must plan BMP implementation scenarios to meet the phosphorus reduction requirements in Tables F-1, F-4, and F-5 in Appendix F, Part A.I as part of each phase. EPA has developed an accounting system for quantifying stormwater phosphorus load reduction credits for several non-structural and structural BMPs that are provided in Attachments 2 and 3 to Appendix F, respectively. The approach used to determine

stormwater phosphorus load reduction requirements is described in detail in Attachment 1 to this Fact Sheet. This approach allows stormwater phosphorus load reduction amounts to be quantified by all permittees using a consistent approach and with credible BMP performance information that EPA has determined to be representative of long-term cumulative reduction rates and will assist EPA and MassDEP in tracking phosphorus load reduction progress for the watershed and relating reduction estimates to future ambient water quality monitoring data. This approach also eliminates the need for permittees to develop their own models and estimates using potentially disparate sources of information and assumptions and thus, allows permittees to move forward in the relatively near future with the needed information to develop the PCP. Each phase of the PCP has associated phosphorus reduction milestones in Tables F-1, F-4, and F-5 of Appendix F, Part A.I. This allows permittees to plan BMPs to be conducted during each phase of the PCP with each phase plan building upon what has been conducted to date. EPA anticipates creating tools to help permittees with this process and allow permittees to run through multiple scenarios on how best to meet the milestones in Tables F-1, F-4, and F-5 in Appendix F, Part A.I. These tools will be available for use before the permit effective date.

5. **Operation and Maintenance Program for Structural BMPs:** The permit requires permittees to establish an Operation and Maintenance Program (O&M) for all structural BMPs being claimed for phosphorus reduction credit as part of demonstrating compliance with the PCP permit requirements. Structural BMPs require regular inspections and maintenance to ensure that BMPs are operating as designed and achieving the full stormwater phosphorus load reduction credits estimated and being claimed by the permittee. Structural stormwater BMPs are susceptible to fouling from debris and accumulated sediments that are delivered by incoming stormwater runoff. Regular inspections of all BMPs are needed to identify potential operational problems that may arise and to trigger immediate remediation corrective actions to resolve operational problems and maintain the optimal functional capacities and performances of the BMPs. Reduced BMP capacity due to accumulation of sediments and debris, clogging, short-circuiting and other operational problems will reduce BMP pollutant removal efficiency and potentially create local hazards to the public. Additionally, an established O & M program is essential for protecting the significant financial investment made in implementing the BMPs and maintaining their maximum beneficial return for the communities.

6. **Phosphorus Control Plan Implementation Schedule:** The permit requires the permittee to prepare an implementation schedule as part of each phase of the PCP. This requirement is intended to ensure that permittees undertake the necessary planning to successfully implement each phase of the PCP. EPA has determined that detailed and comprehensive planning will be needed for each PCP phase in order to identify and schedule all activities that will need to be completed in order to successfully implement the PCP and achieve permit compliance. Possible examples of activities to be identified in a schedule include determining the type and extent of BMPs to be implemented during the next 5 year period; estimating funding needs and identifying mechanisms to

obtain needed funding; constructing structural BMPs and implementing non-structural BMP programs; purchasing key equipment and hiring staff and/or consultants; conducting O& M programs; reporting; and preparation of needed studies.

7. **Estimated Cost for Implementing PCP:** The permit requires the permittee to estimate the cost of implementing non-structural and structural controls and associated O&M programs for each phase of the PCP. EPA expects that the estimated costs for implementing the PCP for most permittees will likely be beyond budgets currently dedicated to stormwater management. Therefore, developing cost estimates for implementing the PCP is needed to determine funding needs so that permittees can then take the necessary steps to obtain adequate funding to implement the PCP and comply with permit requirements.

8. **Performance Evaluation:** For the purpose of demonstrating compliance with the phosphorus reduction requirements and milestones in Tables F-1, F-4, and F-5 of Appendix F, Part A.I , the permit requires permittees to evaluate the effectiveness of the PCP by tracking stormwater phosphorus load reductions achieved through implementation of structural and non-structural BMPs using credits developed for this permit by EPA. The permit directs the permittee to calculate stormwater phosphorus load reductions consistent with methodologies provided in Attachment 2 to Appendix F (non-structural BMP performance) and Attachment 3 to Appendix F (structural BMP performance) for all BMPs implemented to date. The permit also requires permittees to calculate total phosphorus export increases due to development since 2005 starting with the first performance evaluation in year 6 after the effective date of the Permit. The purpose of this requirement is for permittees to account for changes in their PCP stormwater phosphorus load reduction requirements due to increases in stormwater phosphorus load associated with new development projects. Increases in impervious area (IA) associated with new development or re-development will result in significant increases in stormwater phosphorus load rates (See Attachment 1 to this Fact Sheet), while removal of impervious surfaces and restoration of permeable surfaces will result in substantial reductions in stormwater phosphorus loading rates. Attachment 1 to Appendix F of the Draft Permit provides the methodology the permittee shall use to calculate the increases in stormwater phosphorus loads due to development, Attachment 3 to Appendix F provides the methodology the permittee shall use to calculate phosphorus reduction credits for removing IA and from the installation of structural BMPs. Attachment 2 to Appendix F provides the methodology for calculating credits for non-structural BMPs. Each new or redevelopment project will need to be accounted for in 2 places in the performance evaluation. First, in the load increase as if no BMPs were installed on the property (consistent with Attachment 1 to Appendix F) and phosphorus reductions from BMPs installed to control stormwater on the new or redeveloped site will be calculated using Attachment 3 to Appendix F. This process is explained in detail in Attachment 1 to Appendix F. EPA anticipates creating tools to help permittees with the annual evaluation process and to track the BMPs installed to date and the associated phosphorus removal and progress toward meeting milestones in Tables F-1, F-4 and F-5 in Appendix F, Part A.I. These tools will be available for use before the permit effective date. See Attachment 1 to this Fact Sheet for a detailed explanation of the rationale used to support non-structural and structural phosphorus reduction credits.

EPA specifically seeks comments on the Charles River Watershed PCP approach including schedules and milestone objectives. EPA also specifically invites additional BMP performance information relevant to EPA's estimates of phosphorous reduction credits for BMPs included in Attachments 2 and 3 to Appendix F, as well as new BMPs (e.g. leaf litter pickup programs, catch basin inserts, augmenting BMPs with material designed to remove nutrients, etc.). Any proposed BMP performance information must be based on scientifically sound studies focusing on long term performance and evaluation of BMPs through collection of event mean concentration (EMC) data during storm events and long term modeling of the proposed BMP.

Lake and Pond Phosphorus TMDLs

Between 1999 and 2010, EPA approved 13 Lake TMDLs submitted by MassDEP covering 78 lakes and ponds within the Commonwealth of Massachusetts (referred to collectively as Lake TMDLs). Two of the Lake TMDLs, Salisbury Pond (2002) and Indian Lake (2002), are for lakes located within the city of Worcester and are therefore not included in this MS4 permit. Moreover, TMDLs for lakes that fall within non-MS4 areas are also not included in this MS4 permit. The Lake TMDLs address water quality impairments resulting from the excessive growth of algae caused by an over-abundance of phosphorus in discharges to the lakes and ponds. The identified impairments in these waters include a variety of pollutants related to nutrient impairments including, but not limited to, noxious plants, low dissolved oxygen, turbidity, nutrients, over-abundance of nuisance aquatic plants, and nutrient enrichment; all of which are indicators of eutrophication. In freshwater systems the primary nutrient known to accelerate eutrophication is phosphorus.

TMDL Stormwater Allocations and Draft Permit Requirements

The Draft Permit requires a relative percent reduction in annual phosphorus loading from regulated MS4 drainage areas consistent with the applicable TMDLs. The derivation of the relative percent reductions specified in Appendix F is discussed below.

Nine of the eleven Lake TMDLs were completed prior to the Region's initial issuance of the small MS4 permit in 2003, and therefore they did not specifically allocate phosphorus loads to urban stormwater in the WLA. Instead, they included urban stormwater sources of phosphorus in the Load Allocation (LA). In developing the Draft Permit, EPA considered both the WLAs and LAs (to the extent they include allocations for now-regulated MS4 stormwater discharges) in setting necessary phosphorus load reductions from MS4 sources. In six of these nine Lake TMDLs, phosphorus loads and target load allocations were categorized according to 6 land use types: forest, agriculture, open land, low density residential, high density residential, and commercial/industrial. Within these six Lake TMDLs, MassDEP allocated the land use loads into LAs and WLAs by two different methods, as follows:

- Categorized all land use loads in the LA; no WLA was included unless a specific non-stormwater point source (e.g. wastewater treatment facility) was located in the watershed.

    - Includes the following Lake TMDLs: Northern Blackstone Lakes (2002), Chicopee Basin Lakes (2002), Connecticut Basin Lakes (2002).
- Separated land use loads between the LA and WLA; high-density residential, industrial and commercial land uses were included in the WLA along with any other applicable non-stormwater point sources (e.g. wastewater treatment facility) located in the watershed. Remaining land use loads were included in the LA.
    - Includes the following Lake TMDLs: French Basin Lakes (2002), Millers Basin Lakes (2003), Leesville Pond (2002).

For each of these six Lake TMDLs that allocated loads by land use, EPA calculated the relative percent reductions presented in Appendix F, Table F-6 based on the sum total reduction required watershed wide. In other words, all current land use phosphorus loads and target load allocations, regardless of the allocation between LA and WLA in the TMDL, were summed to calculate a representative watershed-wide reduction, without changing the TMDL target phosphorus concentration in each lake. EPA believes this approach is the most consistent considering the differences in each Lake TMDL allocation and best represents regulated stormwater from urbanized area, since regulated urbanized area could include all of the land use types across the watershed.

The remaining three Lake TMDLs, for Lake Boon, Bare Hill Pond, and Lake Quinsigamond & Flint Pond, categorized sources according to watershed specific WLAs and LAs that did not include land use categories. EPA calculated relative percent reductions for these three Lake TMDLs based on the sources that best represented urbanized regulated stormwater.

In the Lake Boon TMDL, all phosphorus loads were allocated to the LA, which included direct precipitation, groundwater, septic systems, dry weather runoff, wet weather runoff and internal release. EPA used the LA and target load for wet weather runoff to establish the required phosphorus reductions in Appendix F, Table F-6, as this best represents the load from regulated stormwater.

In the Bare Hill Pond TMDL, phosphorus loads were all included in the LA, which included atmosphere, groundwater (ambient), sediment recycling, and 5 subwatershed loads. The subwatershed loads represented phosphorus from groundwater and surface water runoff, with the majority of the load attributed to leachate from septic systems. The TMDL assigned a 4.9% reduction in phosphorus loadings from stormwater sources within the subwatersheds. Therefore, EPA used this 4.9% reduction as the required phosphorus load reduction applicable to regulated MS4 stormwater discharging to Bare Hill Pond.

Lastly, the Lake Quinsigamond & Flint Pond TMDL had both LAs and WLAs. Load allocations included atmosphere and base flow; neither are applicable to regulated stormwater. The WLAs included stormwater load reduction targets and reductions from two NPDES permitted non-stormwater sources. EPA based the required phosphorus reductions in Appendix F, Table F-6, on the WLA for stormwater load.

In the Quaboag Pond TMDL (2006), MassDEP chose to allocate urban stormwater to the WLA by combining discrete sources of phosphorus in urban, commercial and industrial areas as “urban runoff” or “stormwater.” Nonpoint source runoff from remaining land uses

(e.g. forest, open land, low density residential) was allocated to the LA. However, these land use types do not necessarily define what stormwater is regulated under the MS4 permit. Therefore EPA summed all land use loads and allocations in the Quaboag Pond TMDL in order to calculate the watershed-wide relative percent reduction necessary to reach the TMDL target and applied this reduction to MS4 sources.

A permittee that operates an MS4 within the watershed boundaries of the respective impaired lake or pond is required to achieve the identified phosphorus reduction from the baseline phosphorus loading from any MS4 area discharging to the impaired waterbody or its tributaries. Appendix F, Table F-6 of the Draft Permit contains a list of primary municipalities subject to the Lake TMDLs and the required phosphorus load percent reduction for each MS4 within the lake watershed. The list of municipalities on Table F-6 in Appendix F contains only the primary municipalities that operate MS4s within the respective lake watersheds; these are the municipalities in which the majority of the lake or pond was located, as identified in the Lake TMDLs. However, this is not a comprehensive list of MS4 permittees subject to phosphorus reduction requirements, since the lake or pond watersheds could reach into other municipalities. In addition, there may be non-traditional or transportation MS4s that discharge to the lake or pond or its tributaries. If any other non-traditional MS4 or other traditional MS4s not identified on Table F-6 in Appendix F discharges to the impaired lake or pond or its tributaries, that MS4 is also subject to the requirements of Appendix F Part A. II including the required percent load reduction applicable to regulated stormwater associated with the listed impaired lake or pond.

Lake Phosphorus Control Plan (LPCP) Compliance Schedule

Part 2.2.1 and Appendix F of the Draft Permit require the permittee to develop a Lake Phosphorus Control Plan that, when implemented, will satisfy its Phosphorus Reduction Requirement through any combination of implementing enhanced non-structural BMPs and implementing structural BMPs. For more information on phosphorus removal through BMPs, please see the Attachment 1 to this Fact Sheet.

The LPCP is a multi-step process that includes the implementation of non-structural and structural BMPs to achieve the phosphorous reductions consistent with the calculated Allowable Phosphorus Load that is consistent with the percent phosphorus reduction WLA given in the applicable TMDL. The Draft Permit requires the permittee to complete the implementation of its LPCP as soon as possible but no later than 15 years after the effective date of the Permit. Table F-7 in Part A.II. of Appendix F contains milestones that each permittee must comply with during LPCP implementation. These milestones include yearly reporting of phosphorus load reductions and required phosphorus load reductions 8, 10, 13, and 15 years after the permit effective date. The milestones are there to ensure adequate progress is made by each permittee in implementing the LPCP.

The NPDES regulations at 40 CFR §122.47 allow EPA to establish schedules of compliance to give permittees additional time to achieve compliance with the CWA and applicable regulations. Schedules must require compliance by the permittee "*as soon as possible."* Based on the rationale discussed below, EPA has estimated that "as soon as possible" for most permittees will be on the order of a 15 year timeframe. However permittees must complete the requirements of the LPCP as soon as possible if they are able to meet the required phosphorus load reductions sooner than 15 years after the permit

effective date, consistent with 40 CFR §122.47. Some permittees will have small required phosphorus load reductions compared to others and therefore should be able to meet their required phosphorus reduction sooner than 15 years after the permit effective date. Table F-7 in Appendix F contains milestones that each permittee must demonstrate phosphorus load reductions. The 10 year milestone includes a minimum phosphorus load reduction of 30 kg/year unless the full Phosphorus Reduction Requirement has been fulfilled. This is to ensure that those permittees with minimal Phosphorus Reduction Requirements fulfill their required reductions as soon as possible and not wait to decrease their phosphorus loads until the end of the 15 year compliance period.

- Achieving stormwater pollutant load reductions from existing developed areas is not commonplace and represents a substantial shift in how stormwater management is currently approached. At present, stormwater management focuses on incorporating controls on new development and applying minimal non-structural controls to regulated watershed areas. Presently, applying stormwater structural controls to existing development is done mostly on a "demonstration" basis. Time will be needed for municipalities and the consultant community at large to shift from the "cookbook" stormwater standards approach used for new development and re-development to a more expansive and innovative approach needed for developing effective stormwater management plans for existing development (retrofit plans).
- Implementing structural stormwater controls and/or substantially expanded non-structural controls to existing development requires substantial baseline information, up-front planning and sustainable and sufficient funding sources. Currently, the baseline information that is needed for developing stormwater management retrofit plans is typically extremely limited and incomplete.
- Developing sustainable stormwater funding mechanisms (e.g., utilities) at the local community level is a time consuming process subject to a number of variables including the level of knowledge and understanding of the voting public, existing local government administrative schedules and the actual development of a program to assess and collect fees. Experience indicates that if such a process goes smoothly it will likely take a community two (2) to three (3) years to establish a program. Potential legal challenges and collection of the fees after a utility goes into to place could further delay implementation or adequate funding of the program.
- Development of the baseline information such as detailed storm water collection system and infrastructure mapping needed for developing adequate stormwater retrofit plans is beyond the immediate funding capacity of many communities and will require a special allocation that must be approved through the community's administrative process.
- EPA has estimated that the average cost to install structural retrofits to remove excess phosphorus from stormwater is approximately $3,000 to $54,000 per pound of removed phosphorus. These costs fluctuate based on a number of factors specific to the watershed in which the BMP is being placed and the type of BMP installed. Through this work, EPA has realized the potential cost savings in careful planning and optimization of a LPCP plan; a properly optimized plan can save the permittee as much as 50% in the total cost of implementation. Developing more cost effective plans will accelerate the rate of achieving phosphorus reductions because of lower unit cost factors (more phosphorus removed per dollar spent), and avoid implementing the larger more costly controls.

- Development of retrofit plans will most likely be accomplished by the large field of consultants that work in the stormwater field. Many of these consultants have limited experience in developing stormwater retrofit plans using the most effective practices with varying water quality volume capacities. Many will have little to no experience in developing plans based on conducting optimization analyses. EPA considers it to be vitally important for the implementation process to allow for sufficient time so that the stormwater consultant community can learn of the importance of developing optimized retrofit plans. Also, it is important that the consultant community have access to information and tools that would allow for ready development of optimized retrofit plans. Time is needed to develop such tools.
- In the interest of maximizing the use of limited financial resources and minimizing disturbance of developed areas and daily routines, it is desirable to allow for the opportunity for stormwater controls to be incorporated into other planned redevelopment and public work projects. It is expected that unit costs for reducing phosphorus will be significantly lower for such projects. Also, overall disruption to the community associated with construction activities can be reduced.
- The local permitting burden associated with stormwater related activities will be substantially increased as a result of implementing the LPCP. Currently, most if not all communities implement MA stormwater regulations through the conservation commissions (Con Coms). The Con Coms are voluntary and have limited capacities to process permit applications. In many cases it may be important to apportion the overall permitting burden over a longer period in order to not overwhelm or incapacitate the local permitting process.
- Time is needed for EPA to work with MassDEP to identify and work through potential state regulatory requirements that may inhibit development and implementation of optimized retrofit plans. For example, MA stormwater performance standards may dictate sizing requirements that are significantly different than what might be identified through development of an optimized retrofit plan. Modifying MA stormwater standards or policies to specifically recognize retrofit projects will take time.
- Time should be allowed for assessing and modifying local planning zoning regulatory requirements that might present obstacles to implementing desired controls.
- Like any structural control measure, adequate maintenance is critical for proper and successful operation to ensure these novel controls perform as designed. Even as we continue to better quantify estimated pollutant removal performance of LID control measures, actual performance and maintenance burdens remain less clear. Maintenance of LID controls will likely require additional resources, equipment and skills that municipalities will need to wisely invest in and acquire over time. In some instances, LID controls may be more vulnerable to inadequate maintenance than more traditional controls, manifesting in poor or non-performance under some circumstances or unintended consequences at worst. Ramp-up time will allow implementers to determine maintenance requirements that will facilitate educated decisions on the applicability and future selection of particular controls.

The compliance schedule of 15 years after the permit effective date is slightly shorter than the requirements for the Charles River watershed communities (20 years). This is due to the magnitude of reductions required in the Lake TMDLs in contrast with the Charles River

TMDLs. The magnitude of reductions required from the regulated area in the Charles River watershed is greater than those reductions required by lake or pond TMDLs. In addition, the impaired lakes and ponds have smaller watersheds with smaller regulated area subject to phosphorus reduction requirements than the Charles River watershed communities. Therefore EPA believes that 15 years represents "as soon as possible" for those permittees subject to phosphorus reductions required by a lake or pond TMDL. EPA specifically invites comments on the compliance schedule.

Lake Phosphorus Control Plan Components:

Section A.II in Appendix F of the Draft Permit includes several components that are required as part of the LPCP. The magnitude of stormwater phosphorus load reductions requirements for most permittees will require extensive implementation of stormwater BMPs throughout their developed portion of the watershed. Development of an effective and successful LPCP will likely require a multifaceted approach. EPA considers the LPCP components required in the permit to be essential elements for developing and implementing a successful LPCP. Following is the basis for each of the requirements:

1. **Legal Analysis**: The Draft Permit requires that permittees conduct a legal analysis to assess the use and/or hindrance of existing and potential local by-laws/ordinances for carrying out the LPCP. Because LPCP implementation activities may take place in a large portion of the communities' areas, local by-laws will likely be triggered during the process. Local by-laws/ordinances may present both opportunities and hindrances to success in carrying out the LPCP.

   Examples of opportunities include adopting more stringent re-development standards that would result in decreased stormwater phosphorus loads over time as redevelopment occurs; and modifying planning standards that would allow for less or smaller parking spaces for commercial and industrial operations, and thus, allowing for less impervious area and the associated stormwater phosphorus load. One of the most cost effective BMPs will be the elimination of un-needed impervious cover in the watershed.

   An example of a hindrance could be by-laws that require the use of certain BMPs that are not necessarily the best performers for removing stormwater phosphorus load. By-laws that inhibit the use of LID practices, many of which have been estimated to be among the most effective BMPs for removing stormwater phosphorus load, may have unintended consequences of blocking local use of highly effective BMPs. Another potential hindrance is local requirements, such as mandating specific BMP design capacities, may prevent the development and implementation of an optimized PCP that calls for wide-scale implementation of varied sized BMPs including many small sized BMPs. The legal analysis can be updated in each phase of the PCP as needed.

2. **Funding Source Assessment**: The permit requires permittees to describe known and anticipated funding mechanisms that will be used to implement the LPCP. Developing and implementing a LPCP likely goes beyond the resources currently available to most permittees' current stormwater management program. Ultimately, each permittee will need funding at levels adequate to satisfy the LPCP requirements in order to be in compliance with the permit. This requirement is intended to have the permittee assess the overall long-term funding needs for completing the LPCP and to evaluate options

for generating sustainable funding sources that meet the needs. While focused on communities in the Charles River Watershed, EPA still encourages permittees to review the 2011 study, The Sustainable Stormwater Funding Evaluation Final Report (Horsley Witten, 2011),for information on some potential options for funding that are applicable to communities developing a LPCP.

3. **Define LPCP Scope (LPCP Area):** The permit requires permittees to indicate the scope of the impaired lake's or pond's watershed area in which the permittee plans to implement the LPCP. This area is referred to as the "PCP Area." The permit allows each permittee to choose which areas of the permittee's jurisdiction to implement the LPCP. EPA is aware that in most cases the entire lake or pond watershed will not be classified as Urbanized Area identified by the US Census and therefore not all stormwater that discharges to the lake or pond or its tributaries within the jurisdiction of each permittee may be subject to NPDES permit requirements. However, permittees may find it more cost effective to implement BMPs outside of the regulated area within its jurisdiction. Therefore, the permittee is given the option to consider implementation of measures in non-regulated areas, especially where such implementation requires little or no additional resources; or where such implementation would have a significant and demonstrable effect on phosphorus loading. If the permittee chooses to implement its LPCP in the entire portion of its jurisdiction from which there are stormwater discharges to the lake or pond and its tributaries (both regulated and non-regulated area) as its LPCP Area, then any BMP (structural and non-structural) implemented or installed within the permittee's jurisdiction that is within the lake or pond watershed may be used to calculate phosphorus reductions to demonstrate compliance with the phosphorus reduction milestones in Table F-7 of Appendix F Part A.II. If the permittee chooses to implement its LPCP in only the regulated portion of its jurisdiction that is within the lake or pond watershed, then the permittee may only calculate phosphorus reductions for those BMPs implemented in the regulated area. Any BMPs (both nonstructural and structural) implemented within the permittee's jurisdiction but outside the regulated area may not be used to calculate phosphorus load reductions to comply with the milestones in Table F-7 of Appendix F Part A.II.

4. **Calculate Baseline Phosphorus Load (P_{base}), Phosphorus Reduction Requirement (P_{RR}) and Allowable Phosphorus Load (P_{allow}):** Based on the PCP Area selected, each permittee creating an LPCP must calculate a Baseline Phosphorus Load in mass/yr using the methodology in Attachment 1 to Appendix F. The rational and methodology for calculating the composite phosphorus load export rates is found in Attachment 1 to this Fact Sheet. After calculating the Baseline Phosphorus Load discharging to the impaired lake or pond or its tributaries, each permittee will calculate the Allowable Phosphorus Load in mass/yr by multiplying the Baseline Phosphorus Load by the applicable percent reduction found in Table F-6 in Appendix F. Finally, the Phosphorus Reduction Requirement in mass/yr is the difference between the Baseline Phosphorus Load and the Allowable Phosphorus Load. This process is explained in detail in Attachment 1 to Appendix F. EPA believes that the consistent approach regardless of TMDL is appropriate for all the lakes in Massachusetts due to the uniformity of phosphorus export rates based on land use within the region. This approach also streamlines the process for each lake regardless of TMDL completion date or methodology, while staying consistent with the required percent reductions in phosphorus loadings from various sources within each lake or pond watershed.

5. **Description of planned non-Structural and Structural controls**: Each permittee must plan BMP implementation scenarios to meet the specific calculated Phosphorus Reduction Requirement and applicable milestones found in Table F-7 of Appendix F. EPA has developed an accounting system for quantifying stormwater phosphorus load reduction credits for several non-structural and structural BMPs that are provided in Attachments 2 and 3 to Appendix F, respectively. The approach used to determine stormwater phosphorus load reductions associated with each structural and non-structural control available for phosphorus reduction credit is described in detail in Attachment 1 to this Fact Sheet and is applicable to communities subject to the Charles River TMDL as well as the lake and pond TMDLs. This approach allows stormwater phosphorus load reduction amounts to be quantified by all permittees using a consistent approach and with credible BMP performance information that EPA has determined to be representative of long-term cumulative reduction rates and will assist EPA and MassDEP in tracking phosphorus load reduction progress for the watershed and relating reduction estimates to future ambient water quality monitoring data. This approach also eliminates the need for permittees to develop their own models and estimates using potentially disparate sources of information and assumptions and thus, allows permittees to move forward in the relatively near future with the needed information to develop the LPCP. EPA anticipates creating tools to help permittees with this process and allow permittees to run through multiple scenarios on how best to meet the milestones in Table F-7 in Appendix F. These tools will be available for use before the permit effective date.

6. **Operation and Maintenance program for Structural BMPs:** The permit requires permittees to establish an Operation and Maintenance Program (O&M) for all structural BMPs being claimed for phosphorus reduction credit as part of demonstrating compliance with the LPCP permit requirements. Structural BMPs require regular inspections and maintenance to ensure that BMPs are operating as designed and achieving the full stormwater phosphorus load reduction credits estimated and being claimed by the permittee. Structural stormwater BMPs are susceptible to fouling from debris and accumulated sediments that are delivered by incoming stormwater runoff. Regular inspections of all BMPs are needed to identify potential operational problems that may arise and to trigger immediate remediation corrective actions to resolve operational problems and maintain the optimal functional capacities and performances of the BMPs. Reduced BMP capacity due to accumulation of sediments and debris, clogging, short-circuiting and other operational problems will reduce BMP pollutant removal efficiency and potentially create local hazards to the public. Additionally, an established O & M program is essential for protecting the significant financial investment made in implementing the BMPs and maintaining their maximum beneficial return for the communities.

7. **Phosphorus Control Plan Implementation Schedule:** The permit requires the permittee to prepare an implementation schedule as part of each phase of the LPCP. This requirement is intended to ensure that permittees undertake the necessary planning to successfully implement of the LPCP. Unlike the Charles River PCP, the LPCP does not contain phases of planning due to the relative scope of the reductions required when compared to Charles River phosphorus reduction requirements. However, during implementation permittees can update their implementation schedule as necessary to meet the phosphorus reduction milestones in Table F-7 of Appendix F. The phosphorus reduction milestones are intended to make each permittee accountable for phosphorus

reductions after the development of a written LPCP. This provides accountability for permittees and attempts to ensure that water quality improvements are not pushed off to the latest date possible. The 10 year milestone includes a minimum phosphorus load reduction of 30 kg/year unless the full Phosphorus Reduction Requirement has been fulfilled. This is to ensure that those permittees with minimal Phosphorus Reduction Requirements fulfill their required reductions as soon as possible.

8. **Estimated Cost and Funding Assessment:** The permit requires the permittee to estimate the cost of implementing non-structural and structural controls and associated O&M programs for the LPCP. EPA expects that the estimated costs for implementing the LPCP for most permittees will likely be beyond budgets currently dedicated to stormwater management. Therefore, developing cost estimates for implementing the LPCP is needed to determine funding needs so that permittees can then take the necessary steps to obtain adequate funding to implement the LPCP and comply with permit requirements.

9. **Performance Evaluation:** For the purpose of demonstrating compliance with the phosphorus reduction requirements and milestones in Table F-7 in Appendix F, the permit requires permittees to evaluate the effectiveness of the LPCP by tracking stormwater phosphorus load reductions achieved through implementation of structural and non-structural BMPs using credits developed for this permit by EPA. The permit directs the permittee to calculate stormwater phosphorus load reductions consistent with methodologies provided in Attachment 2 to Appendix F (non-structural BMP performance) and Attachment 3 to Appendix F (structural BMP performance) for all BMPs implemented to date. The permit also requires permittees to calculate total phosphorus export increases due to development Attachment 1 to Appendix F of the Draft Permit provides the methodology the permittee shall use to calculate the increases in stormwater phosphorus loads due to development. Each new or redevelopment project will need to be accounted for in 2 places in the performance evaluation. First, in the load increase as if no BMPs were installed on the property (consistent with Attachment 1 to Appendix F) and phosphorus reductions from BMPs installed to control stormwater on the new or redeveloped site will be calculated using Attachment 3 to Appendix F. This process is explained in detail in Attachment 1 to Appendix F. EPA anticipates creating tools to help permittees with the annual evaluation process and to track the BMPs installed to date and the associated phosphorus removal and progress toward meeting milestones in Table F-7 in Appendix F. These tools will be available for use before the permit effective date. See Attachment 1 to this Fact Sheet for a detailed explanation of the rationale used to support non-structural and structural phosphorus reduction credits.

EPA specifically invites comments on the LPCP approach including schedules and milestone objectives.

Bacteria and Pathogen TMDLs

Bacteria and pathogens indicate the presence of raw sewage and/or the presence of feces from warmed blooded mammals and represent a risk to human health and the environment. Information on pathogen related control measures and BMPs is discussed in the document: *Mitigation Measures to Address Pathogen Pollution in Surface Waters: A TMDL*

Implementation Guidance Manual for Massachusetts[4] . There are a total of 15 bacteria or pathogen TMDLs applicable to waters to which MS4 communities discharge as of the public notice date of the Draft Permit[5]. The WLA for stormwater discharges to waters with applicable bacteria or pathogen TMDLs is set at the state water quality standard for the indicator organism for that waterbody at the time of TMDL development. Currently, fecal coliform is used as the indicator organism by Massachusetts Division of Marine Fisheries (DMF) in its classification of shellfish growing areas and E. coli is used as the indicator organism for freshwater beaches, while marine beaches use Enterococci as the indicator organism, as required by the Federal Beaches Environmental Assessment and Coastal Act of 2000, an amendment to the CWA. Prior to amending the state water quality standards in late 2006, Massachusetts used fecal coliform as the indicator organism of potential harmful pathogens in surface waters; therefore, TMDLs approved prior to the amendment of state WQS include WLAs for fecal coliform as the indicator organism and TMDLs developed after the amendment of state WQS contain WLAs for E. coli or Enterococci as the indicator organisms of potential harmful pathogens in fresh and marine waters, respectively.

The bacteria and pathogen TMDLs do not have MS4-specific reduction requirements for the particular indicator bacteria; however, the TMDLs set the WLA and LA for prohibited sources, such as illicit discharges, boat discharges, and failing septic systems, at zero. The permit requirements in Appendix F Part A.III therefore focus on elimination of illicit discharges, education including pet waste management, and pollution prevention measures. These measures build upon the MEP measures found in Part 2.3 of the Permit in order to specifically target bacteria sources that contribute to increased bacteria concentration in stormwater. These measures are not meant to take the place of the requirements in Part 2.3 of the Permit but instead supplement the requirements where more work is needed to decrease bacteria concentrations in discharges to the impaired waters. EPA believes the Draft Permit's MEP requirements are not sufficient to control bacteria/pathogens in stormwater discharges adequately where the receiving waterbody requires bacteria/pathogen reductions to meet water quality standards. Illicit discharges are likely the single largest contributor of bacteria to MS4 systems and ranking those catchments that are discharging to bacteria/pathogen TMDL waters as High Priority will eliminate those bacteria sources as expeditiously as possible. Pet waste is also a large source of bacteria to MS4 systems and the permit requires the Public Education minimum control measure to be supplemented with additional messages regarding this potential bacteria source. Bacteria from multiple sources accumulate on impervious surfaces and additional street sweeping in those catchments discharging stormwater to bacteria/pathogen impaired waters will reduce those sources of pathogens on impervious surfaces and prevent them from being washed off into the MS4 system. EPA believes that these provisions are consistent with the assumptions and requirements of each bacteria or pathogen TMDL.

Cape Cod Watershed Nutrient/Nitrogen TMDLs

There are thirteen approved TMDLs for nitrogen for various watersheds, ponds, and bays on Cape Cod. The TMDLs for nitrogen identify stormwater as a source of nitrogen to the

[4] Available at: http://www.mass.gov/dep/water/resources/impguide.pdf. Retrieved 8/12/2013.
[5] See http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdls.html for all Massachusetts TMDL documents

impaired waterways and include stormwater discharges in the WLAs. The TMDLs conclude that stormwater nitrogen sources are relatively small when compared to the other nitrogen sources on Cape Cod and establish the WLAs at existing load levels. The TMDLs do not provide WLAs for future growth, which means that nitrogen loads from MS4 sources may not increase. EPA believes the Draft Permit's MEP requirements are not sufficient to prevent nitrogen increases in all MS4 discharges to the nitrogen impaired waters. Therefore, the Draft Permit requires enhanced BMPs relating to public education and outreach, illicit detection and elimination, good housekeeping, and post construction stormwater management to prevent increases in nitrogen inputs to impaired waterbodies or their tributaries from MS4 sources.

Municipalities subject to these requirements are found in Part 2.2.1.g. of the Draft Permit and all MS4s located in those municipalities or discharging to a waterbody found on Table F-9 or their tributaries are subject to the requirements found in Appendix F Part A.IV of the Draft Permit. The permittees remain subject to MEP requirements of Part 2.3 of the Draft Permit but shall augment their SWMP to comply with the requirements of Part A.IV of Appendix F. These measures build upon the MEP measures found in Part 2.3 of the Permit in order to specifically target nitrogen sources that contribute to increased nitrogen concentration in stormwater. These measures are not meant to take the place of the requirements in Part 2.3 of the Permit but instead supplement the requirements to control nitrogen concentrations in discharges to the impaired waters or their tributaries. Appendix F Part A.IV contains measures to specifically target the reduction of accumulated organics on impervious surfaces through enhanced street sweeping programs and public education messages; removal of organics from contact with stormwater will reduce the amount of nitrogen contributed to receiving waters. Appendix F Part A.IV also contains additional requirements to target the reduction of fertilizer application to turf that will in turn reduce the amount of nitrogen discharged in stormwater from fertilizer application activities. Lastly, Appendix F Part A.IV contains requirements that target the removal of nitrogen in stormwater following development or redevelopment activities. The requirement that post construction stormwater management systems be optimized for nitrogen removal is meant to require post construction stormwater management systems to be designed with BMPs that are known to reduce nitrogen concentrations in stormwater. Examples include systems that are designed with an anaerobic zone to promote denitrification such as a gravel wetland or similarly constructed BMP. The post construction requirement is slightly changed from the MEP requirements to specifically require developers to put in stormwater controls that remove nitrogen from stormwater sources to ensure new and redevelopment projects do not increase the stormwater nitrogen load to any nitrogen impaired water.

Assabet River Phosphorus TMDL

The Assabet River Phosphorus TMDL was approved by EPA on September 23, 2004; it addresses water quality impairments due to excess phosphorus.

The Assabet River is a highly effluent dominated river, receiving wastewater flow from four publicly owned treatment facilities located in Westborough, Marlborough Hudson, and Maynard. Since the majority of the water being discharged through the treatment facilities is withdrawn from the watershed, the river has experienced severe alterations of the natural hydrology with significant depletion of flows in the tributary streams. The river also has multiple dams, which compound nutrient-related water quality violations by

creating sinks of phosphorus that accumulate in the sediments. A significant amount of this phosphorus in the sediments recycles into the water column during the critical growing period. In addition to waste load allocations for the four publicly owned treatment works, the TMDL also required a 90% reduction in the phosphorus loading from the sediments in impoundments (sediment flux reduction).

Following the approval of the TMDL, a study was conducted by the Corps of Engineers (COE) to consider methods for achieving the necessary sediment reductions, including dredging and dam removal (CDM, 2008). The study concluded that dam removal was the best alternative for addressing the ongoing source of phosphorus from the sediments and to restore a healthy riverine aquatic community. Despite these studies, no plan has been developed to achieve the necessary reductions, nor is there any consensus on the method for attaining the reductions. The Massachusetts Department of Environmental Protection also surveyed the river during the summer of 2012 to determine levels of Duckweed growth in the impoundments (see 12/19/12 document entitled " Assabet 2012 Duckweed Monitoring on the Assabet River"). The survey found that there were still excessive levels of Duckweed in impoundments of the Assabet River.

Stormwater discharges are known to contain phosphorus both in dissolved form and particulate form when adhered to fine particles. These particles containing phosphorus are easily trapped behind the dams on the Assabet River and over time contribute to the sediment load of phosphorus causing water quality impairments in the Assabet River system through re-suspension of once adhered phosphorus. With the lack of dam removal and dredging either planned or commenced, and stormwater contributing to the phosphorus load in the Assabet River in the form of dissolved and particulate forms, stormwater controls to reduce phosphorus are needed at the source (runoff from impervious and pervious surfaces), before it makes its way into the Assabet river system. EPA believes the Draft Permit's MEP requirements are not sufficient to prevent phosphorus increases in all MS4 discharges to the phosphorus impaired waters of the Assabet. Consequently, the permit contains requirements to control phosphorus loading to the Assabet River that result from stormwater discharges directly to the Assabet River or its tributaries.

Since the Assabet River TMDL does not contain stormwater-specific phosphorus load reductions, the permit in Part A.V of Appendix F requires additional non-structural controls to control phosphorus in stormwater discharges. These measures build upon the MEP measures found in Part 2.3 of the Permit in order to specifically target phosphorus sources that contribute to increased phosphorus concentration in stormwater. These measures are not meant to take the place of the requirements in Part 2.3 of the Permit but instead supplement the requirements where more work is needed to decrease phosphorus concentrations in discharges to the impaired waters or their tributaries. Appendix F Part A.V contains measures to specifically target the reduction of accumulated organics on impervious surfaces through enhanced street sweeping programs and public education messages. Removal of organics from contact with stormwater will reduce the amount of phosphorus contributed to receiving waters. Appendix F Part A.V also contains additional requirements to target the reduction of fertilizer application to turf that will in turn reduce the amount of phosphorus discharged via stormwater from fertilizer application activities. Lastly, Appendix F Part A.V contains requirements that target the removal of phosphorus in stormwater following development or redevelopment activities. The requirement that post construction stormwater management systems be optimized for phosphorus removal is meant to require post construction stormwater management systems to be designed with

BMPs that are known to reduce phosphorus concentrations in stormwater. Examples include systems designed to infiltrate stormwater where appropriate or employ BMPs on site that are known to reduce phosphorus concentrations such as filtration BMPs. The post construction requirement is slightly changed from the MEP requirements to specifically require developers to put in stormwater controls that remove phosphorus from stormwater sources to ensure new and redevelopment projects do not increase the stormwater phosphorus load to any phosphorus impaired water.

b) Requirements for Discharges to Impaired Waters with an Approved Out Of State TMDL

Long Island Sound Nitrogen TMDL

The Connecticut River, the Housatonic River and the Thames River are tributary to Long Island Sound (LIS), which has an approved TMDL for nitrogen. The drainage area of LIS includes the states of Connecticut, Massachusetts, Vermont, and New Hampshire as well as Quebec, Canada. The TMDL establishes both in-basin reductions and out-of basins reductions. Out-of-basin areas are considered those areas north of Connecticut. The TMDL identifies a 10 percent reduction in nitrogen loads from out-of-basin urban and agriculture nonpoint and stormwater sources. Currently, the LIS nitrogen TMDL is being revised and updated to refine quantification of nitrogen sources, including stormwater.

At present, EPA does not have specific evidence to suggest that the out-of-basin required reductions have not been met and, conversely, does not have the information that suggests the out-of-basin load reductions have been met. However, even though there is uncertainty concerning whether or not allocations have been met, the TMDL does not allow for increased nitrogen load from out-of-basin sources. EPA believes the Draft Permit's MEP requirements alone are not sufficient to adequately control nitrogen in discharges where the receiving waterbody requires nitrogen reductions to meet water quality standards. Therefore, the Draft Permit contains requirements intended to prevent increases in the load of nitrogen coming from stormwater discharged from regulated areas as well as requirements aimed to reduce nitrogen to offset any additional nitrogen being discharged in stormwater due to uncontrolled development within regulated areas. Specifically, the Draft Permit requires enhanced BMPs relating to public education and outreach, illicit detection and elimination, good housekeeping, and post construction stormwater management as well as a nitrogen source identification report to reduce nitrogen inputs to nitrogen impaired waterbodies from MS4 sources. These requirements are slightly different from the requirements for discharges to Cape Cod TMDL waterbodies because the Long Island Sound TMDL specifically calls for an out-of-basin reduction in stormwater sources of nitrogen where the Cape Cod TMDLs do not require a reduction in stormwater nitrogen sources. While there is not a defined reduction required in the Draft Permit, the Draft Permit does require permittees to begin to take steps to reduce nitrogen loads and track any BMP implementation that reduces nitrogen in stormwater.

Municipalities subject to these requirements are found in Part 2.2.1.c.i. of the Draft Permit and all MS4s located in those municipalities are subject to the requirements found in Appendix F Part B.I of the Draft Permit. The permittees remain subject to MEP requirements of Part 2.3 of the Draft Permit but shall augment their SWMP to comply with the requirements of Part B.I of Appendix F. These measures build upon the MEP measures found in Part 2.3 of the Permit in order to specifically target nitrogen sources that

contribute to increased nitrogen concentration in stormwater. These measures are not meant to take the place of the requirements in Part 2.3 of the Permit but instead supplement the requirements where more work is needed to prevent increases in nitrogen concentrations in discharges to the impaired waters or their tributaries.

Appendix F Part B.I contains measures to specifically target the reduction of accumulated organics on impervious surfaces through enhanced street sweeping programs and public education messages. Removal of organics from contact with stormwater will reduce the amount of nitrogen contributed to receiving waters. Appendix F Part B.I also contains additional requirements to target the reduction of fertilizer application to turf that will in turn reduce the amount of nitrogen discharged in stormwater from fertilizer application activities. In addition, Appendix F Part B.I contains requirements that target the removal of nitrogen in stormwater following development or redevelopment activities. The requirement that post construction stormwater management systems be optimized for nitrogen removal is meant to require post construction stormwater management systems be designed with BMPs that are known to reduce nitrogen concentrations in stormwater. Examples of such BMPs include systems that are designed with an anaerobic zone to promote denitrification, such as a gravel wetland or similarly constructed BMP. The post construction requirement is slightly changed from the MEP requirements to specifically require developers to put in stormwater controls that remove nitrogen from stormwater sources to ensure new and redevelopment projects do not increase the stormwater nitrogen load to any nitrogen impaired water.

Part B.I of Appendix F also requires a source identification and assessment report that requires permittees to identify source categories and specific locations within the contributing catchments that are potential "hot spots" for nitrogen in stormwater. The nitrogen source identification report shall contain outfall mapping and catchment delineations that are completed as part of MEP requirements, calculations of the size of MS4 area draining to the receiving water, any monitoring data and impervious area and directly connected impervious area data for the contributing catchments. In order to make use of information being developed under Part 2.3 of the Permit (mapping, monitoring, etc.), this report must be submitted with the year four annual report. This report is meant to guide the permittee in making decisions about which areas of the MS4 to retrofit or target for redevelopment BMPs that significantly reduce nitrogen in stormwater discharges. The permittee should use the findings of the report to guide decision making in order to maximize environmental benefit.

Lastly, Part B.I of Appendix F requires the permittee to produce a list of locations where structural BMPs can be installed as retrofits or as part of redevelopment of the municipally owned property. The permittee shall identify retrofit or redevelopment opportunities where BMPs can be installed to reduce nitrogen concentrations in stormwater discharges. The list of BMPs, locations for installation and a schedule for installation shall be submitted with the year five annual report. The permittee shall install a minimum of one BMP as a demonstration project six years after the effective date and install the remainder of the identified BMPs on the schedule developed and submitted as part of the year five annual report.

The SWMP and each annual report shall include steps the permittee is taking to reduce nitrogen in discharges. The Draft Permit requires the permittee to begin tracking nitrogen reductions from any installed structural BMPs. The tracking information gathered by

permittees estimating the nitrogen removal from structural controls may potentially be used to meet future WLAs or nitrogen reduction requirements if the EPA and the state agency find reductions are necessary from stormwater sources.

EPA has identified nitrogen loading rates, and structural BMP performance for nitrogen removal from extensive work being conducted in Chesapeake Bay. Specifically, the nitrogen removal efficiencies indicated in Attachment 1 in Appendix H are from two documents produced by the Chesapeake Stormwater Network: (1) CSN TECHNICAL BULLETIN No. 9, August 2011, *Nutrient Accounting Methods to Document Local Stormwater Load Reductions in the Chesapeake Bay Watershed* (Schueler, 2011) and (2*) Recommendations of the Expert Panel to Define Removal Rates for New State Stormwater Performance Standards* (Comstock, et al., 2012). EPA recognizes that the performance of some BMPs may be underestimated by the current methods contained in Attachment 1 to Appendix H and EPA anticipates refining the nitrogen loading and removal efficiencies from structural and non-structural controls in future permits, but beginning to track nitrogen loading increases and decreases to waters tributary to LIS is essential for ensuring that out-of-basin stormwater loads remain consistent with the assumptions of the TMDL. EPA is currently in the process of developing spreadsheet tools that permittees may use for this initial nitrogen tracking. EPA expects these tools to be available upon final permit issuance.

Reductions gained through non-structural practices (e.g. street sweeping, catch basin cleaning) will be an important part of any successful nitrogen reduction program. However, EPA Region 1 has not currently identified nitrogen removal efficiencies specific to these practices and anticipates additional research in this area to inform future nitrogen reduction credits for non-structural BMPs.

Phosphorus TMDLs

There are currently eight approved phosphorus TMDLs for certain waterbody segments in Rhode Island that identify urban stormwater discharges in Massachusetts as sources that are contributing phosphorus to the impaired segments. The TMDLs include the Kickemuit Reservoir, Upper Kikemuit River, Kickemuit River, Ten Mile River, Central Pond, Turner Reservoir, Lower Ten Mile River, and Omega Pond TMDLs. The TMDLs require a reduction of phosphorus concentrations in impaired waterbodies or their tributaries at the State line. No TMDL contains specific reductions required by specific Massachusetts sources; however, the TMDLs do identify urban stormwater as causing or contributing to the phosphorus impairment in the waterbody. As such, the Permit requires those MS4s in municipalities in the impaired waterbody's watershed that discharge to the impaired waterbody or its tributaries to implement additional measures targeted at reducing phosphorus concentrations in MS4 discharges. These municipalities are listed in Part 2.2.1.c.ii of the Draft Permit.

The permit in Part B.II of Appendix F requires additional non-structural and structural controls to control phosphorus in stormwater discharges. These measures build upon the MEP measures found in Part 2.3 of the Permit in order to specifically target phosphorus sources that contribute to increased phosphorus concentration in stormwater. These measures are not meant to take the place of the requirements in Part 2.3 of the Permit but instead supplement the requirements where more work is needed to decrease phosphorus concentrations in discharges to the impaired waters or their tributaries. EPA believes the

Draft Permit's MEP requirements are not sufficient to adequately control phosphorus in discharges where the receiving waterbody requires phosphorus reductions to meet water quality standards.

Appendix F Part B.II contains measures to specifically target the reduction of accumulated organics on impervious surfaces through enhanced street sweeping programs and public education messages; removal of organics from contact with stormwater will reduce the amount of phosphorus contributed to receiving waters. Appendix F Part B.II also contains additional requirements to target the reduction of fertilizer application to turf that will in turn reduce the amount of phosphorus discharged in stormwater from fertilizer application activities. In addition, Appendix F Part B.II contains requirements that target the removal of phosphorus in stormwater following development or redevelopment activities. The requirement that post construction stormwater management systems be optimized for phosphorus removal is meant to require post construction stormwater management systems be designed with BMPs that are known to reduce phosphorus concentrations in stormwater. These BMPs include systems designed to infiltrate stormwater where appropriate or employ BMPs on site that are known to reduce phosphorus concentrations, such as filtration BMPs.

While controlling future discharges of phosphorus in MS4 discharges through a targeted development and redevelopment program is necessary, the TMDLs also indicate that the current load of phosphorus from urban stormwater sources in Massachusetts needs to be reduced. Part B.II of Appendix F contains additional measures to reduce current phosphorus loads in MS4 discharges. These requirements include a source identification and assessment report that requires permittees to identify source categories and specific locations within the contributing catchments that are potential contributors of phosphorus in stormwater. The phosphorus source identification report shall contain outfall mapping and catchment delineations, calculations of the size of MS4 area draining to the receiving water, any monitoring data and impervious area and directly connected impervious area (DCIA) data for the contributing catchments. In order to make use of information being developed under Part 2.3 of the Permit (mapping, monitoring, etc.), this report must be submitted with the year four annual report. This report is meant to guide the permittee in making decisions about which areas of the MS4 to retrofit or target for redevelopment BMPs that significantly reduce phosphorus in stormwater discharges. The permittee should use the findings of the report to guide decision making in order to maximize environmental benefit.

Lastly, Part B.II of Appendix F .requires the permittee to produce a list of locations where structural BMPs can be installed as retrofits or as part of redevelopment of the municipally owned property. The permittee shall identify retrofit or redevelopment opportunities where BMPs can be installed to reduce phosphorus concentrations in stormwater discharges so the permittees discharge no longer causes or contributes to exceedances of water quality standards in the receiving water. The list of BMPs, locations for installation and a schedule for installation shall be submitted with the year five annual report. The permittee shall install a minimum of one BMP as a demonstration project six years after the effective date and install the remainder of the identified BMPs on the schedule developed and submitted as part of the year five annual report. The installation of identified BMPs shall be completed as soon as possible after the permit effective date.

The SWMP and each annual report shall include steps the permittee is taking to reduce phosphorus in discharges. The permittees are also required to begin tracking phosphorus

load reductions through the implementation of structural BMPs consistent with the methodology included in Attachment 3 to Appendix F. Each annual report shall include the estimated phosphorus reductions gained through structural BMPs installed in the regulated area. While there are currently no specific phosphorus load requirements in this permit, the information gathered by the permittee can be used to potentially satisfy future permit limits or TMDL WLAs.

Bacteria and Pathogen TMDLs

Bacteria and pathogens indicate the presence of raw sewage and/or the presence of feces from warmed blooded mammals and represent a risk to human health and the environment. Information on pathogen related control measures and BMPs is discussed in the document: *Mitigation Measures to Address Pathogen Pollution in Surface Waters: A TMDL Implementation Guidance Manual for Massachusetts*[6] . There are currently six approved bacteria (fecal coliform bacteria) or pathogen (fecal coliform and/or enterococcus bacteria) TMDLs for certain waterbody segments in Rhode Island that identify urban stormwater discharges in Massachusetts as sources that are contributing bacteria or pathogens to the impaired segments. The TMDLs include the Kickemuit Reservoir, Upper Kikemuit River and Kickemuit River TMDL, Ten Mile River, Lower Ten Mile River and Omega Pond TMDLs. Table F-11 in Appendix F lists municipalities in Massachusetts identified in the TMDLs as containing MS4s contributing bacteria or pathogens to the impaired waterbody segments in Rhode Island, the impaired receiving water, and the approved TMDL name. Any permittee (traditional or non-traditional) that operates an MS4 in a municipality listed in Table F-11 and that discharges stormwater to a waterbody or a tributary of a waterbody listed on Table F-11 is subject to the requirements of this Part B.III of Appendix F.

None of the TMDLs contains specific reductions required by specific Massachusetts sources; however, the TMDLs do identify urban stormwater as causing or contributing to the bacteria or pathogen impairment in the waterbody. As such, the Permit requires those MS4s in municipalities listed in Table F-11 in Appendix F that discharge to the impaired waterbody or its tributaries to implement additional measures targeted at reducing bacteria and pathogens in MS4 discharges. The permit requirements in Appendix F Part B.III focus on elimination of illicit discharges, education including pet waste management, and pollution prevention measures. These measures build upon the MEP measures found in Part 2.3 of the Permit in order to specifically target bacteria sources that contribute to increased bacteria concentration in stormwater. These measures are not meant to take the place of the requirements in Part 2.3 of the Permit but instead supplement the requirements where more work is needed to decrease bacteria concentrations in discharges to the impaired waters. EPA believes the Draft Permit's MEP requirements are not sufficient to control bacteria/pathogen in discharges adequately where the receiving waterbody requires bacteria/pathogen reductions to meet water quality standards. Illicit discharges are likely the single largest contributor of bacteria to MS4 systems and ranking those catchments that are discharging stormwater to a waterbody listed on Table F-11 in Appendix F or its tributaries as High Priority will eliminate those bacteria sources as expeditiously as possible. Pet waste is also a large source of bacteria to MS4 systems and the permit requires the Public Education minimum control measure be supplemented with additional

[6] Available at: http://www.mass.gov/dep/water/resources/impguide.pdf. Retrieved 8/12/2013.

messages regarding this potential bacteria source. Bacteria from multiple sources accumulates on impervious surfaces and additional street sweeping in those catchments discharging stormwater to a waterbody listed on Table F-11 or its tributaries will reduce those sources of bacteria and pathogens on impervious surfaces and prevent them from being washed off into the MS4 system. EPA believes that these provisions are consistent with the assumptions and requirements of each bacteria or pathogen TMDL.

Metals TMDLs

There are currently five approved metals TMDLs for waterbody segments in Rhode Island that identifies urban stormwater discharges in Massachusetts as sources that are contributing metals (Cadmium, Lead, Aluminum, Iron) to the impaired segments. The TMDLs include the Upper Ten Mile River, Lower Ten Mile River, Central Pond, Turner Reservoir and Omega Pond TMDLs. Table F-12 in Appendix F lists municipalities in Massachusetts identified in the TMDLs as containing MS4s contributing metals to the impaired waterbody segments in Rhode Island, the impaired receiving water, the approved TMDL name, and the pollutant of concern. Any permittee (traditional or non-traditional) that operates an MS4 in a municipality listed in Table F-12 and that discharges stormwater to a waterbody or tributary of a waterbody listed on Table F-12 is subject to the requirements of Part B.IV of Appendix F.

None of the TMDLs contains specific reductions required by specific Massachusetts sources; however, the TMDLs do identify urban stormwater as causing or contributing to the metals impairments in the waterbody. As such, the Permit requires those MS4s in municipalities listed in Table F-12 in Appendix F that discharge stormwater to the impaired waterbody listed in Table F-12 in Appendix F or its tributaries to implement additional measures targeted at reducing metals in MS4 discharges. Metals concentration in urban stormwater are found in greatest quantities in discharges from impervious areas, with industrial or commercial land use metals concentrations increasing with increased sediment load. Therefore the requirements of Part B.IV of Appendix F include additional BMPs to specifically target the control of sediment (which is associated with increased metals concentrations) from areas with known higher pollutant loadings of sediment and metals. The permittees discharging to a waterbody found on Table F-12 of Appendix F of the Draft Permit remain subject to MEP requirements of Part 2.3 of the Draft Permit but shall augment their SWMP to comply with the requirements of Part B.IV of Appendix F. The additional BMPs include additional good housekeeping requirements where the permittee determines an increased street sweeping and catch basin cleaning program that will significantly reduce sediment loads. The permittee shall also treat development or redevelopment of commercial or industrial projects in catchment areas draining to the impaired waterbody or its tributaries as areas of potentially high pollutant load and require stormwater post-construction management on these sites to include designs that allow for shutdown and containment to isolate the system in the event of an emergency spill or other unexpected event. This requirement is intended to protect water quality degradation from areas with the highest potential to discharge high concentrations of metals to the MS4 system.

3. Discharges to Certain Waters Without a TMDL

a) Water Quality Limited Waters

CWA §402(p)(3)(B)(iii) provides that MS4 permits may include "such other provisions as the Administrator determines appropriate." EPA has determined that §402(p)(3)(B)(iii) allows EPA to include more stringent permit requirements than those established as MEP in order to meet water quality standards. EPA believes it is appropriate to include such additional requirements for MS4 discharges to waters that are not meeting water quality standards due to one or more of the pollutants typically found in urban stormwater runoff. EPA considered multiple approaches when determining which discharges should be subject to additional requirements in order to meet water quality standards when there is no TMDL completed for the waterbody. Example approaches include: identifying permittees that had the potential to cause or contribute to a violation of water quality standards based on the percent of impervious cover discharging to a waterbody or identifying permittees that had the potential to cause or contribute to a violation of water quality standards based on the stream size or waterbody type the permittee is discharging to. Due to the complexity of the analysis needed if based either on stream size or impervious cover, EPA determined that the most straightforward and fair way to identify those permittees whose discharges have the potential to cause or contribute to the known impairment is by identifying permittees whose discharges include the pollutants known to be found in stormwater along with Massachusetts's Section 303(d) and 305(b) lists identifying water quality limited waters that are impaired due to the same constituents found in stormwater. EPA is also aware that the 303(d) and 305(b) lists do not represent an exhaustive list of those waters that may be experiencing excursions above water quality standards and took this information into account when determining which discharges would be identified as needing additional controls over the course of the permit term. EPA welcomes comments on the approach to identify which permittees are subject to additional water quality requirements because of the potential to cause or contribute to an in-stream excursion above applicable water quality standards described below.

For the purposes of permit Part 2.2.2, "water quality limited water(s)" include any waterbody that does not meet applicable water quality standards, including but not limited to waters listed in categories 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b).

The Clean Water Act (CWA) requires states, territories, and authorized tribes to submit to EPA various reports concerning their waters, including:

1. Section 303(d) - by April 1 of all even numbered years, a list of impaired and threatened waters still requiring TMDLs; identification of the impairing pollutant(s); and priority ranking of these waters, including waters targeted for TMDL development within the next two years.
2. Section 305(b) - by April 1 of all even numbered years, a description of the water quality of all waters of the state (including rivers/streams, lakes, estuaries/oceans and wetlands). States may also include in the section 305(b) submittal a description of the nature and extent of groundwater quality.

Since the 2002 reporting cycle, EPA has encouraged states to prepare a single, Integrated Report that satisfies the reporting requirements above. EPA's recommended Integrated Reporting (IR) format reduces inefficiency, burden and redundancy in reporting requirements, and provides greater accountability on the status of all state monitored waters. In the IR guidance, EPA

recommends the states use the following reporting categories to report on the water quality status of all waters in their state:

- Category 1 - All designated uses (DU) are supported, no use is threatened
- Category 2 - Available data and/or information indicate that some, but not all of the DUs are supported
- Category 3 - There is insufficient available data and/or information to make a DU support determination
- Category 4 - Available data and/or information indicate that at least one DU is not being supported or is threatened, but a TMDL is not needed
- Category 4a- A TMDL is established
- Category 4b - Other required control measures are expected to result in attainment of an applicable water quality standard in a reasonable period of time
- Category 4c - Non-attainment of any applicable water quality standard is the result of pollution and is not caused by a pollutant
- Category 5 - Available data and/or information indicate that at least one DU is not being supported or is threatened, and a TMDL is needed
- Category 5m - Non-attainment of any applicable water quality standard for mercury as the result of mainly atmospheric deposition sources and comprehensive mercury reduction programs are in place to address the impairment

Waters in Category 4, 4a, 4b, 4c, 5 and 5m are impaired or threatened, and Category 5 and 5m represent the state's Section 303(d) list. Massachusetts chooses to list each waterbody segment in only one category listed above; therefore, waters that have an approved TMDL for some pollutants but not others would remain in Category 5 until TMDLs are approved for all of the pollutants impairing those waters. There are also unassessed waters in each state, including Massachusetts, that are not given a category designation but still may be experiencing excursions above water quality standards. This permit uses the term "water quality limited waters" to encompass both waters listed as impaired under Categories 5 and 4b pursuant to Section 303(d) for particular pollutants, and waters not listed as impaired for particular pollutants but that are experiencing excursions above water quality standards.[7]

In the Final 2012 Massachusetts Impaired Waters List (303(d) list) approved by EPA in May 2013, MassDEP identified over two thousand impairments in over seven hundred waterbody segments still requiring TMDLs. Roughly half of these impairment-waterbody segment combinations were related to stormwater pollution, including, but not limited to, impairments for bacteria, excess algal growth, nutrients, sedimentation, and dissolved oxygen. Pollution from urban stormwater runoff is well documented as a leading cause of impairment of freshwater lakes, rivers, and estuaries (US EPA, 2009); (National Research Council, 2008). A number of harmful pollutants are contained in urban stormwater runoff, including the following

[7] The absence of a water being listed as "impaired" pursuant to Section 303(d) of the Clean Water Act does not preclude the permittee, EPA or MassDEP from determining that the waterbody (or a segment thereof) is not meeting water quality standards and should be treated as "water quality limited" for purposes of Part 2.2.2 of the Draft Permit. (Such a determination does not automatically add the waterbody to the list of impaired waters under Section 303(d).) "Water quality limited" for the purposes of Part 2.2.2 of this Draft Permit does not include any waterbody segment for which the discharge of a particular pollutant is subject to an EPA approved TMDL. Those discharges are subject to Part 2.2.1 of the Permit.

major constituents: Nutrients (nitrogen and phosphorus), Bacteria/Pathogens, Chloride, Solids, Oil & Grease (Hydrocarbons), and Metals (Center For Watershed Protection, 2003); (US EPA, 1999); (Shaver, et al., 2007); (Lin, 2004); (Schueler, 2011); (Pitt, et al., 2004) (Clark & Pitt, 2012); (National Research Council, 2008)

The occurrence of these major pollutants in stormwater runoff was also evaluated through use of the data available in the National Stormwater Quality Database (NSQD) Version 3. NSQD Version 3 was the most recent update available; it contains 8,602 rain events from 104 cities throughout the continental United States, and represents all 9 EPA Rain Zones and 12 land use categories. Data from EPA Rain Zones 1 and 2 were utilized as these areas cover the New England region, and cover areas with similar rainfall patterns to New England. Data was selected from composite samples only in order to eliminate sample timing-specific bias. Table FS-1 below presents results from this analysis, and only includes results above sample detection limits. These results demonstrate the prevalence of nutrients (nitrogen and phosphorus), bacteria/pathogens, chloride, solids, oil & grease, and metals in urban stormwater in New England. A more detailed description of each major pollutant category and their sources in stormwater runoff is included below.

Parameter	Count	Median	Geometric Mean	Minimum	Maximum	25%	75%
Phosphorus Total (mg/l)	1967	0.25	0.26	0.02	10	0.15	0.42
Total Nitrogen (mg/L)	1763	2.0	2.0	1.0	7.0	1.0	3.0
Fecal Coliform (colonies/100 ml)	524	4500	3578	2.0	5230000	800	26000
Total E Coli (colonies/100 ml)	25	1100	1366	10	35000	460	8500
Chloride (mg/l)	57	6.0	7.0	1.0	350	4.0	10
Turbidity (NTU)	12	106	98	16	630	43	176
Total Suspended Solids (mg/l)	2046	45	46	1.0	2405	22	95
Oil and Grease Total (mg/l)	390	5.0	4.8	0.2	570	2.5	8.5
Zinc Total (ug/l)	1592	105	89	1.4	3050	50	190

Table FS-1: Urban stormwater pollutant event mean concentrations (EMCs). NSQD urban stormwater composite samples from rainfall zone 1 and 2.

Nutrients

In both marine and freshwater systems, an excess of nutrients results in degraded water quality, adverse impacts to ecosystems and limits on the use of water resources (Center For Watershed Protection, 2003) (Shaver, et al., 2007) . The most common forms of nutrient pollution are nitrogen and phosphorus. Nutrient loading to waterbodies is often

characterized not only through event mean concentrations (EMCs) but also through export coefficients from land uses with similar characteristics and represent the total amount of either nitrogen or phosphorus loaded annually to a system from a defined area. Annual export coefficients for nutrients are particularly useful at characterizing urban stormwater because of the cumulative affects nutrients have on receiving water bodies, including effects on downstream receiving waters. Receiving waters respond to the overall annual load of nutrients they receive, not just a snapshot in time of the urban stormwater nutrient concentration. Below is a further explanation of nitrogen and phosphorus in urban stormwater.

Nitrogen

Nitrogen is the most critical element in coastal and marine ecosystems, with nitrogen loading regarded as one of the important drivers of coastal eutrophication (Driscoll, et al., 2003) (Ryther & Dunstan, 1971) (US EPA, 2008) (National Research Council, 2000). Eutrophic waters often exhibit dense growths of algae or other nuisance aquatic plants, depressed levels of dissolved oxygen, loss of fish and submerged aquatic vegetation and foul odors (Moore, et al., 2011). The primary sources of nitrogen in urban stormwater are:

- Atmospheric deposition including mobile source deposition (deposition from combustion engines)
- Wash-off of fertilizers
- Nitrogen attached to eroded soils and stream banks
- Organic matter (such as pollen and leaves) and pet wastes that are deposited on impervious surfaces
- Leaching of nitrate from functioning septic systems

Residential lawns and turf areas (e.g., sports fields, golf courses, and parks) in urbanizing watersheds have been shown to be "hot spots" for nutrient input into urban runoff (Center For Watershed Protection, 2003). Research suggests that nitrogen concentrations in runoff from lawns and turf areas can be as much as four times greater than those from other urban nutrient source areas (Bannerman & Fries, 1993) (Waschbusch, 2000) (Garn, 2002) (Center For Watershed Protection, 2003). Runoff carries nitrogen from lawn areas and other pervious areas onto impervious surfaces, combines with nitrogen on impervious areas from other sources, and is eventually discharged to waterbodies via direct runoff or an MS4 system. The median nutrient EMC of total nitrogen seen in urban stormwater is 2.0 mg/l across the New England Region, based on the data available in NSQD (Table FS1). Similar levels of total nitrogen were seen in stormwater runoff in the Chesapeake region (Schueler, 2011) as well as across the nation, with Lin reporting a national average event mean concentration of 2.415 mg/L for nitrogen (TKN $+NO_2$ and NO_3) (Lin, 2004). In New England, an EMC of 2.0 mg/l nitrogen in urban stormwater would lead to an average yearly nitrogen loading of between 12 and 17 lb/acre/year of total nitrogen from impervious surfaces.

Phosphorus

Phosphorus is often the limiting nutrient in freshwater bodies, and can cause algal blooms and subsequent eutrophication to receiving water bodies (Mihelcic, 1999) (Schueler, 2011) (Shaver, et al., 2007). Orthophosphate is the form of phosphorus most readily available to aquatic life and is the most common form occurring in stormwater. The primary sources of phosphorus in urban stormwater are:

- Wash-off of phosphorus based lawn fertilizers used in residential areas, parks, cemeteries, and golf courses and fertilizers used by agriculture
- Wash-off of organic matter (such as pollen and leaves) and pet wastes that are deposited on impervious surfaces
- Atmospheric deposition
- Soil erosion
- Leaching from failed or inadequate septic systems

Data analysis in the Chesapeake region found that the total phosphorus concentration in lawn runoff is greater than other urban land areas (Center For Watershed Protection, 2003). Urban areas are cited as one of the two most important contributors to stormwater pollution (Carpenter, et al., 1998). The median nutrient concentration of total phosphorus in urban stormwater was 0.25 mg/l across the New England Region, based on data available in NSQD (Table FS-26). An analysis of data nationwide found the concentration of phosphorus during storms is very consistent with a mean EMC of 0.30 mg/l (Center For Watershed Protection, 2003).

Bacteria/Pathogens

Where stormwater runoff is discharged to recreational waters such as beaches and lakes, or comes into contact with shellfish beds, there is a potential public health risk associated with pathogen contamination. There are a number of indicator organisms that have been used to evaluate the presence of harmful pathogens in stormwater runoff; fecal coliform has been frequently used as well as Escherichia coli (e-coli), streptococci and enterococci (US EPA, 1999). Primary sources of pathogens in urban stormwater runoff include:

- Leaky sanitary sewer lines,
- Sanitary sewer cross-connections,
- Wash-off of wildlife and pet excrement,
- Failing septic systems.

Bacteria and pathogen concentrations in urban stormwater vary greatly with total e-coli concentrations ranging from 10 colonies per 100ml to 35,000 colonies per 100ml a across the New England Region, based on data available in NSQD (Table FS-1). As a point of reference, in order to meet water quality standards, Massachusetts Class B waters cannot exceed 235 colonies per 100ml during the bathing season due to the threat to human health. Generally bacteria and pathogen concentrations increase with increased impervious and increased urbanization (Mallin, et al., 2009).

Chloride

Chlorides are salt components found in runoff that result primarily from road deicer applications during winter months. Small amounts of chloride are essential for life, but high chloride levels can cause human illness and can be toxic to plants and animals (Shaver et al., 2007). The primary sources of chloride in urban stormwater are:

- Chloride based road deicing chemical application on roadways
- Chloride based road deicing chemical application on parking lots and other impervious surface
- Atmospheric deposition
- Chloride based road deicing stockpile runoff

Chloride is toxic to fresh water species. In surface waters, EPAs aquatic life national recommended water quality criteria for chloride are 860mg/l (acute criteria) and 230 mg/l (chronic criteria). In addition excess chloride can cause density stratification in lakes and ponds which results in oxygen depletion and potential fish kills. While the geometric mean EMC for chloride in New England is 7.0 mg/l based on data available in NSQD (Table FS-1) this includes data collected during all seasons where the highest concentration of chloride in stormwater discharges would be during winter months during the application of deicers on impervious surfaces. Granato and Smith have recorded chloride concentrations in highway runoff in Massachusetts exceeding 10,000 mg/l (Granato & Smith, 1999) and while that may be an extreme case, chloride concentrations in urban runoff during the deicing season can cause urban streams to violate acute water quality criteria (Tedder, 2009) (Heath & Belaval, 2011).

Solids/Sediment

Sediment, measured as total suspended solids (TSS) and/or turbidity, is one of the most common and potentially damaging pollutants found in urban runoff. TSS is a measure of the total mass suspended sediment particles in water and provides an estimate of sediment load transported to local and downstream receiving waters. Turbidity is a measure of how suspended solids present in water reduce the ability of light to penetrate the water column. The primary sources of sediment in stormwater runoff include:

- Wash-off of particulate material from impervious surfaces, including streets, parking lots, and rooftops
- Wash-off from lawns and landscaped areas
- Wash-off from construction activities
- Stream bank erosion

Sediment also provides a medium for the accumulation, transport, and storage of other pollutants, such as nutrients and metals (US EPA, 1999) (Center For Watershed Protection, 2003). Solids contribute to many water quality, habitat and aesthetic problems in urban waterways. Elevated levels of solids increase turbidity, reduce the penetration of light at depth within the water column, and limit the growth of desirable aquatic plants. Solids that settle out as bottom deposits contribute to sedimentation and can alter and eventually destroy habitat for fish and bottom-dwelling organisms Turbidity can exert impacts on aquatic biota, such as the ability of submerged aquatic vegetation to receive light and the ability of fish and aquatic insects to use their gills. The geometric mean EMC for total suspended solids in New England is 46 mg/l based on data available in NSQD (Table FS-1). This is slightly lower than the national EMC for TSS of 78.4 mg/l (Lin, 2004).

Oil & Grease (Hydrocarbons) and Metals

Metals are among the most common stormwater pollutant components. Many trace metals can often be found at potentially harmful concentrations in urban stormwater runoff (Center For Watershed Protection, 2003). Metals like lead, zinc, copper, and cadmium get into runoff from impervious areas that are trafficked by vehicles, such as roadways, driveways and parking lots, from vehicle wear, tire wear, motor oil, grease and rust. Zinc was used here as a surrogate for other metals found in stormwater runoff because it is the most ubiquitous of all metals found in urban runoff, and as the concentration of metals like copper, chromium and lead increase, so does the concentration of zinc (generally). The primary sources of metals in stormwater include:

- Wash-off of material deposited on impervious surfaces from corrosion of automobiles and bridges

- Atmospheric deposition
- Wash off from industrial areas
- Soil erosion

The geometric mean EMC for zinc in New England is 89 ug/l based on data available in NSQD (Table FS-1), this is lower than the national average EMC for zinc of 162 ug/l reported by Lin (2004), Lin also reported average EMCs for copper and lead of 13.5 ug/l and 67.5 ug/l respectively (Lin, 2004). Dissolved metals in waterbodies are readily assimilated by plants and animals living in the waters and while they are considered micronutrients, increased concentrations can cause hazardous effects and toxicity effects. The current EPA recommended water quality criteria for zinc is 120 ug/l for both acute and chronic exposure with lead having recommended water quality criteria of 65 ug/l(acute) and 2.5 ug/l(chronic). Copper criteria are calculated using the Biotic Ligand Model due to its toxicity being linked to other water quality parameters.

Oil and grease and hydrocarbons associated with oil and grease contain carcinogenic compounds and may be toxic to plants and animals (Center For Watershed Protection, 2003). Hydrocarbons adhere to sediments and are flushed into rivers and streams during storm events. Highest concentrations of hydrocarbons in stormwater runoff are generally associated with similar source areas as high metals concentrations. The sources of hydrocarbons in urban stormwater include:

- Wash-off of particulate material from impervious surfaces, including streets, parking lots
- Wash-off from vehicle maintenance areas
- Wash-off from gas stations
- Illicit dumping to storm drains

Oil and grease is used as a surrogate for all hydrocarbons because it is the most often measured hydrocarbon parameter. The geometric mean EMC for oil and grease in New England is 4.8 mg/l based on data available in NSQD (Table FS-1), this consistent with a geometric mean EMC for oil and grease in Massachusetts of 5.4 mg/l (Center For Watershed Protection, 2003). Currently Massachusetts has a narrative standard for oil and grease linked to aesthetics and EPA has interpreted this narrative criteria for oil and grease to be 15mg/l. Any concentration above 15 mg/l of oil and grease is assumed to produce a visible sheen in the receiving water.

Literature review and analysis of NSQD data of urban stormwater constituents indicates that it can be reasonably assumed that stormwater discharges from urban areas in New England contain bacteria/pathogens, nutrients, chloride, sediments, metals, and oil and grease (hydrocarbons). This is not to say that every grab sample of stormwater will contain each of the aforementioned stormwater constituents at the concentrations expressed in Table FS-1. However, if enough data are gathered on any single urban stormwater discharge, the average concentrations of bacteria/pathogens, nutrients, chloride, sediments, zinc (metals), and oil and grease (hydrocarbons) will likely be in the range of concentrations presented on Table FS-1. When a waterbody is found to be impaired pursuant to Section 303(d) or 305(b) of the CWA for a particular pollutant, or the receiving water is experiencing an excursion above water quality standards due to the presence of a particular pollutant, it indicates that the waterbody has no assimilative capacity for the pollutant in question. EPA reasonably assumes that urban stormwater discharges from urbanized areas in New England contain bacteria/pathogens,

nutrients, chloride, sediments, metals, and oil and grease (hydrocarbons) and finds that MS4 discharges are likely causing or contributing to the excursion above water quality standards when the receiving waterbody impairment is caused by bacteria/pathogens, nutrients, chloride, metals, sediments or oil and grease (hydrocarbons). EPA has determined that it is appropriate to require additional controls on such discharges to protect water quality

EPA believes that further general characterization of urban stormwater by permittees is not warranted and will likely result in event mean concentrations for stormwater constituents similar to the concentrations found in literature. In addition, the National Research Council recommends a minimum of 30 flow weighted composite samples collected over the course of 2-3 years on a variety of storm sizes to characterize the discharge from an outfall properly, which is a costly an onerous undertaking. Enough data have been collected to date to generally characterize urban runoff in New England and further study may be a waste of valuable resources. Also, the NSQD report found that general characterization of urban stormwater runoff quality is no longer warranted and "is not likely to provide any additional value beyond the data and information contained in the NSQD" (Pitt, et al., 2004). However, the Draft Permit does include a mechanism for permittees who believe their discharge does not contain the pollutant of concern to conduct sampling to demonstrate that their discharge does in fact not contain the pollutant of concern. EPA will review the sampling effort and may relieve the permittee of the requirements of Appendix H applicable to it. In order to adequately characterize the discharge, the permittee is expected to conduct a rigorous sampling effort equivalent to the sampling recommendation of the National Research Council discussed above. Upon completion of such a study, the permittee may submit its findings and data to EPA to request relief from the relevant portion of Appendix H. Until EPA provides written approval of relief from the requested requirements of Appendix H, the permittee remains subject to the requirements of Appendix H. EPA welcomes comments on this approach and the overall scope of the permittees subject to additional requirements.

Section 2.2.2 and Appendix H of the Draft Permit contain additional measures to control the discharge of stormwater to certain water quality limited waterbodies, namely, waterbodies that are impaired due to the presence of bacteria/pathogens, nutrients, chloride, metals, sediment, and oil and grease (hydrocarbons). Part 2.2.2 of the Draft Permit identifies permittees subject to the additional water quality based provisions of the Draft Permit and Appendix H contains the requirements broken down by pollutant type. EPA has determined that these additional BMPs are necessary and appropriate under the CWA because they specifically target the reduction of the pollutant causing the in-stream impairment. The schedules and BMP implementation requirements found in Appendix H represent the requirements each permittee identified in Part 2.2.2. of the Draft Permit must adhere to in order to comply with Part 2.1.1.a. of the Draft Permit

Discharges that are causing or contributing to an exceedance of water quality standards not due to bacteria/pathogens, nutrients, chloride, metals, sediment, and oil and grease (hydrocarbons) are subject to part 2.1.1.iii. of the Draft Permit.

a. Requirements for discharges to waterbodies that are impaired due to nitrogen:

As discussed above, urban stormwater generally contains dissolved nitrogen and discharges from MS4 systems to nitrogen impaired waterbodies or their tributaries can cause or contribute to excursions of water quality standards. Part 2.2.2.a. of the Draft Permit identifies permittees subject to water quality based requirements to control the discharge of nitrogen and Part I of Appendix H details the requirements and permittee responsibilities.

Discharges of nutrients in stormwater not only affect the point at which the discharge enters the receiving waterbody but also affect downstream waterbodies. With respect to nitrogen, excess nitrogen loading to coastal waterbodies is of primary concern. Estuaries, embayments and coastal waters are generally nitrogen limited with respect to eutrophication. MS4s that discharge to coastal waterbodies that are impaired due to excess nitrogen or to their tributaries require nitrogen reductions. Based on the 2012 Section 303(d) list for Massachusetts and the constituents known to be found in urban stormwater, urban stormwater discharges from the Taunton River Watershed, Buzzards Bay Watershed, Narragansett Bay watershed and Blackstone River Watershed are likely contributing to eutrophication impairments in Massachusetts coastal waters. Therefore, permittees located in these watersheds are subject to the water quality-based requirements found in Appendix H Part I. These requirements include additional BMPs above what is required in Part 2.2.3 of the Draft Permit to specifically target the control of nitrogen and protect water quality.

The permittees identified in Part 2.2.2.a. of the Draft Permit remain subject to MEP requirements of Part 2.2.3 of the Draft Permit but shall augment their SWMP to comply with the requirements of Part I of Appendix H. Additional or modified BMPs include modified Public Education requirements targeting education on nitrogen sources and source reduction; additional requirements that BMPs required during New Development and Redevelopment be optimized for nitrogen reduction; and Good Housekeeping Requirements including the requirement of the use of slow release fertilizers on municipal property (where fertilizers are used) and provisions targeting the collection of organic matter. Optimization for nitrogen removal in new and redevelopment means requiring developers to choose BMPs known to reduce nitrogen in stormwater, specifically BMPs that contain an anaerobic component to cause denitrification. These additional BMPs are specifically designed to target the reduction of nitrogen in stormwater by reducing nitrogen sources.

Part I of Appendix H also requires a source identification and assessment report that requires permittees to identify source categories and specific locations within the contributing catchments that are potential "hot spots" for nitrogen in stormwater. The nitrogen source identification report shall contain outfall mapping and catchment delineations that are completed as part of MEP requirements, calculations of the size of MS4 area draining to the receiving water, any monitoring data and impervious area and directly connected impervious area data for the contributing catchments. In order to make use of information being developed under Part 2.3 of the Draft Permit (mapping, monitoring, etc.), this report must be submitted with the year four annual report. This report is meant to guide the permittee in making decisions about which areas of the MS4 to retrofit or target for redevelopment BMPs that significantly reduce nitrogen in stormwater discharges. The permittee should use the findings of the report to guide decision making in order to maximize environmental benefit.

Lastly, Part I of Appendix H requires the permittee to produce a list of locations where structural BMPs can be installed as retrofits or as part of redevelopment of the municipally owned property. The permittee shall identify retrofit or redevelopment opportunities where BMPs can be installed to reduce nitrogen concentrations in stormwater discharges. The list of BMPs, locations for installation and a schedule for installation shall be submitted with the year five annual report. The permittee shall install a minimum of one BMP as a demonstration project six years after the permit effective date and install the remainder of the identified BMPs on the schedule developed and submitted as part of the year five

annual report. The SWMP and each annual report shall include steps the permittee is taking to reduce nitrogen in discharges. The permittees are also required to begin tracking nitrogen load reductions through the implementation of structural BMPs consistent with the methodology included in Attachment 1 to Appendix H. Each annual report shall include the estimated nitrogen reductions gained through structural BMPs installed in the regulated area. While there are currently no specific nitrogen load requirements in this Draft Permit, the information gathered by the permittee can be used to potentially satisfy future permit limits or TMDL WLAs.

EPA believes that, once fully implemented, the provisions of Appendix H Part I will substantially reduce nitrogen in stormwater discharges. Future assessments of the water quality limited waterbodies or other information may indicate further reductions are needed in future permit terms, but given the information presently known, EPA believes these provisions are appropriate and protective of water quality.

b. Requirements for discharges to waterbodies that are impaired due to phosphorus:

As discussed above, urban stormwater generally contains dissolved and particulate phosphorus and discharges from MS4 systems to phosphorus impaired waterbodies or their tributaries can cause or contribute to excursions of water quality standards. Part 2.2.2.b. of the Draft Permit identifies permittees subject to water quality based requirements to control the discharge of phosphorus and Part II of Appendix H details the requirements and permittee responsibilities. Discharges of nutrients in stormwater not only affect the point at which the discharge enters the receiving waterbody but also affect downstream waterbodies. With respect to phosphorus, excess phosphorus loading to inland waterbodies is of primary concern. Excessive concentrations of phosphorus is the most common cause of eutrophication in freshwater lakes, reservoirs, streams and headwaters of estuarine systems (Correll, 1998). Moreover, studies have demonstrated the water quality impact of phosphorus additions to downstream stream reaches, some as distant as 10 km (Correll, 1998). Therefore, MS4s that discharge to waterbodies that are impaired due to excess phosphorus or to their tributaries require phosphorus reductions. EPA evaluated each watershed containing segments impaired by phosphorus on the 2012 Section 303(d) list for upstream contributing segments using a GIS analysis. The permittees identified in Part 2.2.2.b. of the Draft Permit discharge either directly to a waterbody that is water quality limited by phosphorus or to a waterbody tributary to the water quality limited segment. The permittees identified in Part 2.2.2.b. of the Draft Permit remain subject to MEP requirements of Part 2.2.3 of the Draft Permit but shall augment their SWMP to comply with the requirements of Part II of Appendix H.

These additional or modified BMPs include additional Public Education requirements targeting education on phosphorus sources and source reduction; additional requirements that BMPs for New Development and Redevelopment be optimized for phosphorus removal; and Good Housekeeping Requirements including provisions targeting the collection of organic matter. The requirement that BMPs be optimized for phosphorus removal includes requiring infiltration where feasible because infiltration has been shown to cause the adsorption of phosphorus onto soil particles. Other BMPs with known phosphorus removal include BMPs that are designed with a sand/organic filtration

component. These additional BMPs are specifically designed to target the reduction of nitrogen in stormwater by reducing nitrogen sources.

Part II of Appendix H also requires a source identification and assessment report that requires permittees to identify source categories and specific locations within the contributing catchments that are potential contributors of phosphorus in stormwater. The phosphorus source identification report shall contain outfall mapping and catchment delineations, calculations of the size of MS4 area draining to the receiving water, any monitoring data and impervious area and directly connected impervious area (DCIA) data for the contributing catchments. In order to make use of information being developed under Part 2.3 of the Draft Permit (mapping, monitoring, etc.), this report must be submitted with the year four annual report. This report is meant to guide the permittee in making decisions about which areas of the MS4 to retrofit or target for redevelopment BMPs that significantly reduce phosphorus in stormwater discharges. The permittee should use the findings of the report to guide decision making in order to maximize environmental benefit.

Lastly, Part II of Appendix H requires the permittee to produce a list of locations where structural BMPs can be installed as retrofits or as part of redevelopment of the municipally owned property. The permittee shall identify retrofit or redevelopment opportunities where BMPs can be installed to reduce phosphorus concentrations in stormwater discharges so the permittees discharge no longer causes or contributes to exceedances of water quality standards in the receiving water. The list of BMPs, locations for installation and a schedule for installation shall be submitted with the year five annual report. The permittee shall install a minimum of one BMP as a demonstration project six years after the effective date and install the remainder of the identified BMPs on the schedule developed and submitted as part of the year five annual report. The installation of identified BMPs shall be completed as soon as possible after the permit effective date. The SWMP and each annual report shall include steps the permittee is taking to reduce phosphorus in discharges.

The permittees are also required to begin tracking phosphorus load reductions through the implementation of structural BMPs consistent with the methodology included in Attachment 3 to Appendix F. Each annual report shall include the estimated phosphorus reductions gained through structural BMPs installed in the regulated area. While there are currently no specific phosphorus load requirements in this permit, the information gathered by the permittee can be used to potentially satisfy future permit limits or TMDL WLAs. EPA believes that, once fully implemented, the provisions of Appendix H Part II will substantially reduce phosphorus in stormwater discharges. Future assessments of the water quality limited waterbodies or other information may indicate further reductions are needed in future permit terms, but given the information presently known, EPA believes these provisions are appropriate and protective of water quality.

c. Requirements for discharges to waterbodies that are impaired due to bacteria or pathogens:

Part III of Appendix H deals specifically with water quality limitations caused by excess bacteria or pathogens. Bacteria or pathogens in stormwater are also a potential public health concern. Part 2.2.2.c. designates permittees subject to additional requirements found in Appendix H Part III. For bacteria or pathogens, the water quality impacts are felt near the

point of discharge and it is for this reason that only permittees discharging directly to a waterbody that is found to be impaired to bacteria or pathogens are subject to additional requirements.

Where the exceedance is caused by illicit connection(s) or other condition(s) that can be eliminated or corrected readily, Part III of Appendix H requires that the condition causing or contributing to the water quality exceedence be eliminated within 60 days of identifying the problem. This includes situations where, during the permit term, the permittee becomes aware that its discharge is causing or contributing to a water quality exceedence. This situation is likely to occur when the source of bacteria is readily identified and can be removed; therefore the permit requirement to remove the condition within 60 days in Part III of Appendix H corresponds to the schedule for the removal of an illicit connection found in Part 2.3.4 of the Draft Permit (removal of the illicit connection within 60 days).

When the condition causing or contributing to the water quality exceedance cannot be removed readily, or the permittee discharges directly to a waterbody identified as impaired due to bacteria or pathogens in categories 5 and 4b on the most recent Massachusetts Integrated Report of waters listed pursuant to Clean Water Act sections 303(d) and 305(b), Part III of Appendix H requires additional BMPs above what is required in Part 2.3 of the Draft Permit to specifically target the control of bacteria or pathogens. Permittees remain subject to MEP requirements of Part 2.3 of the Draft Permit but shall augment their SWMP to comply with the requirements of Part III 1)c. of Appendix H. These additional BMPs include additional Public Education requirements targeting education on bacteria or pathogen sources, including proper management of pet waste in areas that discharge to a waterbody impaired for bacteria or pathogens, and proper maintenance of septic systems in any catchment that discharges to a waterbody impaired for bacteria or pathogens. Part III Appendix H also requires the permittee to designate catchments draining to any waterbody impaired for bacteria or pathogens either Problem Catchments or HIGH priority in implementation of the IDDE program, and to install and maintain trash receptacles for the collection of pet waste at open spaces and park areas within the community.

EPA believes that, once fully implemented, the provisions of Appendix H Part III will substantially reduce bacteria and pathogens in stormwater discharges. Future assessments of the water quality limited waterbodies or other information may indicate further reductions are needed in future permit terms but given the information presently known, EPA believes these provisions are appropriate and protective of water quality.

d. Requirements for discharges to waterbodies that are impaired due to chloride:

Part IV of Appendix H deals specifically with water quality limitations caused by chloride. Part 2.2.2.d. identifies permittees subject to additional requirements found in Appendix H Part IV. The water quality impacts of chloride are greatest near the point of discharge and it is for this reason that only permittees discharging directly to a waterbody that is found to be impaired due to chloride are subject to additional requirements. EPA realizes the use of deicing chemicals during the winter season is for public safety and is not imposing requirements that would completely stop the use of salts as the preferred deicing agent. Instead, the requirements found in Appendix H Part IV focus on reducing the amount of chloride applied to various sources (state roads, town roads, parking lots, storage, etc.) through the use of calibration, low salt zones, application rate standards and other BMPs

designed to reduce the amount of road salt applied without compromising public safety. Each permittee discharging to waterbodies that are impaired due to chloride shall create a Salt Reduction Plan aimed at reducing the total amount of chloride applied in the catchment area that drains to the impaired water. Each permittee can tailor the Salt Reduction Plan to meet the needs of the permittee as long as the total amount of chloride applied is reduced in the catchment discharging to the water quality limited waterbody. Progress toward reducing the amount of salt applied by the permittee or its agents shall be evaluated by tracking the total amount of salt used by the permittee or its agents each year. EPA fully recognizes that salt use will change year to year based on the number of days deicing is required but the overall application of chloride per deicing day should decline as a result of implementation of the salt reduction plan. In the event that a permittee has a Salt Reduction Plan in place and becomes aware of a water quality standard violation in another waterbody due to chloride and the permittee's discharge is causing or contributing to the impairment, the permittee can apply the Salt Reduction Plan already in place to the new catchment draining to the water quality limited waterbody. EPA also recommends instituting the Salt Reduction Plan town wide due to potential cost savings of reducing the amount of salt applied to impervious surfaces. Appendix H Part IV also contains requirements the permittee must impose upon private property, specifically the requirement that deicing chemical stock piles at commercial and industrial sites be covered and not exposed to precipitation. EPA believes that, once fully implemented, the provisions of Appendix H Part IV will substantially reduce chloride in stormwater discharges. Future assessments of the water quality limited waterbodies or other information may indicate further reductions are needed in future permit terms, but given the information presently known, EPA believes these provisions are appropriate and protective of water quality.

e. Requirements for discharges to waterbodies that are water quality limited due to solids, metals or oil and grease (hydrocarbons):

Part V of Appendix H deals specifically with water quality limitations caused by solids, metals or oil and grease (hydrocarbons). Part 2.2.2.e. identifies permittees subject to additional requirements found in Appendix H Part V. The water quality impacts of solids, metals or oil and grease (hydrocarbons) are greatest near the point of discharge and it is for this reason that only permittees discharging directly to a waterbody that is found to be impaired due to solids, metals or oil and grease (hydrocarbons) are subject to additional requirements. Water quality limitations due to sediment, metals or oil and grease (hydrocarbons) can include (but are not limited to) impairments identified as TSS, total solids, clarity, turbidity, any heavy metal, PAHs, toxicity, hydrocarbons and visible sheen. Solids, metals and oil and grease are lumped together due to each pollutant's close association with one another. All of these pollutants are found in greatest quantities in stormwater discharges from impervious areas with industrial or commercial land uses, with oil and grease and metals concentrations increasing with increased sediment load.

The requirements of Part V of Appendix H include additional BMPs above what is required in Part 2.3 of the Draft Permit to specifically target the control of sediment from areas with known higher pollutant loadings of sediment, oil and grease (hydrocarbons) and metals. The permittees identified in Part 2.2.2.e. of the Draft Permit are subject to additional requirements.

Where the exceedance is caused by illicit connection(s) or other condition(s) that can be eliminated or corrected readily, Part V of Appendix H requires that the condition causing or contributing to the water quality exceedence be eliminated within 60 days of identifying the problem. This includes situations where, during the permit term, the permittee becomes aware that its discharge is causing or contributing to a water quality exceedence. This situation is likely to occur when the source of sediment, oil and grease (hydrocarbons) or metals is readily identified and can be removed; therefore the permit requirement to remove the condition within 60 days in Part III of Appendix H corresponds to the schedule for the removal of an illicit connection found in Part 2.3.4 of the Draft Permit (removal of the illicit connection within 60 days).

When the condition causing or contributing to the water quality exceedance cannot be removed readily, or the permittee discharges directly to a waterbody identified as impaired due to sediment, oil and grease (hydrocarbons) or metals in categories 5 and 4b on the most recent Massachusetts Integrated Report of waters listed pursuant to Clean Water Act sections 303(d) and 305(b), Part V of Appendix H requires additional BMPs above what is required in Part 2.3 of the Draft Permit to specifically target the control of sediment, oil and grease (hydrocarbons) and metals. Permittees remain subject to MEP requirements of Part 2.2.3 of the Draft Permit but shall augment their SWMP to comply with the requirements of Part V of Appendix H.. The additional BMPs that shall be implemented include additional good housekeeping requirements where the permittee shall determine an increased street sweeping and catch basin cleaning program in areas known to produce high sediment loads. The permittee shall also treat development or redevelopment of commercial or industrial projects in the catchment areas draining the water quality limited waterbody as areas of potentially high pollutant loading and require pollutant removal prior to infiltration and require that systems are designed to provide shutdown and containment in case of an emergency or unexpected event. EPA believes that, once fully implemented, the provisions of Appendix H Part V will substantially reduce sediment, metals and/or oil and grease (hydrocarbons) in stormwater discharge., Future assessments of the water quality limited waterbodies or other information may indicate further reductions are needed in future permit terms, but given the information presently known, EPA believes these provisions appropriate and protective of water quality.

4. Requirements to Reduce Pollutants to the Maximum Extent Practicable

Maximum Extent Practicable (MEP) is the statutory standard that established the level of pollutant reduction required by permits for operators of MS4s. All MS4 permittees are subject to MEP requirements. There is not a precise regulatory definition of MEP. Rather, as EPA explained in the preamble to the Phase II regulations, "MS4s need the flexibility to optimize reductions in storm water pollutants on a location-by-location basis…. The pollutant reductions that represent MEP may be different for each small MS4, given the unique local hydrologic and geologic concerns that may exist and the differing possible pollutant control strategies." 64 FR 68722, 68754, December 8, 1999. Accordingly, the Draft Permit requires each permittee to determine appropriate BMPs to satisfy each of the six minimum control measures through an evaluative process.

MEP is expected to continue to adapt based on changing conditions, improving BMP effectiveness, and increasing operator capabilities. Practices that were considered MEP under the MS4-2003 permit may no longer meet that standard and must be improved or expanded based on changed conditions. EPA developed the MEP provisions in this Draft Permit (discussed in detail below) after reviewing annual reports and stormwater management plans to consider measures being

employed by MS4s to implement the MS4-2003 permit in Massachusetts.. EPA also reviewed other MS4 general permits in New England and throughout the country to better understand what other MS4s are being required to do to control stormwater pollutants in order to determine what would be practicable enhancements to the MS4-2003 MEP requirements. The MEP provisions in this Draft Permit reflect the approach of building on the existing programs of the 2003 permit with additional requirements that EPA believes are practicable and satisfy the MEP statutory requirement.

a) Control Measures

The MS4-2003 permit required that "[a]ll elements of the storm water management program must be implemented by the expiration of this permit."[8] This Draft Permit does not extend the compliance deadlines set forth in the MS4-2003 permit. Further, permittees authorized under the MS4-2003 permit must continue to implement their existing SWMPs while updating their SWMPs pursuant to this new permit.

Implementation of the SWMP involves the identification of BMPs to address the control measures and the identification of measurable goals for the BMP. The Draft Permit identifies the long-term objective of each control measure. The long-term objective of the control measure may not be completely met at the end of the Permit term, but the permittee should be able to demonstrate progress towards the defined long-term objective. The permittee must implement the control measures described in the Draft Permit and document actions in the SWMP demonstrating progress towards achievement of the objective of the control measure. The permittee must identify interim goals as steps towards achievement of the long-term objective. This process represents the iterative nature of MEP.

Goals identified as part of the SWMP must be measurable. A "measurable goal" is a goal for which progress can be tracked or measured. A well-defined goal will have an outcome associated with it. Goals can be expressed as short term, mid-range or long term. The permittee must evaluate the success of a goal. The permittee can evaluate the success of the goals using a variety of indicators including programmatic, social, physical, hydrological, or environmental changes.

Measurable goals may be expressed either quantitatively or qualitatively. The method used to assess whether a goal has been met should be measurable, reliable, relevant, and an actual measure of the outcome. There are various methods to measure outcome. These include confirmation or documentation that a task has been completed; tracking an absolute number or value of something; surveying to determine the knowledge or awareness of a group; inspections to make actual observations of an event; and monitoring to obtain an actual measurement of a pollutant in-stream or in an outfall, and using surrogates for pollutant removal. In some instances, the Draft Permit identifies specific measurement methodologies. In others, the permittee may select a method of evaluation that satisfies the discussions above.

Relying on Another Entity (Part 2.3.1)

In accordance with 40 CFR § 122.35, the Draft Permit allows an MS4 to rely on another entity for implementation of all or part of a permit condition or control measure. The permittee may

[8] MS4-2003 permit Parts IIA.2; IIIA.2; IVA.2; and V.A.2

rely on the other entity if the other entity is actually implementing the control measure or permit condition. The other entity must agree to implement the measure or condition for the MS4. This agreement must be included as part of the SWMP. If the other party fails to implement the measure or permit condition, the permittee is ultimately legally responsible for its implementation.

One comment during the previous draft permit comment period expressed concern about allowing another entity to implement a permit provision for the permittee. The intent of this provision is not that the other entity is provided more flexibility than the permittee. The permit is intended to allow flexibility to the permittee in the methodology it uses to implement some of the Draft Permit's provisions. Many permit requirements are an "end point" and typically do not dictate the process to that end point. Different activities can accomplish the same task. For example, the permit requires an education program, but does not provide the methodology for putting the program together. Another entity could develop an education program which has the same elements of the Draft Permit and the permittee could rely on that other entity to comply with the terms of the Draft Permit. The permittee is expected to achieve the "end point" and this provision allows it to rely on another entity to accomplish the required measure. Crucially, however, the permittee remains responsible for complying with the permit even if it shares, delegates, or otherwise arranges for another entity to perform some of the actions under the permit.

a. Public Education and Outreach

The MS4 must implement a public education program to distribute educational materials to the populations within the MS4 or conduct other outreach activities about the impacts of stormwater discharges on water bodies within the MS4 jurisdiction and steps the public can take to reduce pollutants in stormwater runoff. The education program must be specific to the MS4 and builds upon what was conducted as required by the 2003 MS4 permit. The Draft Permit describes requirements that slightly increase the expectations and requirements for a permittee's public education program and attempts to provide more guidance on targets for the program, building upon what was conducted and reported as completed by permittees in the previous permit term. The Draft Permit identifies four audiences that must be considered in the public education program. The audiences are residents, industrial facilities, commercial/business facilities, and the construction/development industry. The overall long-term goal of an effective education program is to change an identified behavior and increase the knowledge of the community. EPA recognizes that the goal may take more than one permit term to achieve.

EPA expects an education program to have a defined and targeted message for each of the different audiences and to include methods to evaluate effectiveness of the educational messages. Based on review of annual reports from the MS4-2003 permit, EPA found that some of the education programs developed by MS4s did not reflect these expectations. In order to achieve the objective of this measure, the Draft Permit includes detailed expectations for educating the public.

As stated previously, the Draft Permit defines target audiences and requires the permittee to provide educational materials to each. The Draft Permit includes topics for consideration for all audiences. The permittee may use those topics listed or may focus on other topics specific to the small MS4. The permittee must distribute a minimum of two educational

messages to each audience during the permit term (a minimum total of eight). The messages must be spaced at least a year apart. The time in between the distribution of the educational material will allow the municipality to evaluate the effectiveness of the message. Any method the permittee uses to measure the effectiveness of the education should be linked to the established measureable goals. Some examples include surveys to gauge changes in behavior or awareness. Quantifiable data such as the number of brochures distributed, the number of hits on a website, or the number of public attendees at MS4 sponsored events can be tracked. The permittee may identify a specific behavior the program is targeting and track metrics which show the adaptation of that behavior. The educational messages should reflect the needs and characteristics of the area served by the MS4. This may include distribution of materials in a language other than English, as appropriate. Permittees can form partnerships with other organizations to assist in the implementation of its education and outreach programs. These partnerships may include other MS4s in a watershed, environmental groups, watershed associations, or other civic organizations.

The Draft Permit contains requirements to evaluate the effectiveness of the education program. Information about evaluation of program effectiveness can be found in EPA's Getting In Step Program (http://cfpub.epa.gov/npstbx/getinstep.html). When designing the education program, the municipality should determine evaluation techniques up front. For example, if a municipality wants to track the number of hits on the municipal website, the website should be designed with a tracking mechanism. Evaluations can focus on the process, the impact, or the content. Indicators such as administrative, social or environmental can also factor into the evaluation of program effectiveness.

Ideally, an MS4's public education program should include goals and objectives that are based on specific stormwater issues in the municipality or pollutants of concern within a waterbody. Each MS4 may select its own unique set of goals or objectives, but the ultimate outcome of the program is to elicit specific changes in behavior that in turn benefits water quality. The measurement of the effectiveness of the educational messages should be linked to the measurable goals established by the MS4. For example, a measurable goal may be to decrease the amount of trash in a local park by a certain percentage. The municipality installs more trash barrels and signs, establishes a clean-up day then monitors the results for a defined period of time. If the amount of trash decreases based on the efforts of the municipal then the municipality could conclude that both the message and delivery of the message where effective.

Comments on the previous draft permits expressed a desire for EPA to take the lead in the development of an educational program. At this time, while EPA has not developed a nation-wide educational message, Region has developed the Soak Up the Rain website and other resources to help raise awareness about stormwater and promote the implementation of practices to reduce runoff. Useful links include:

- Soak up the Rain www.epa.gov/region1/soakuptherain
  The Soak up the Rain website has a wide range of resources for those looking to conduct outreach about actions citizens can take to reduce polluted runoff.
- Nonpoint Source Toolbox http://cfpub.epa.gov/npstbx/index.html
  The toolbox includes a variety of resources to help develop an effective and targeted outreach campaign. The Toolbox is intended for use by state and local agencies and other organizations interested in educating the public on nonpoint

source pollution or stormwater runoff.

- Public Education on Stormwater and Impacts
  http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=1
  A wide range of resources including fact sheets, how to guides, and case studies on outreach and educational programs
- Low Impact Development Videos:
  http://water.epa.gov/polwaste/green/video.cfm
  A collection of videos, including "Reduce Runoff: Slow it Down, Spread it Out, Soak it In!" that can be aired on cable television.
- After the Storm: http://water.epa.gov/action/weatherchannel/index.cfm
  A video produced by EPA and the Weather Channel to educate the public about watersheds and practices to address stormwater.
- Green Infrastructure
  http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-1
  Find case studies, research, tools, and a wide range of information related green infrastructure.

Watershed and other environmental organizations, regional stormwater coalitions, and other municipalities may collaborate with permittees and many have materials for use in conducting outreach. During the public comment period on the previous draft permit, the Blackstone River Watershed Association expressed a willingness to "…collaborate with conservation commissions, departments of public works, and other town entities or to present at town meetings and other municipal gatherings ...." During the MS4-2003 permit term, various stormwater coalitions and other groups developed comprehensive public education programs for use by regulated small MS4s.

EPA estimates that the total cost for implementation of the Public Education and Outreach minimum control measure will likely be less than 5% of the overall stormwater budget used for compliance with this permit. The Sustainable Stormwater Funding Evaluation Final Report (Horsley Witten, 2011) found that on average the three towns studied spent less than 2% of their overall budget on Public Education and Outreach. The estimated increase to 5% of the overall budget reflects additional requirements and emphasis the Draft Permit places on public education and outreach. EPA anticipates that the cost of compliance with the Public Education and Outreach minimum control measure will be between approximately $3,000 and $40,000 per year depending on the size of the municipality and the scope of the public education and outreach program.

b. Public Involvement and Participation

This control measure is closely related to the public education and outreach control measure. EPA supports the concept that when the public is given an opportunity to understand and participate in a stormwater protection program, the public generally will become supportive of the program. The objective of this measure is to provide and engage the public with opportunities to participate in the review and implementation of the SWMP. The Draft Permit requires that public participation opportunities, at a minimum, comply with the public notice requirements of the Commonwealth. All public participation meetings need to be conducted in accordance with the Massachusetts Open Meeting Law, M.G.L. c. 30A, §§ 18-25.

Permittees are encouraged to provide more interactive opportunities for public participation. Examples include volunteer water quality monitoring, community clean up days, hazardous waste collection days, and adopt a drain/adopt a stream programs.

The Draft Permit requires that the permittee annually provide an opportunity for the public to participate in the implementation of the SWMP. Participation efforts should attempt to engage all groups serviced by the MS4. This effort may include creative public information messages such as announcements in neighborhood newsletters, use of television spots on the local cable channel, or announcements or displays at civic meetings. One goal of public participation is to involve a diverse cross-section of people and businesses in the community to assist in development of a stormwater management program that meets the needs of the permittee and the community serviced by the MS4.

Many comments on the previous draft permit requested a requirement for municipalities to post the SWMP and updates, maps, annual reports and NOIs on EPA's website. Under the 2003 permit, EPA routinely posted NOIs and annual reports on its website. EPA plans to continue this practice upon finalization of this new permit. At this time, EPA does not require the submission of the SWMP therefore SWMPs will not be posted on EPA's website. EPA requires the posting of the SWMP online where the permittee is able to do so through an existing website. The majority of permittees under this permit are traditional permittees and have town websites that could be used to fulfil this requirement. However, if permittees do not have websites, they are not required to post the SWMP online. The Sustainable Stormwater Funding Evaluation Final Report (Horsley Witten, 2011) found that on average the three towns studied spent less than 2% of their overall budget on Public Participation and Involvement. EPA does not anticipate the cost of compliance with the Public Participation and Involvement requirements of this permit to increase from those costs associated with the 2003 permit.

c. Illicit discharge detection and elimination

The MS4-2003 permit required that the "permittee must develop, implement, and enforce a program to detect and eliminate illicit discharges."[9] The MS4-2003 permit also provided that "[a]ll elements of the stormwater management program must be implemented by the expiration date of this permit."[10] While this Draft Permit builds upon the requirements set forth in the MS4-2003 permit, it does not extend the deadlines applicable to the illicit discharge detection and elimination (IDDE) minimum measure imposed by the MS4-2003 permit.

The MS4-2003 permit required each MS4 to develop and implement an IDDE program. Since issuance of that permit, EPA, MassDEP, and MS4s have gained an improved and more comprehensive understanding of the nature of illicit discharge connections; the extent of the problem; effective technologies and procedures to detect and verify illicit connections; and the best practices to reduce discharges of contaminated stormwater due to

[9] MS4-2003 Parts II.B.3 IV.B.3; and V.B.3
[10] MS4-2003 Parts II.A.2 ; IV.A.2; and V.A.2

the presence of illicit connections. Collaborative programs such as the Clean Charles Initiative have demonstrated IDDE can be a key contributor to improved water quality. In light of the demonstrated results and practical experience gained from these efforts, the Draft Permit requires more specific BMPs than the MS4-2003 permit. For example, the Draft Permit requires MS4s to develop a written IDDE protocol that includes specific requirements and procedures for implementation of the IDDE program. Examples of these requirements are a detailed map, a written prioritization of areas with a potential of illicit discharges, dry weather screening, wet weather outfall monitoring, record keeping, and thorough and complete storm drain network investigations that systematically and progressively evaluate manholes in the storm system to narrow the location of a suspected illicit connection or discharge to an isolated pipe segment. These comprehensive requirements are described in the following paragraphs.

This control measure requires the MS4 to detect and eliminate illicit discharges from its municipal separate storm sewer system. The regulations at 40 CFR §122.26(b)(2) define an illicit discharge as "…any discharge to a municipal separate storm sewer system that is not composed entirely of stormwater except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities." Some illicit discharges enter the storm system directly, such as incorrectly connected wastewater discharge lines, while others may enter indirectly, such as through infiltration from cracked sanitary lines or spills collected by drain outlets. Both types of discharges can contribute pollutants to the system that in turn affect water quality. An illicit discharge is, with limited exceptions, any discharge to a municipal separate storm sewer system that is not stormwater.

Consistent with 40 CFR § 122.34(b)(3)(iii), the Draft Permit contains a list of specific types of non-stormwater discharges that the permittee must address only if the permittee identifies such discharges as significant contributors of pollutants. MS4s should examine the potential sources as categories or individual discharges and examine the potential of those categories or individual discharges to contribute pollutants to the MS4. For example, potable water may not contribute pollutants that affect the MS4 discharges because the source is associated with the water supply. However, foundation drains and crawl spaces may be associated with residential basements and the type of pollutants may be unknown. In this situation, the MS4 may want to establish a registration program and incorporate an educational message about proper storage of household chemicals, or the permittee may prohibit this source of non-stormwater due to the unknown nature of the pollutants. The permittee must document its determinations on the categories of non-stormwater in its SWMP and must prohibit any sources identified as significant contributors of pollutants.

For all other non-stormwater discharges, the Draft Permit describes required components of an illicit discharge detection and elimination program. The Draft Permit includes elements that are listed as guidance in 40 CFR §122.34(b)(3) and the information and procedures included in Illicit Discharge Detection and Elimination – A Guidance Manual for Program Development and Technical Assessment by the Center for Watershed Protection and Dr. Robert Pitt. These measures have been used in enforcement cases throughout Massachusetts and by towns in the Charles River and Mystic River Watersheds and have resulted in the successful removal of illicit connections and improvements in water quality. EPA believes that the inclusion of elements in the permit as requirements instead of guidance represents a necessary step to strengthen requirements of the IDDE program and creates an aggressive, thorough, and systematic approach that can be implemented across

the Commonwealth that will lead to improvements to water quality. In addition, this Draft Permit prohibits non-stormwater discharges (Part 1.3 of the Draft Permit). EPA feels that the level of effort described in Part 2.3.4. of the Draft Permit is necessary and appropriate to ensure discharges from the MS4 are limited to the stormwater discharges authorized by this NPDES permit.

Sanitary Sewer Overflows – SSOs

SSOs – Sanitary Sewer Overflows – are illegal. They are unpermitted discharges of raw sewage and are often caused by blockages or breaks in sewer lines. There are a variety of situations which can cause an SSO to occur. These include:

- Infiltration and Inflow (I/I) – too much rainfall or snowmelt infiltrating through the ground into leaky sanitary sewers which are not designed to accommodate all the rainfall;
- Excess water inflowing through roof drains connected to the sewers, broken pipes and badly connected sewer service lines**;**
- Undersized systems;
- Pipe failures;
- Equipment failures;
- Sewer Service connections; and
- Deteriorating sewer systems.

Due to the significant impacts which can be caused by SSOs, they must be removed from the storm sewers and be properly directed to the treatment plants. The approach to address SSOs involves not just operators of the storm sewer systems, but also operators of the sanitary system.

The Draft Permit specifically prohibits discharges from SSOs. The permittee must identify any SSOs that have not been eliminated or for which an underlying cause has not been identified or corrected. The Draft Permit requires the permittee to have an inventory of all SSOs including the suspected causes and planned corrective measures. This information must be included as part of the SWMP and the annual report.

Outfall Inventory

If not completed under the MS4-2003 permit, the Draft Permit requires the MS4 to conduct an outfall inventory. The purpose of the outfall inventory is to verify outfall information. EPA expects a municipality to know the locations of outfalls it owns and where they discharge. EPA recognizes that due to topography and private property issues, exactly locating each outfall may not always be feasible. In situations where locating the actual outfall is not feasible, the permittee should identify the nearest point within the system that can be safely and legally documented and record it as part of the outfall inventory. The permittee should use existing maps and verify them based on actual field observations. The permittee must complete the inventory no later than 1 year from the effective date of the Permit. The permittee should use the definition of "point source" found at 40 CFR § 122.2 for purposes of identifying outfalls. For each outfall, the permittee must observe the outfall and record specific information. Each outfall must have a unique identifier such as a number or name and be located within +/- 30 feet. Permittees must also include the condition of the outfall and record any indicators of illicit connections which include color,

odor, floatables, oil sheens or evidence of flow. Permittees are encouraged to couple this inventory with dry weather outfall flow sampling requirements of the dry weather investigation requirements (Part 2.3.4.7) where applicable.

System Mapping

The MS4-2003 permit required MS4s to develop a map that, at a minimum, depicted the locations of the stormwater outfalls and names and locations of all waters that receive discharges from those outfalls. That map must have been completed by May 1, 2008. The Draft Permit requires that additional detail be added to the existing map. In addition to outfalls and receiving waters, the map must now include the locations of catch basins, manholes, pipes, treatment facilities associated with the stormwater system, and water resource areas (beaches, drinking water sources, critical habitats). The permittee may choose to include additional useful information on the map such as data regarding land use (zoning information) and the amount of impervious area on a parcel or in a catchment. The Draft Permit does not require a specific tool for the mapping, however, a map generated using a Geography Information System (GIS) is EPA's preferred method. The Draft Permit defines an outfall as a point source (as defined in 40 CFR § 122.2) at the location where the municipal separate storm sewer system discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances that connect segments of the same stream or other waters of the U.S. and that are used to convey waters of the U.S.

The Draft Permit provides two (2) years for all MS4s (excluding new permittees) to complete the additional mapping elements required by the Draft Permit for permittees covered under the 2003 permit. The Draft Permit does not provide any additional time for the completion of the map of outfalls and receiving waters that was required in the previous permit for permittees covered under the 2003 MS4 permit. The initial system map must have been complete by May 1, 2008. The two year timeframe for additional mapping in the Draft Permit is based on the expectation that the permittee has completed the mapping required by the MS4-2003. New permittees are given an additional 2 years to complete the mapping required by this Draft Permit.

Written Illicit Discharge Detection and Elimination Program

The MS4 must have adequate legal authority to implement the following activities as part of the IDDE program: prohibit illicit discharges; investigate suspected illicit discharges; eliminate illicit discharges and enforce the IDDE program. The MS4-2003 permit required development of an ordinance or other regulatory mechanism to address the required program components. The ordinance must have been in place and effective by May 1, 2008. The MS4 must reference the authority to implement this measure in the IDDE program. The IDDE program is part of the overall SWMP.

The MS4-2003 permit required the permittee to "develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, into the system." The MS4-2003 permit established the required elements of the plan.[11] As required by the MS4-

[11] MS4-2003 Permit Parts II.B.3(c); III.B.3(c); IV.B.3(c); and V.B.3(c)

2003, this plan must have been developed and implemented by May 1, 2008. The Draft Permit does not extend this deadline.

The Draft Permit builds on the requirements of the MS4-2003 permit by detailing additional required components of an illicit discharge detection and elimination program. One component is a written protocol that clearly identifies responsibilities with regard to eliminating illicit connections. A second component is an assessment and ranking of the catchments within the MS4 for their potential to have illicit discharges. The final component is a written systematic protocol for locating and removing illicit connections. Each of these components is discussed in the following paragraphs.

The permittee must have in place a written protocol that clearly identifies methodologies and responsibilities with regard to detecting and eliminating illicit discharges. The protocol must identify who is responsible to pay for removal of an illicit connection/discharge. The permittee may incur the initial costs and seek partial or complete reimbursement from the owner of the illicit connection depending on the specifics of the situation and local and state law. EPA does not require a specific methodology, only that one exists and that the staff responsible for locating and removing illicit connections is familiar with it. The protocol must also define appropriate methods for removal of the illicit discharge or connection. The protocol must identify appropriate procedures or methodologies for confirmation of removal of illicit discharges or connections. The protocol must be completed by the end of year one of the Permit and be maintained as part of the written IDDE program.

The permittee must assess the illicit discharge potential for all areas that discharge to the MS4. The assessment consists of three steps: (1) delineation of catchments or drainage units; (2) evaluation of existing data that provides information concerning the potential for illicit discharges or connections for the delineated catchments or drainage unit and (3) ranking each catchment or drainage unit for its potential to have illicit discharges as "excluded", "low", or "high" priority catchments. The ranking is based on EPA and/or permittee defined screening factors and known information about the MS4. The initial ranking by the permittees will likely be qualitative in nature and based on existing information. If the permittee has prior knowledge or data regarding illicit connections or the potential for an illicit discharge for a catchment or drainage unit, the permittee may identify these catchments as Problem Catchments during the initial ranking. Once the permittee has identified a catchment as a Problem Catchment, the permittee shall begin to implement the systematic procedure required by Part 2.3.4.7e. in the catchment. Catchments identified as problem catchments need not be preliminarily screened during dry weather pursuant to Part 2.3.4.7.d.(iii). The ranking can then be updated throughout the permit term in order for the permittee to consistently be investigating those catchments with the highest potential of containing an illicit connection.

The screening factors that the permittee must consider are listed in the Draft Permit. (Part 2.3.4.7.c.(ii)). The permittee must consider all applicable factors and may add other factors that are relevant to the municipality. "Excluded" catchments are intended to limit the scope of the IDDE program to just those catchments with any potential for an illicit connection. The ranking is intended to identify areas with the greatest potential for illicit connections and prioritize illicit removal efforts on those areas with known potential for illicit discharges and improved water quality benefits. The permittee must begin implementation of the systematic illicit detection protocol in areas identified with the highest ranking

(Problem catchments first, then High Priority Catchments, then Low Priority Catchments). The permittee must continue to implement the protocol in all MS4 areas until all areas have been evaluated.

A storm drain network investigation involves systematically and progressively opening and inspecting key junction manholes in the system to narrow the location of an illicit discharge to an isolated pipe segment between two manholes. The permittee shall inspect key junction manholes for visual evidence of illicit connections or discharges (e.g. excrement, toilet paper, or sanitary products). When flow is observed in the manhole, the permittee shall sample for ammonia and surfactants using field test kits if desired. Ammonia is a useful indicator of sewage. The concentration of ammonia is higher in sewage than in ground water or tap water. Surfactants are the active ingredient in most commercial detergents. Surfactants are typically measured as Methyl Blue Active Substances (MBAS). These are a synthetic replacement for soap. The presence of surfactants is an indicator of sewage and wash waters. There are other indicator parameters the permittee could use such as fluoride; municipalities typically add fluoride to drinking water supplies, and its presence is an indicator of tap water. Potassium is another indicator that has relatively high concentrations in sewage and the permittee may choose to sample for potassium but it is not required. When the concentration of potassium is evaluated in combination with the concentration of ammonia, the ratio of the two can help distinguish wash waters from sanitary wastes. In addition to the use of indicators to help identify the source of an illicit connection or discharge, the permittee may use dye testing, video testing, smoke testing or other appropriate methods to locate illicit connections or discharges.

In addition to determining what indicators to use to determine if a manhole is "clean" or "dirty," the permittee must also determine where in a particular catchment to begin the investigation of manholes for illicit connections. The permittee must begin investigations in catchments identified with the highest priority ranking or identified as Problem Catchments. The permittee must decide whether the systematic investigations will be from the outfall working progressively up into the system (bottom up) or from the upper parts of the catchment working progressively down (top down). Either method or a combination of both methods may be used. Any method that is used by the permittee must include a systematic inspection of representative junction manholes to locate and isolate sources. The permittee must document the chosen procedure in the protocol. EPA believes that in systems that are complex and service large populations, the top down approach is the most effective for locating illicit discharges.

The permittee must begin its systematic investigation of catchments upon of completion of the written protocol. The permittee must address any illicit connections found prior to completion of the protocol in accordance with Part 2.3.4.2 of the Draft Permit. The permittee shall continue the investigations until the permittee has evaluated all areas of the MS4.

The Draft Permit requires the permittee to either remove or eliminate the illicit discharge or take appropriate enforcement action within sixty (60) days of detection. The permittee must also track the progress of the IDDE program implementation. Appropriate tracking indicators are those that demonstrate elimination of a pollutant source and/or water quality improvements. For example, if a permittee has a beach that has closures due to bacteria, an appropriate indicator for tracking progress would be a decrease in the frequency of beach closures or water quality monitoring that indicates that the water is meeting standards.

Other examples include the number of reported illicit discharges, the number of illicit connections located, and the number of illicit connections repaired or removed and volume of illicit discharge removed.

In addition to detecting and removing illicit discharges, the permittee must also develop and implement mechanisms and procedures for preventing illicit discharges. This includes training to inform public employees, businesses, and the general public of the hazards associated with illegal discharges. The requirement to prevent illicit discharges can be incorporated into the public education and public participation control measures. Examples of mechanisms to prevent illicit discharges include identification of opportunities for pollution prevention or source control; distribution of information concerning car washing or swimming pool draining; routine maintenance activities; and inspections of facilities particularly municipal drains undergoing work by private parties.

Monitoring

All monitoring in the Draft Permit is tied directly to implementation of the IDDE program. Screening and sampling protocols used by the permittee must be consistent with Appendix I to the Draft Permit. It should be noted that it is not necessary to adopt the protocol in Appendix I, just a procedure that is consist with the methodology in Appendix I. The Draft Permit contains three different categories of screening/monitoring, they are: (1) baseline dry weather screening/monitoring, (2) confirmatory screening/monitoring in dry weather and potentially wet weather, and (3) follow up screening in dry and potentially wet weather.

Baseline screening/monitoring must be completed on all high priority and low priority outfalls 3 years after the effective date of the permit. The information obtained during screenings can be used to update the catchment investigation rankings. Confirmatory screening/sampling takes place after completion of the IDDE investigation procedure in a given catchment. It is at this point that wet weather screening/sampling must be done if there are wet weather vulnerability factors within the catchment. Wet weather vulnerability factors are used to only sample catchments with the potential of wet weather triggered illicit discharges and not force wet weather screening on all catchments. If the confirmatory screening/sampling indicates the presence of an illicit connection, the permittee must reinvestigate the catchment and remove the illicit connection, including wet weather triggered illicit connections. This would be followed by another round of dry and potentially wet weather confirmatory screening. When confirmatory screening no longer indicates the presence of illicit connections, the catchment investigation can be marked as complete for that catchment and follow up screening scheduled. Follow up screening includes dry weather screening/monitoring and wet weather monitoring where wet weather vulnerability factors still exist in the catchment. Follow up screening remains in place because illicit connections can occur at any time through new development or failing infrastructure and this screening recognizes that IDDE work is ongoing.

Dry and wet weather discharges must be analyzed for the following pollutants: conductivity, salinity, chlorine, temperature, surfactants (as MBAS), ammonia and *E. Coli* (for a discharge to a fresh water) or enterococcus (for a discharge to a marine water). If an outfall discharges directly to a water that is water quality limited, (see the Massachusetts 303(d) list referenced above) the permittee must also sample for the pollutant identified as

the cause of impairment provided a test method for the pollutant is included in 40 CFR part 136. EPA invites comments on the scope of the outfall monitoring program.

Based on comments received on the previous draft permits, the Sustainable Stormwater Funding Evaluation Final Report (Horsley Witten, 2011), and information gathered from vendors, EPA estimates that the cost for compliance with the IDDE requirements of the Draft permit will be between $17,000 and $98,000 per year depending on the size of the MS4 system. These costs assume each permittee conducts its IDDE program using municipal staff, no mapping was completed during the previous permit term and assumes no cost sharing between municipalities for test kits, mapping equipment purchases etc. It should be noted that these costs also represent a decrease in cost burden from previous draft permit conditions of between $3,000 and $17,000 per year by reducing the scope of monitoring requirements in this new Draft Permit and allowing the use of test kits for IDDE investigations. EPA received many comments on the previous draft permits related to the cost of implementing permit provisions, specifically the cost burden associated with screening and sampling of outfalls and updated the requirements in this draft in attempt to reduce the cost burden while maintaining the intentions of the previous draft permit conditions. While the cost of the IDDE program may be significant for some permittees, EPA believes that this level of effort is necessary to ensure discharges remain authorized under this permit and the discharges are not unlawful.

d. Construction site stormwater runoff control

The MS4-2003 permit required that the "permittee … develop, implement and enforce a program to reduce pollutants in any stormwater runoff to the MS4 from construction activities that result in land disturbance equal to or greater than one acre [and] less than one acre if part of a larger common plan."[12] While this Draft Permit builds upon the requirements set forth by the MS4-2003 permit, it does not extend the deadlines applicable to the construction site stormwater runoff control minimum measure imposed by the MS4-2003 permit.

MS4s are required to continue to review and enforce a program to reduce pollutants in stormwater runoff from construction activities that result in a land disturbance equal to or greater than one acre that discharge to the MS4. The overall objective of an effective construction runoff management program is to have a program that minimizes or eliminates erosion and maintains sediment on site.

The construction program required by the Draft Permit is different from EPA's program that is implemented through the Construction General Permit (CGP), although there is some overlap. EPA's CGP applies to construction projects that have one or more acres of disturbed land and discharge directly to a waterbody or indirectly to a waterbody through an MS4. The MS4 construction program must address the discharges from construction projects within its jurisdiction that discharge directly to the MS4. A project may need a CGP from EPA as well as be regulated under the permittee's construction program. Discharges from a construction project to a combined sewer system and construction projects that do not discharge at all, are not subject to the CGP. 40 CFR §122.26(a)(7). A

[12] MS4-2003 Parts II.B.4; III.B.4; IV.B.4; and V.B.4

permittee is not required to regulate any construction project that receives a waiver from EPA in accordance with 40 CFR § 122.26(b) (15) (i).

The permittee must have an ordinance or other regulatory mechanism requiring proper sediment and erosion control. The requirement to develop the ordinance was part of the previous permit. The ordinance must have been in place and effective by May 1, 2008. In addition to addressing sediment and erosion control, the ordinance must include controls for other wastes on constructions sites such as demolition debris, litter and sanitary wastes. EPA encourages permittees to include design standards in local regulations for sediment and erosion control BMPs. The Draft Permit includes a list of controls that could be included as part of the local program.

Unlike the 2003 MS4 permit, this Draft Permit requires the program to include written procedures for pre-construction review and approval of site plans. Permittees should make every effort to ensure that qualified personnel review plans. In addition, the program must include a procedure for receiving information from the public and taking such information into consideration during the site plan review. The plan review procedures must include consideration of water quality impacts. EPA believes the site plan review requirement is a necessary step to control the discharge from construction sites that enters the permittee's MS4 and ensures the construction site operators have taken the necessary steps to control stormwater generated on site before the stormwater is discharged to the MS4 system.

The Draft permit requirements build upon the 2003 MS4 Permit requirements by requiring the program to have procedures for site inspections and enforcement. Qualified personnel should perform inspections. Qualified personnel are those who possess the knowledge and the skills to assess conditions and activities that could impact stormwater quality and who can also evaluate the effectiveness of stormwater control measures. Inspections should occur during construction as well as after construction to ensure that BMPs are installed and operating as described in approved plans. The permittee shall have clearly defined procedures regarding who is responsible for inspections at construction sites and what aspects of the construction site are to be inspected. The permittee must have authority to impose sanctions if construction projects are found not to be in compliance with local ordinance. Sanctions can include monetary penalties, stop work orders, or other remedies authorized by law.

MS4s should review existing procedures in the community that apply to these activities (plan reviews and inspections). Often construction plans are seen by the planning board that may not have the technical expertise or engineering staff to evaluate them. An MS4 should look at the various components of the local government, and whenever possible, optimize coordination between municipal offices as appropriate to ensure adequate review of plans and other documents associated with a construction project. These measures are enhanced from the 2003 MS4 permit to provide a more thorough construction site stormwater management program. MS4 systems are responsible for the discharges they accept into their system and therefore a thorough understanding and control of development projects that discharge to the permittee's MS4 is necessary to protect water quality.

The cost of the Construction Site Stormwater Control minimum measure is highly dependent on the size of the MS4 system and the amount of development taking place in the regulated area. Using data reported by the Sustainable Stormwater Funding Evaluation Final Report (Horsley Witten, 2011) and data collected in California (Office of Water

Programs, 2005), EPA estimates that the total cost for implementation of the Construction Site Stormwater Control minimum measure will likely be less than 5% of the overall stormwater budget used for compliance with this permit. This is equal to an anticipated cost of between approximately $3,000 and $40,000 per year.

e. Stormwater Management in New Development and Redevelopment

The MS4-2003 permit required that the "permittee must develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre and discharge to the municipal system [and] less than one acre if the project is part of a larger common plan of development which disturbs greater than one acre." The permit also set forth required elements of the post construction program.[13] This Draft Permit builds upon the requirements set forth in the MS4-2003 permit, but does not extend the deadlines applicable to the post construction storm water management in new development and redevelopment minimum measures imposed by the MS4-2003 permit.

This measure was called Post Construction Stormwater Management in New Development and Redevelopment under the MS4-2003 permit. The name of the measure was changed to more accurately reflect EPA's expectations with regard to implementation of the measure. This updated control measure requires the MS4 to continue to review and enforce a program to address post construction stormwater runoff from areas of new development and redevelopment that disturb one or more acres. The MS4 must update the ordinance or other regulatory mechanism to manage post construction stormwater runoff from new development and redevelopment that was required under the previous permit and must have been effective by May 1, 2008 to comply with the new requirements of this Draft Permit. The measures in this Draft Permit build upon the stormwater control measures required by the last permit with more specific requirements to control stormwater after construction on all new and redeveloped properties within the regulated area. While permittees became familiar with controlling stormwater on new and redeveloped sites during the previous permit term, EPA believes a state-wide consistent approach to dealing with post construction stormwater discharges is warranted as stormwater from urbanized areas continues to degrade the quality of waters in the Commonwealth. State-wide consistency will provide a common bar for development and redevelopment in every regulated community and afford more consistent protection of affected waters. The Draft Permit proposes standards for newly developed and redeveloped sites that are meant to prevent the further creation of excess stormwater discharges and pollutant loadings that result from the addition of impervious surface; to proactively protect receiving waters; and to ensure progress is made in protecting waterbodies from stormwater discharges over time. The limitations discussed in the following paragraphs were developed to further the control of stormwater and the associated pollutants found in stormwater in order to protect water quality.

The long-term objective of this measure is to reduce the concentration and pollutant loadings found in stormwater prior to discharge of stormwater from new and re-development projects within the regulated area. Post construction stormwater runoff may

[13] MS4-2003 Parts II.B.5; III.B.5; IV.B.5; and V.B.5

cause two types of impacts. One is an increase in the type and the quantity of pollutants. The alteration of the land by development can increase the discharge of pollutants such as oil and grease (hydrocarbons), heavy metals, solids and nutrients. Another impact occurs with an increase in the quantity of stormwater that is delivered to water bodies during storm events. Increases in impervious area decrease the amount of precipitation that naturally infiltrates into the ground, which provides for natural filtration of many pollutants found in stormwater. The lack of natural infiltration increases the volume of stormwater runoff into water bodies which causes increased flows and increase in sediment loadings in the stream that can cause stream bank scouring, impacts to aquatic habitat, and flooding. The increased pollutant loading associated with increased impervious area will further degrade the receiving waterbodies if new and redevelopment is allowed to continue unmitigated. [14]Planning and design for the minimization of pollutants in post construction stormwater discharges is the most cost-effective approach to stormwater quality management.

EPA's *Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems* in 61 FR 41698 (August 9, 1996) provides guidance with respect to modifications to the Permittee's SWMP upon permit re-issuance. In particular, it states that "[t]he components of the original stormwater program which are found to be effective should be continued …. Such components may include: …- continued, if not greater emphasis on addressing impacts of new development/construction; [and] - proper storm design criteria for all new developments…."

This Draft Permit requires MS4s to develop or modify existing ordinances within two (2) years of the effective date of the Permit to include elements in Part 2.3.6.a. of the Permit, at a minimum. The post construction ordinance or regulatory mechanism shall apply to all new and re-development within the regulated area that disturb one or more acres of land (solely or part of a common plan) and that discharge to the permittee's MS4 at a minimum. This sizing requirement is consistent with the construction site stormwater control requirements in the Draft Permit and with the Federal Construction General Permit and is kept for Post Construction Stormwater Control requirements for consistency. Each permittee can decide to adopt more stringent ordinances for new and redevelopment than the requirements proposed in the Draft Permit and in many cases permittees may already have such standards in place and the requirement to amend ordinances or regulatory mechanisms will have already been met. Each permittee can choose the scope of the requirements as well, implementing them jurisdiction wide or only within the regulated area of the MS4. EPA recommends implementing the ordinance jurisdiction wide for consistency and to prevent further degradation of waters outside of the regulated area.

The Draft Permit requires that all stormwater management systems be designed to retain the first inch of runoff from all impervious area on site, or to treat the first inch of runoff

[14] In the Preamble to the NPDES Permit Application Regulations for Storm Water Discharges, found in 55 FR 48054 (November 16, 1990), EPA describes that of equal importance to the pollutants washed into receiving waters from residential and commercial areas is "…the volume of storm water runoff leaving urban areas during storm events. Large intermittent volumes of runoff can destroy aquatic habitat. As the percentage of paved surfaces increases, the volume and rate of runoff and the corresponding pollutant loads also increase. Thus, the amount of storm water runoff from commercial and residential areas and the pollutant loadings associated with storm water runoff increases as development progresses; and they remain at an elevated level for the lifetime of the development."

from all impervious area on site. The volume of stormwater that would need to be retained or treated under this standard is calculated by multiplying the area of impervious area on site by one inch. This standard does not intend for stormwater controls to be designed to have the capacity to retain or treat the runoff from every storm that produces one inch of runoff from impervious area under all circumstances. For example, several large storm events over a short period of time may produce runoff events where the first inch of runoff is not fully retained or treated by the stormwater management system for each storm. Requiring retention or treatment of the first inch from all storms in such a circumstance would substantially increase the design volume of the stormwater management system and significantly increase the cost of implementation. The capacity equal to the first inch of runoff from impervious surfaces roughly equates to the capture or treatment of the 90th percentile storm event in New England. In addition, data developed by Tetra-Tech for EPA indicates that for the annual average rainfall in the Boston area, 90 percent of the storm events are one inch or less. EPA believes that the standard requiring capture of the volume that represents 1 inch of runoff from the total impervious area will not only capture all of the runoff from impervious surfaces at new and redeveloped projects the majority of storm events, but will also capture the majority of pollutants associated with runoff during larger storm events.

Stormwater BMP designs typically include the modeling or estimation of runoff from impervious surface in order to properly size the BMP, so this concept is not a new one in stormwater treatment design, and sizing BMPs to treat the first inch of runoff has become an industry standard. The first inch of runoff is also used in many stormwater design standards in New England, including portions of the Massachusetts Stormwater Standards that are applied through the Wetlands Protection Act. Currently, Connecticut, Maine, and Rhode Island have retention or treatment standards for post construction stormwater control that require the retention or treatment of a minimum of the first inch of runoff from the site. The Vermont post construction standard is the only one based on a percent retention and requires the retention of 90% of the annual storm events (US EPA, 2014). Basing the retention/treatment standard on the volume of runoff produced from impervious area on site is easily calculated and provides a quantifiable target for program implementation and is the method used by the majority of States for post construction stormwater management requirements.

"Retaining" or "retaining on-site" means keeping the required volume of storm water from discharging off the site that is being developed or re-redeveloped. "Keeping" does not literally mean keeping rainfall on-site in perpetuity. It encompasses, among other things, any activity that infiltrates, captures for use, or evapotranspirates the stormwater. Retention on-site of the first inch of runoff would lead to pollutant removal of over 90% of the sediment, phosphorus and heavy metals that would have been discharged in stormwater from the newly developed or redeveloped site (Tetra Tech Inc., 2010). In addition, the volume reduction in runoff achieved through the retention of the first inch of runoff would also reduce erosion and sedimentation in streams.

The Draft Permit does not mandate the use of a particular technology to retain the first inch of runoff on-site, which provides maximum flexibility for developers to use the vast array of Low Impact Development (LID) and green infrastructure techniques during site design to meet the standard in the most economical way possible. It has also been shown that environmentally sensitive site design and the use of LID techniques can reduce the cost of

construction when compared to typical curb/gutter and catchment designs (Houle, et al., 2013).

The Draft Permit conditions provide developers the flexibility of how to meet the retention/treatment standard by either retaining the first inch of runoff from all impervious area on site or retaining on site the maximum amount of runoff feasible and providing treatment of the remainder of the runoff that cannot be retained on site due to site constraints. "Treating" means the use of a BMP that does not retain the water on-site but, instead, is designed to provide pollutant removal before discharging the stormwater off-site. When the first inch of runoff cannot be retained on site, the remainder of the runoff that cannot be retained on site shall be treated through any combination of BMPs that collectively would be at least as effective in reducing pollutant loads as biofiltration of that same volume of runoff that cannot be retained on site.

Biofiltration systems (also known as biofilters and bioretention systems) operate by filtering diverted runoff through vegetation followed by vertical filtration through soil and organic media. Pollutant removal is achieved through sedimentation, filtration, sorption, and biological uptake. The water is collected via an underdrain and discharged to a storm sewer or receiving water. Biofitration has been shown to be effective at removing heavy metals, bacteria, phosphorus, sediment, hydrocarbons and in some cases, nitrogen (Davis, et al., 2003) (Davis, et al., 2006) (Hatt, et al., 2009) (Li, et al., 2012). In general, biofiltration is a well-known and well-studied BMP providing reliable pollutant removal and was therefore chosen as the standard to which stormwater management systems shall be designed. This provides flexibility in the design of the stormwater management systems while providing a consistent minimum level of performance for all stormwater management systems. It should be noted that this standard does not require the use of biofiltration on every site but instead is requires a level of treatment equivalent to a biofiltration system to set a consistent standard that all stormwater management systems can be measured against.

In order for developers to determine compliance with the treatment standard proposed in the Draft Permit, EPA's BMP performance extrapolation tool (BMP-PET) shall be used to calculate the level of performance that the stormwater management system must be designed to meet. The BMP-PET is an interface tool that provides users with results of BMP performance modeling conducted by Tetra Tech, Inc for EPA Region 1 (Tetra Tech Inc., 2010). The tool provides pollutant removal estimates for sediment, phosphorus and zinc for runoff from different land uses in New England. EPA believes that when stormwater management systems are designed to provide the pollutant removal efficiencies estimated for sediment, phosphorus and zinc, the removal of bacteria and hydrocarbons will be significant as their removal is closely associated with sediment removal.

Due to the vast array of BMPs available to developers of newly developed and re-developed sites EPA has chosen not to differentiate between new development and re-development for the purposes of compliance with the retention/treatment standard. EPA believes the flexibility inherent in the ability to design to a pollutant removal efficiency rather than force infiltration of a fixed amount of runoff provides enough flexibility that the standard becomes feasible on both newly developed and re-developed sites while capturing the majority of the pollutant load from the new or re-developed site. EPA invites comment on this approach.

The remainder of the requirements of Part 2.3.6.a. are modeled after the Massachusetts Stormwater Standards to provide BMP design standards and treatment requirements that protect water quality and are familiar to permittees and engineers in Massachusetts. The requirements also allow flexibility to permittees to establish additional controls where they see fit or in accordance with their priorities. EPA is aware that retention of stormwater on site through infiltration is not always preferable. This is especially true in areas with high pollutant load potential (industrial sites) and sites with documented soil contamination where infiltration at these sites could contaminate groundwater and potentially harm public water supplies. At these sites, Part 2.3.6.a. requires that only "treatment" BMPs be used for pollutant removal and infiltration be avoided. In addition, stormwater management systems designed to infiltrate near drinking water sources or that discharge directly to drinking water sources need to be designed to treat stormwater prior to infiltration or discharge and to allow for shutdown and containment of the stormwater to prevent discharge in the event of an emergency spill or other unexpected event. This provision not only protects high quality water sources but protects public health.

While these standards for new and re-development are similar to the Massachusetts Stormwater Standards, they are not identical, and those projects that are subject to the Wetlands Protection Act or which require a § 401 certification for a CWA § 404 permit from the Corps of Engineers must also meet the requirements of the Massachusetts Stormwater Standards and any other requirements imposed by the MassDEP.

Design Standards Assessment

The permit requires the permittee to assess current street and parking lot designs that affect the creation of impervious cover. The objective of this assessment is to determine if changes in design standards can be made to accommodate Low Impact Development (LID) options. Some of the street and parking lot design standards and requirements an MS4 would want to consider in this assessment include flexibility in road design standards (the width of the road and placement of sidewalks) and flexibility in design of parking lots (shared and multi-level lots, and flexibility in the number of parking spaces). If the assessment indicates that changes in design standards or requirements are practicable, the MS4 must develop recommendations and a schedule for implementing the changes and implement those changes on the schedule created. This requirement is meant to facilitate the implementation of new development and redevelopment capture standards required by Part 2.3.6.a. of the Draft Permit.

Assessment of Roadblocks to Green Infrastructure

The permit requires permittees to assess their regulations and identify potential roadblocks to the implementation of green infrastructure. The assessment shall identify roadblocks in applicable regulations that impede or preclude the use of green infrastructure or Low Impact Development (LID) practices within the permittees jurisdiction. Management of stormwater on-site can be accomplished in many ways. LID focuses on using practices that imitate the natural water cycle. Rather than directing stormwater to a pipe or conveyance, the stormwater is managed on-site. LID practices can work at the site level as well as the watershed level. The Draft Permit requires the permittee to evaluate the existing local regulations and make determinations as to whether the existing local regulations allow LID practices and

what changes would be necessary for LID practices to occur. The MS4 must develop recommendations and a schedule for implementing the changes and implement those changes on the schedule created. Some of the LID practices that the municipality should consider are green roofs; infiltration practices, such as porous pavement and rain gardens; and water harvesting devices, such as rain barrels and cisterns. This standard is meant to facilitate the implementation of new development and redevelopment capture standards required by Part 2.3.6.a. of the Permit.

Directly Connected Impervious Area (DCIA)

Large volumes of stormwater may also cause erosion along stream banks and result in altered habitats. Studies from the Center for Watershed Protection have shown that impairments from stormwater runoff can be observed in watersheds with as little as 10 percent impervious cover (Center For Watershed Protection, 2003), and additional research shows that these impacts may occur at even lower percent impervious thresholds (King, et al., 2011). Impervious cover includes roads, sidewalks, driveways, roof tops, and other surfaces that do not allow for infiltration. The Draft Permit requires the permittee to estimate the amount of DCIA that discharges stormwater to its MS4 in each annual report. EPA will provide permittees with an initial estimate of the DCIA for its MS4. The permittee shall inventory properties and infrastructure within its jurisdiction that have the potential to be retrofitted with BMPs designed to reduce the frequency and intensity of stormwater discharges. Reductions in the amount of impervious cover within a watershed should result in reductions of stormwater quantities. Reductions in stormwater quantities and their associated pollutants (bacteria/pathogens, nutrients, chloride, metals, solids and oil and grease (hydrocarbons) should result in improvements to water quality.

Where it is practicable to reduce the amount of existing impervious cover, properties often can be retrofitted with low impact development techniques that remove direct, hard connections that discharge stormwater from the property's impervious surfaces to the MS4. These techniques include swales, rain gardens, bioretention basins, porous pavement, and collection and infiltration systems for roof runoff. Because of the effectiveness of reducing stormwater pollution by decreasing DCIA, the Draft Permit contains provisions to track the amount of DCIA in each sub-watershed within the jurisdiction of the MS4. The Draft Permit requires the permittee to report this estimate annually and to evaluate the feasibility of reducing the DCIA on permittee-owned properties. The Draft Permit encourages the reduction of DCIA through retrofit technologies. The permittee is required to track the number of acres of impervious cover that have been added or removed annually. This tracking will facilitate the calculation of added or reduced phosphorus loading in the Charles River Watershed and the watersheds of phosphorus impaired lakes. This information will also be integral in producing nitrogen and phosphorus source identification reports for discharges to water quality limited waterbodies where the waterbody is water quality limited due to excess nitrogen or phosphorus. EPA encourages permittees to require the development community to include a calculation of added or removed impervious acres during site plan review for new and redeveloped projects.

There are many new requirements for Post Construction Stormwater Control in the Draft Permit compared to the 2003 permit. The required retention/treatment standard in particular will require some municipalities to update their post construction ordinances passed during

the 2003 permit term; and the other provisions are designed to help implement this retention/treatment standard and will require additional effort compared to the 2003 Permit. The costs associated with the Post Construction Stormwater Management minimum control measure will vary from permittee to permittee. For instance, some permittees may already have post construction stormwater standards that are at least as stringent as the standards required by this Draft Permit and therefore will have no costs associated with ordinance or bylaw updating, while others will need to spend time amending their ordinances or bylaws. EPA estimates that the total cost for implementation of the Post Construction Stormwater Control minimum measure will likely change from year to year. For instance, the report assessing current street design and parking standards does not have to be completed until three years after the permit effective date and the report assessing impediments to green infrastructure does not have to be completed until four years after the permit effective date. When distributed over the five year permit term, EPA believes the cost of implementation of the Post Construction Stormwater Management minimum control measure be less than 5% of the overall stormwater budget used for compliance with this permit. This is equal to an anticipated cost of between approximately $3,000 and $40,000 per year.

f. Pollution Prevention/Good Housekeeping

The MS4-2003 permit required that the "permittee must develop and implement a program with a goal of preventing and/or reducing pollutant runoff from municipal operations" and set forth required elements of the pollution prevention and good housekeeping program.[15] While this Draft Permit builds upon the requirements of the MS4-2003 permit, it does not extend the deadlines applicable to this minimum measure imposed by the MS4-2003 permit.

This measure requires small MS4s to develop and implement an operation and maintenance program that includes an employee training component. The ultimate goal of this measure is to prevent or reduce pollutant runoff from all municipal operations. The Draft Permit includes more detailed requirements than the MS4-2003 permit for the implementation of this control measure. The permittee must develop an inventory of municipal buildings and facilities and update it annually. Permittees are required to develop an operations and maintenance plan for the following permittee-owned activities or facilities: parks and open spaces; buildings and facilities; vehicles and equipment maintenance; and infrastructure (roadways and storm sewer systems). The permittee must develop and implement operation and maintenance plans by the end of the first year of the Draft Permit. While the 2003 Permit did not require a written operation and maintenance plan for permittee-owned activities or facilities, it did require the development of a program to prevent/reduce pollutant runoff for the same activities or facilities identified above. Creating a written plan is intended to provide more clarity and responsibility for staff when dealing with stormwater runoff from permittee owned property. The new Draft Permit is also more prescriptive of what certain operation and maintenance plans must contain based on the type of operation at the facility in order to be more protective of water quality than the 2003 permit provisions.

[15] MS4-2003 Parts II.B.6;; IV.B.6 and V.B.6

The permittee must consider all buildings it owns for the evaluation of buildings and facilities. The permittee shall evaluate the use and storage of petroleum products, management of dumpsters, and other wastes at police and fire stations, schools, and other permittee owned buildings. As stated in the objective of this measure, the permittee must implement good housekeeping and pollution prevention measures at these places. In areas where permittee-owned vehicles are stored, the permittee must establish procedures to ensure that vehicles that are leaking or require maintenance are stored indoors to the extent practicable. Municipal fueling areas must be covered unless impracticable. Washwaters from permittee-owned vehicles must not be discharged to the MS4 or directly to a water of the United States.

The Draft Permit requires the permittee to either establish or continue the implementation of a program to repair and rehabilitate its infrastructure in a timely manner. The Draft Permit requires the MS4 to maintain its streets, roads and rights of way in such manner as to minimize the discharge of pollutants from the MS4. Rather than a specific frequency for cleaning catch basins, the Draft Permit requires the MS4 to optimize its frequency of routine cleaning with a goal that no basin shall be greater than 50 percent full. The municipality must track the amount of material removed from each basin and increase the frequency of cleaning if evidence suggests that material is accumulating more quickly than in other basins. Basins in priority areas may also require more frequent cleaning. EPA is requiring use of a 50% full threshold as consistent with available guidance on appropriate cleaning frequencies, See Stormwater Managers Resource Center, *Pollution Prevention Fact Sheets: Catch Basins* (UNH Stormwater Center, n.d.). Research on catch basin efficiency indicates that catch basins only retain sediment up to approximately 60% full; above that level storm flows may bypass treatment or resuspend sediments previously captured (Pitt & Bissonnette, 1985).

The Draft Permit requires street sweeping to occur at least once per year. This is a change from the previous draft permits based on comments received. Limited access highways and rural roads with no curbing and no catch basins are exempt from this requirement. EPA notes that more frequent sweeping, especially using a high efficiency vacuum sweeper, can have positive impacts on receiving water quality and many permittees may choose increased sweeping frequencies in heavy use areas.

The permittee must establish procedures for winter road safety activities. This includes evaluation of salt and sand use. Permittees are encouraged to minimize the amount of salt used and to evaluate opportunities for the most cost effective and environmentally acceptable management practices. The permittee must ensure that snow removal practices do not result in the discharge of snow to a water of the United States.

The permittee must establish and implement maintenance schedules and inspection frequencies for all permittee-owned BMPs.

In addition to the operation and maintenance plans required for permittee-owned operations, the permittee must develop a Stormwater Pollution Prevention Plan (SWPPP) for municipal maintenance garages, public works facilities, transfer stations, or other waste management facilities. Waste management facilities are those facilities that accept or store material accepted from public or private entities, including recycling facilities, compost areas, organic debris collection, hazardous waste collection areas, etc. These facilities are targeted in this Draft Permit because they can be large generators of stormwater pollution

and may not be covered under another NPDES permit. However, if a facility is already covered by EPA's Multi-Sector General Permit (MSGP), the SWPPP required by the MSGP will satisfy this requirement. The SWPPP required by the MSGP shall be referenced in the MS4's SWMP.

The permittee must develop a SWPPP that consists of the following elements: (1) a pollution prevention team – this team is responsible for the development, implementation and revision of the SWPPP; (2) a description of the facility and identification of potential pollutant sources; (3) identification of any stormwater controls at the facility; and (4) implementation of specific management practices at the facility. The conditions contained in this section are similar to the conditions contained in the Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activities (MSGP). They consist of pollution prevention activities such as preventing exposure, good housekeeping practices, and preventative maintenance. The Draft Permit requires procedures for spill prevention and response and management of runoff. All salt piles or piles that contain salt must be covered or enclosed if stormwater runoff from that pile has the potential to discharge to the MS4 or directly to a water of the United States.

Based on information gathered from the Sustainable Stormwater Funding Evaluation Final Report (Horsley Witten, 2011) and from comments received on the previous draft permits, the good housekeeping requirements represent the most costly of all the 6 minimum control measures. Street sweeping and catch basin cleaning are the most costly. Compared to the previous draft permits, this Draft Permit has reduced street sweeping frequencies and catch basin inspection requirements to help reduce the cost burden on permittees while retaining requirements that build upon requirements from the 2003 permit to further reduce pollutants found in stormwater. EPA estimates that the costs associated with the requirements of the Good Housekeeping minimum control measure in this Draft Permit will range from approximately $40,000 to over 300,000 per year. These costs assume all street sweeping and catch basin cleaning is done by a third party. It should be noted that these costs are likely not above and beyond what the permittee likely spends on maintenance of permittee owned property currently. For instance, these costs assume that the permittee currently does not sweep its streets or clean its catch basins at all. In other circumstances, these costs could underestimate the total cost for maintenance of permittee owned surfaces where permittees choose to sweep streets more than the one time per year required by the Draft Permit.

5. Additional Requirements for Discharges to Surface Drinking Water Supplies and Their Tributaries

The Draft Permit contains specific requirements for discharges to surface drinking water supply sources (Class A and Class B surface waters used for drinking water) or their tributaries. These requirements are meant to be incorporated into the SWMP in order to protect surface drinking water supply sources. By making discharges to water supply sources or their tributaries a priority when implementing the SWMP, it is intended that the permittee will focus stormwater pollution prevention or mitigation activities as required by the Draft Permit on those sources that could impact surface water supplies. For instance, during IDDE priority the permittee could rank catchments draining to a public water supply or its tributaries as High Priority for the purposes of investigation.

E. Evaluation, Record Keeping and Reporting

1. Program Evaluation

The permittee must periodically evaluate its SWMP for the following: compliance with the terms of the Permit, the appropriateness of the identified BMPs, and progress towards achieving the objective of the control measure and the permittee's measurable goals. The permittee may need to change its selected BMPs identified in the SWMP based on this evaluation process in order to ensure compliance with the terms of the Permit, including water quality-based requirements.

2. Record Keeping

The permittee must keep all records required by this permit for a period of five years from the date the record is generated. The permittee must submit records only when requested by EPA or MassDEP. The SWMP must be available to members of the public who request a copy.

3. Reporting

The permittee must submit an annual report. The reporting period will be a one year period commencing on the permit effective date, and subsequent anniversaries thereof, except that the first annual report under this permit shall also cover the period from May 1, [year of final permit issuance] to the permit effective date. The annual report is due ninety days from the close of each reporting period. EPA plans to align the effective date of the permit and therefore the reporting year with the municipal year. EPA invites comment on this proposed change from the 2003 MS4 permit. The report must include a self-assessment regarding compliance with the terms of the Permit, the appropriateness of selected BMPs, and the progress towards achieving the permittee identified measurable goals. The report must also contain a summary of any information that has been collected and analyzed. This includes all data. The permittee must also indicate what activities are planned for the next reporting cycle and discuss any changes to either BMPs or measurable goals. The report must indicate if any control measure or measurable goal is the responsibility of another entity.

The Draft Permit contains more detailed reporting requirements than in the previous permit. Reports must contain sufficient information to enable EPA to assess the permittee's compliance with the permit. Reports are due annually on August 1 and must be submitted to the address provided in the permit.

EPA is currently developing a suggested Annual Report template that can be used by permittees. This form will only be a suggested format and each permittee can choose to use it or develop their own report that contains equivalent information. The suggested format form will be in the form of an electronic fillable .pdf. EPA plans to prepopulate these forms for those permittees who send in their NOI electronically either by email or CD and use the suggested fillable NOI form. The prepopulated Annual Reports will be available for download for those permittees who submitted the NOI electronically on the suggested form and will contain all information submitted on the NOI as defaults for that particular permittee. The goal of this is to lower the reporting burden for permittees who would otherwise have to enter much of the same information on the NOI and then on each subsequent Annual Report

4. Monitoring Reporting

All monitoring requirements for the Draft Permit are now located in the IDDE section of the Draft Permit and are specifically tied to the successful completion of the IDDE program. The requirements of this part are to capture both the monitoring required as part of the IDDE program and any other monitoring the permittee conducts to assess the effectiveness of its programs. Each annual report shall include the results of monitoring either conducted in compliance with the Draft Permit or any other monitoring of receiving waters or outfalls conducted by the permittee or on behalf of the Draft Permittee.

F. Non-Traditional and Transportation MS4s

Non-traditional MS4s are those properties owned and operated by the Commonwealth of Massachusetts or the United States that have stormwater infrastructure and discharge to a Water of the United States. Transportation MS4s are state funded agencies responsible for the operation and maintenance of state owned roadways, except MassDOT-Highway Division which will receive an individual permit. Due to the nature of operations at non-traditional and transportation MS4s, some MEP permit provisions must be modified to be applicable. Part 5 and Part 6 of the Draft Permit contain the requirements for non- traditional and transportation MS4s, respectively. Non-Traditional MS4s have different audiences for their public education requirements (students, employees, other personnel, visitors,) and so public education requirements regarding audiences has been changed to allow the non-traditional MS4s to focus on the audiences that pertain to their particular operation. Not all non-traditionals have regulatory mechanisms to pass an ordinance or bylaw to deal with Construction Site Stormwater Control or Post Construction Stormwater Management, and in this case the Draft Permit requires that non-traditional MS4s create policies or procedures that meet the same goal that the ordinance or bylaw is intended to meet as required for traditional MS4s. All other parts of the Draft Permit apply equally to non-traditional and transportation MS4s. EPA invites comments specifically on the requirements of those parts and their applicability to non-traditional and transportation MS4s.

EPA also notes that Federal Facilities are required to comply with §438 of the Energy Independence and Security Act, which provides: "The sponsor of any development or redevelopment project involving a federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow." 42 U.S.C. § 17094. In many circumstances the minimum post construction standards set forth in Part 5.2. of the Draft Permit may be inadequate to meet the requirements of §438 of the Energy Independence and Security Act and Federal MS4 permittees should consider the standards in Part 5.2 of the Draft Permit as a minimum requirement and should adopt post construction stormwater standards that fulfil the requirements of §438 of the Energy Independence and Security Act as well as Part 5.2 of the Draft Permit.

G. Standard Permit Conditions

40 CFR §§ 122.41 and 122.42 establish requirements that must be in all NPDES permits. Appendix B of the draft general permit includes these requirements.

H. 401 Water Quality Certification

Section 401 of the CWA provides that no Federal license or permit, including NPDES permits, to conduct any activity that may result in any discharge into navigable waters shall be granted until the State in which the discharge originates waives or grants certification that the discharge will comply with

the applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA. Regulations governing state certification are set forth in 40 CFR §§ 124.53 and 124.55. The 401 certification may include additional conditions more stringent than those in the Draft Permit which the Commonwealth finds necessary to meet the requirements of state law, including water quality standards. Concurrent with the public notice of this general permit, EPA will request Section 401 Water Quality Certification from MassDEP.

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