

Portland, Oregon

**National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4) Discharge Permit**

Permit Number: 101314

PERMIT RENEWAL SUBMITTAL

**Prepared for:
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY**

July 31, 2015


Submitted by:

*City of Portland
Port of Portland*

Portland, Oregon
National Pollutant Discharge Elimination System
Municipal Separate Storm Sewer System Discharge Permit
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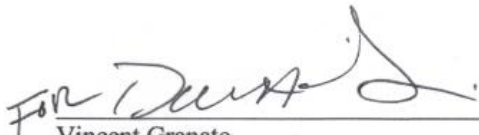
PERMIT RENEWAL SUBMITTAL
July 31, 2015

We, the undersigned, hereby submit this Permit Renewal Submittal for the Municipal Separate Storm Sewer System Discharge Permit No. 101314, in accordance with Schedule B, Section 6 of that permit. We certify, as required by 40 CFR Section 122.22, under penalty of law, that this document was prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Michael Jordan
Director, Bureau of Environmental Services
City of Portland

Date: 6/29/15



Vincent Granato
Executive Director
Port of Portland

Date: 7/16/15

PERMIT HOLDER INFORMATION

Co-Permittee: City of Portland
Bureau of Environmental Services
Address: 1120 SW Fifth Ave., Room 1000, Portland, OR 97204
Contact Person: Barbara Adkins
Telephone No.: 503-823-5737
E-mail Address: barbara.adkins@portlandoregon.gov

Co-Permittee: Port of Portland
Address: 7200 NE Airport Way, Portland, OR 97218
P.O. Box 3529
Portland, OR 97208
Contact Person: Susan Aha
Telephone No.: 503-415-6326
E-mail Address: susan.aha@portofportland.com

PERMIT RENEWAL SUBMITTAL

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Maps provide combined information for both co-permittees.

Zoning and Runoff Coefficients (four sheets)

City/Port Properties/Facilities and Major Structural Controls (four sheets)

Population Density and Projected Growth (four sheets)

Municipal Storm Sewer System Outfalls (four sheets)

NPDES Industrial Stormwater General Permits, Landfills, and Municipal Waste TSDs
(four sheets)

QUALITY ASSURANCE MONITORING PLAN (QAMP) (bound separately)

The QAMP provides an updated monitoring plan for both co-permittees.

INTRODUCTION

This permit renewal submittal is provided to the Oregon Department of Environmental Quality (DEQ) in compliance with requirements of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit No. 101314 (hereinafter referred to as the MS4 permit or permit) issued to the City of Portland and Port of Portland (the co-permittees) on January 31, 2011.

PERMIT AREA

The MS4 permit areas for the two co-permittees are as follows:

- **City of Portland:** Approximately 15,464 acres within the City of Portland's urban services boundary drain to a separate storm sewer system.
- **Port of Portland:** The Port owns approximately 5,505 acres within the City of Portland's urban services boundary. Much of this property drains to the Port's municipal separate storm sewer system and is regulated by the MS4 permit. This acreage includes Portland International Airport (PDX), four marine terminals, several industrial parks occupied by commercial tenants, mitigation sites, and undeveloped land.

The NPDES MS4 permit does not cover:

- Stormwater areas that flow to sumps
- Stormwater areas that flow to combined sewers
- Natural stream systems
- Direct stormwater discharges from private property to natural stream systems (without entering the MS4)
- Areas with no public stormwater infrastructure
- Discharges from facilities that have individual, general, or industrial stormwater permits

ORGANIZATION OF THE PERMIT RENEWAL

- This **Introduction** describes the MS4 permit areas for the two co-permittees.
- **Parts One and Two** provide the permit renewal submittals for the City of Portland and Port of Portland, respectively.
- The **Maps Appendix** contains maps providing updated information as required by Schedule B.6.g of the permit. These are joint maps for both co-permittees.
- The **Quality Assurance Monitoring Plan** (under separate cover) provides an updated monitoring plan for both co-permittees.

PART ONE

City of Portland, Oregon

**National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4) Discharge Permit**

Permit Number: 101314

PERMIT RENEWAL SUBMITTAL

**Prepared for:
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY**

July 31, 2015

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I. OVERVIEW OF PERMIT RENEWAL SUBMITTAL

The City of Portland is providing this permit renewal submittal to the Oregon Department of Environmental Quality (DEQ) to fulfill requirements in the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit #101314 (hereinafter referred to as the stormwater permit or permit) issued to the City of Portland, Multnomah County, and Port of Portland (the co-permittees). The current Portland NPDES MS4 permit was issued by DEQ on January 31, 2011 and expires on January 30, 2016. The permit requires the co-permittees to submit a permit renewal package 180 days before the permit expires (July 31, 2015).

Portland's submittal is divided into seven sections (I through VII) in this document. A Maps Appendix at the end of this document and an updated Quality Assurance Monitoring Plan (bound separately) provide combined information for both co-permittees. Together, these documents fulfill all of the submittal requirements identified in the January 31, 2011 permit. The permit renewal requirements are found in sections B. 6 (MS4 Permit Renewal Application Package) and D.3.c and d (Total Maximum Daily Loads) of the permit.

II. PROPOSED STORMWATER MANAGEMENT PLAN

Permit Requirements

Schedule B.6: MS4 Permit Renewal Application Package

...The application package must include an evaluation of the adequacy of the proposed SWMP modifications in reducing pollutants in discharges from the MS4 to the MEP. The application package must contain:

- a. Proposed program modifications including the modification, addition or removal of BMPs incorporated into the SWMP, and associated measurable goals.

This section provides the City's proposed Stormwater Management Plan (SWMP). The proposed SWMP meets the permit renewal requirements of the current MS4 permit. DEQ has not yet issued the fourth-term permit, so the SWMP does not reflect any new permit conditions.

Following the proposed SWMP is a summary of the proposed changes.

Section III (Evaluation of Stormwater Management Program) of this submittal provides information about how the City evaluated its stormwater program and how the findings were used to develop the proposed SWMP.

The proposed SWMP and the summary of proposed changes were made available for public review in June/July 2015; no comments were received.

City of Portland, Oregon

**National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4) Discharge Permit**

Permit Number: 101314

PROPOSED STORMWATER MANAGEMENT PLAN

**Submitted to:
Oregon Department of Environmental Quality**

July 31, 2015

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ABBREVIATIONS USED

ACWA: Oregon Association of Clean Water Agencies

BPS: Bureau of Planning and Sustainability

BDS: Bureau of Development Services (City of Portland)

BES: Bureau of Environmental Services (City of Portland)

BMP: Best Management Practice

CFR: Code of Federal Regulations

CIP: Capital Improvement Program

DEQ: Department of Environmental Quality (State of Oregon)

ESA: Endangered Species Act (U.S.)

IDDE: Illicit Discharge Detection and Elimination

IER: Interim Evaluation Report

ILL: Illicit Discharges Controls

IND: Industrial/Commercial Controls

MIP: Maintenance Inspection Program

MOA: Memorandum of Agreement

MS4: Municipal Separate Storm Sewer System

ND: New Development Standards

NOAA: National Oceanic and Atmospheric Administration

NPDES: National Pollutant Discharge Elimination System

ODOT: Oregon Department of Transportation

OM/O&M: Operations and Maintenance

PBOT: Portland Bureau of Transportation

PBOT-MO: Portland Bureau of Transportation Maintenance and Operations

PI: Public Involvement

PM: Program Management

SARA: Superfund Amendments and Reauthorization Act (U.S.)

SIC: Standard Industrial Classification

SOM: Stormwater Operations & Maintenance (section of BES)

STR: Structural Controls

SWMM: Stormwater Management Manual

SWMP: Stormwater Management Plan

INTRODUCTION

Overview of Stormwater Management Plan

The City of Portland has prepared this *Stormwater Management Plan* (SWMP) in compliance with requirements of the City of Portland's municipal stormwater permit.¹ The SWMP describes best management practices (BMPs) the City will implement to reduce the discharge of pollutants from the municipal separate storm sewer system (MS4) into waters of the state, protect water quality, and satisfy the applicable requirements of the Clean Water Act. By reducing impacts from the MS4 to receiving waters, the BMPs will help achieve and maintain the beneficial uses (such as recreation, cold water fisheries, municipal and industrial water supply, and navigation) the Oregon Department of Environmental Quality (DEQ) has established for Oregon water bodies.

Permit Area

The City of Portland's NPDES MS4 stormwater management area includes those areas within Portland's urban services boundary that drain to the MS4. Portland's MS4 area is approximately 15,464 acres. The City's MS4 permit does not cover:

- Stormwater that flows to sumps
- Stormwater that flows to the combined sewer area
- Natural stream systems
- Direct stormwater discharges from private property to natural stream systems (without entering the MS4)
- Areas with no public stormwater infrastructure
- Discharges from facilities that have individual, general, or industrial stormwater permits
- Storm sewer systems operated by the Port of Portland²

SWMP Components

The SWMP includes two main components, which are discussed below: best management practices (BMPs) and measurable goals.

BEST MANAGEMENT PRACTICES (BMPs)

BMPs are stormwater pollution control measures that include 1) approaches that prevent pollution (e.g., education programs, erosion control, materials storage and handling) and 2) treatment facilities that remove pollutants from stormwater (e.g., grassy swales, wetland detention systems, and mechanical devices such as oil/water separators).

¹ The full name of the permit is the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit. It is referred to as the municipal stormwater permit, NPDES permit, or MS4 permit.

² The Port of Portland is a co-permittee of the MS4 permit. Portland and the Port of Portland are responsible for separate stormwater conveyance systems they operate within Portland's urban services boundary.

Table 1 shows Portland’s seven BMP categories and the individual BMPs under each category. More detailed information, including specific tasks for each BMP, is included in the BMP sections that follow this Introduction.

Table 1: Summary of Best Management Practices

BMP CATEGORY AND PURPOSE	CITY OF PORTLAND BMPs
<p>Public Involvement (PI) To inform and educate the public about the causes of stormwater pollution, the effects on local streams and rivers, and the need for stormwater management; to encourage active participation in pollution reduction.</p>	<p>PI-1: Implement public information, education, involvement, and stewardship activities that will raise awareness, foster community stewardship, and promote pollution prevention and stormwater management.</p>
<p>Operations and Maintenance (OM) To implement operations and maintenance practices for public streets, sewers, and other facilities to reduce pollutants in discharges from the municipal separate storm sewer system.</p>	<p>OM-1: Operate and maintain components of the municipal separate storm sewer system (MS4) to prevent and remove pollutants in discharges from the MS4.</p> <p>OM-2: Operate and maintain components of public rights-of-way and other City facilities and infrastructure to prevent pollutants in discharges from the municipal separate storm sewer system.</p>
<p>Industrial/Commercial Controls (IND) To reduce and control the discharge of pollutants from industrial and commercial facilities to the municipal separate storm sewer system.</p>	<p>IND-1: Implement the Industrial Stormwater Management Program to control the discharge of pollutants from industrial and commercial facilities to the municipal separate storm sewer system.</p> <p>IND-2: Provide education and technical assistance to reduce industrial and commercial pollutant discharges to the municipal separate storm sewer system.</p>

Table 1 (continued)

BMP CATEGORY AND PURPOSE	CITY OF PORTLAND BMPs
<p>Illicit Connections and Illicit Discharges Controls (ILL) To identify, investigate, and eliminate illicit connections and illicit discharges to the municipal separate storm sewer system.</p>	<p>ILL-1: Identify, investigate, control, and eliminate illicit connections and illicit discharges (illegal dumping and spills) to the municipal separate storm sewer system. Evaluate and, if appropriate, control non-stormwater discharges to the municipal separate storm sewer system.</p>
<p>New Development Standards (ND) To prevent and mitigate pollutant discharges and other water quality impacts associated with new development and redevelopment during and after construction.</p>	<p>ND-1: Control erosion, sediment, and pollutant discharges from active construction sites.</p> <p>ND-2: Implement and refine stormwater management requirements for new development and redevelopment projects to minimize pollutant discharges and hydrologic impacts from stormwater flows.</p>
<p>Structural Controls (STR) To implement structural modifications (constructed facilities) to existing systems/development to reduce pollutants in discharges from the municipal separate storm sewer system.</p>	<p>STR-1: Structurally modify components of the storm drainage system to reduce pollutant discharges. Implement structural retrofits/improvements to existing development to reduce pollutants in discharges from the municipal separate storm sewer system.</p>
<p>Program Management (PM) To conduct effective program management, coordination, and reporting.</p>	<p>PM-1: Conduct program management, coordination, and reporting activities.</p>

MEASURABLE GOALS

Measurable goals are identified for each BMP. They define target levels of implementation for the stormwater program elements identified in Schedule A.4.a-h of the 2011 permit and associated BMP(s), and are quantifiable where possible. Examples include:

- Provide approximately 425 programs (classroom lessons, field science programs, tours, etc.) annually to K-12 and college students.
- Inspect priority City-owned outfalls a minimum of three times a year.
- Maintain the spill response hotline 24 hours a day.
- Inspect 1,500 private stormwater facilities or 450 properties annually.

Measurable goals are targets, not fixed requirements, and as such have some flexibility (e.g., they may change as a result of adaptive management).

Relationship of the SWMP to Annual Compliance Reports

The SWMP is a comprehensive plan that expresses the overall intent and breadth of the City's stormwater management program for the MS4. It includes implementation tasks and, where possible, schedules. In many cases, however, it is difficult to determine implementation details years in advance because so many variables are involved. For that reason, a greater level of detail is included in the annual compliance reports the City (together with the Port of Portland) submits to DEQ by November 1 of each year. The annual compliance reports provide information about BMP activities that have been implemented in the previous fiscal year (July 1 to June 30). They include reporting on the measurable goals, as well as other activities that are essential elements of the stormwater management program. [Annual Compliance Reports](#) are available online.

Category: PUBLIC INVOLVEMENT (PI)

Purpose: To inform and educate the public about the causes of stormwater pollution, the effects on local streams and rivers, and the need for stormwater management; to encourage active participation in pollution reduction.

Overview:

Public involvement is an integral part of Portland’s stormwater program. The public must be involved, informed, and educated about stormwater issues and solutions if the program is to be effective. The Public Involvement category has one best management practice (BMP):

- **PI-1: Implement public information, education, involvement, and stewardship activities that will raise awareness, foster community stewardship, and promote pollution prevention and stormwater management.**

This BMP focuses primarily on the general public. Other education and technical assistance targets specific audiences, such as business and industry. Those activities are conducted as part of other BMPs and included under those BMPs. (See “Other BMP Activities Related to PI-1” below.)

PI-1 is discussed in detail on the following pages.

Pollutants Addressed:

The pollutants addressed by PI-1 depend on the target audience. Much of the outreach and education does not target specific pollutants, but rather promotes environmental stewardship, pollution prevention, and sustainable stormwater management.

PI-1: Implement public information, education, involvement, and stewardship activities that will raise awareness, foster community stewardship, and promote pollution prevention and stormwater management.

INTRODUCTION

PI-1 includes the following components:

- **Information:** Messages and materials distributed to the public and media. Public awareness is crucial to effectively fostering public stewardship.
- **Education:** Activities designed to increase understanding about stormwater/water quality and motivate the public to make behavioral changes.
- **Involvement:** Involving the public in identifying issues and developing solutions; encouraging and empowering Portland citizens to take an active role in the decision-making process.
- **Stewardship:** Enabling citizens to have an active, hands-on role in protecting water quality.

STRATEGY

The City has the following strategies in place.

Clean Rivers Education Programs

BES provides free water quality classroom and field science education programs for grades K through 12 within the City of Portland. These hands-on programs teach students about the causes and effects of water pollution and what individuals can do to protect rivers and streams. The programs also provide community service projects (e.g., marking storm drain inlets with “Dump No Waste” messages), teacher workshops, and curriculum resources.

Community Stewardship Grants Program

The Community Stewardship Grants Program, in place since 1995, provides up to \$10,000 per project to citizens and organizations to encourage watershed protection. Projects must be within the City of Portland, promote citizen involvement in watershed stewardship, and benefit the public. The program seeks to award grants in a way that advances the City’s established equity goals by considering where projects are implemented and whom they involve and benefit. Projects that expand and diversify leadership and participation in watershed stewardship are encouraged.

From 1995 through June 2015, the program has allocated over \$ 1.225 million to 249 projects.

Watershed Education and Stewardship

BES plans and implements watershed programs in the Columbia Slough, Johnson Creek, Fanno Creek, Tryon Creek, and Willamette River watersheds. The watershed-based approach stresses comprehensive, multi-objective watershed management through inter-jurisdictional coordination within each watershed. Each program includes public education and stewardship focused on the specific needs of the watershed, including coordination and partnerships with other community groups.

Watershed Council Support

BES supports watershed councils by providing funding, staff, and other resources and in-kind services. The watershed councils provide stormwater education and involvement activities to a wide and diverse audience.

Citywide Education and Stewardship

BES conducts citywide programs that promote public education and stewardship focused on urban trees and vegetation. These include the Treebate Program, Green Street Steward Program, and Urban Tree Canopy Program (in conjunction with Portland Parks and Recreation). Community partners, such as Friends of Trees and neighborhood groups, may also be involved in these activities.

Print, Electronic, and Social Media

In addition to mailers, factsheets, and other printed information, BES uses web-based platforms, including webpages, blogs and social media to distribute stormwater-related educational and informational materials. Examples include water bill inserts, Riverviews (the bureau's annual newsletter that provides information about the investments the bureau is making on behalf of ratepayers), Facebook page, Green City blog, Twitter, and Youtube videos. BES also develops informational signage for specific projects, such as ecoroof installations, swales, and stormwater demonstration projects.

ACTIVITIES

(Not in any order of priority)

Task 1: Continue Clean Rivers Education programs for grades K-12.

Assignment: Bureau of Environmental Services

Task 2: Continue the Community Stewardship Grants program.

Assignment: Bureau of Environmental Services

Task 3: Continue to conduct watershed-specific education and stewardship activities.

Assignment: Bureau of Environmental Services

Task 4: Continue to support watershed councils with funding, resources, staff, and/or in-kind services.

Assignment: Bureau of Environmental Services

Task 5: Continue citywide education and stewardship activities.

Assignment: Bureau of Environmental Services, Bureau of Parks and Recreation

Task 6: Continue to develop and disseminate stormwater-related information through print, electronic, and social media.

Assignment: Bureau of Environmental Services

Task 7: Conduct community assessment activities (e.g., focus groups, polling, surveying) to solicit information about BES's programs and messages. Review results, and adjust programs and messaging as needed.

Assignment: Bureau of Environmental Services

Other BMP Activities Related to PI-1:

- Education and involvement activities targeted at specific audiences, such as business and industry, are conducted as part of other BMPs and are identified under those BMPs (IND-2, ILL-1, ND-1, ND-2).

Category: OPERATIONS AND MAINTENANCE (OM)

Purpose: To implement operations and maintenance practices for public streets, sewers, and other facilities to reduce pollutants in discharges from the municipal separate storm sewer system.

Overview:

Operations and maintenance BMPs for City facilities are important in order to remove pollutants (e.g., from storm sewer system components) and prevent pollutant discharges (e.g., from storage areas). In addition, some maintenance activities (e.g., saw-cutting) may have the potential to contribute pollutants to stormwater runoff if not properly managed. This category includes the following three BMPs that apply to public facilities:

- **OM-1: Operate and maintain components of the municipal separate storm sewer system (MS4) to prevent and remove pollutants in discharges from the MS4.**
- **OM-2: Operate and maintain components of public rights-of-way and other City facilities and infrastructure to prevent pollutants in discharges from the municipal separate storm sewer system (MS4).**

Note: This BMP category addresses operations and maintenance for public facilities. Operations and maintenance related to private facilities are addressed by BMP categories IND (Industrial/Commercial Controls) and ND (New Development Standards).

OM-1 and OM-2 are discussed in detail on the following pages.

Pollutants Addressed:

The main pollutants addressed by OM-1 and OM-2 are total suspended solids (TSS), horticultural chemicals, metals, nutrients (phosphorus and nitrogen), petroleum hydrocarbons, oil and grease, and floatables (debris and litter). In addition, OM-2 addresses chlorine from water system flushing.

OM-1: Operate and maintain components of the municipal separate storm sewer system (MS4) to prevent and remove pollutants in discharges from the municipal separate storm sewer system.

INTRODUCTION

The MS4 system components managed under this BMP are:

- Separate storm sewer pipes
- Drainage ditches
- Green streets
- Catch basins and storm inlets
- Regional stormwater management facilities
- Manufactured stormwater treatment devices
- Flow control facilities

This BMP does not include:

- Private onsite stormwater management facilities (which are addressed under BMP ND-2)
- Public drywells (which are addressed by a separate *Underground Injection Control Management Plan*)
- Waters of the state (streams, rivers, etc.), which are not part of the MS4 and are the responsibility of the state of Oregon

STRATEGY

The City maintains and updates an inventory and maintenance database of the MS4 facilities within the City's urban services boundary. The City has the following strategies in place for operations and maintenance of the MS4.

Routine Assessment of System Condition

Designated staff from BES's Stormwater Operations & Maintenance (SOM), BES's Revegetation Program, and Portland Bureau of Transportation Maintenance and Operations (PBOT-MO) evaluate system components. Following evaluation, work orders are developed to identify needed maintenance activities and priorities. PBOT-MO and the Revegetation Program then schedule the applicable maintenance work.

Maintenance and Cleaning of System Components

Most routine maintenance is driven by inspection and condition assessment. Maintenance may also occur in response to public complaints. The BES *Stormwater Operations and Maintenance Manual* describes maintenance action triggers and operations and maintenance procedures for stormwater management facilities.

Tracking of System Components

Development and construction plans that include surface stormwater management facilities that will revert to public ownership (those that manage stormwater from public rights-of-way) undergo review by BES staff, as well as overall plan review by the Bureau of Development Services. After construction, the facilities are turned over to the City for maintenance after a 2-year warranty period and are incorporated into the City's inspection and maintenance schedules.

Staff Training

Staff members receive ongoing training on a variety of operation and maintenance-related topics, including:

- Safety: Biological Hazards; Road Work Zone Safety
- O&M practices and procedures: Annual Water Environment School, held by Oregon Water Education Foundation
- Continuing education to maintain professional certifications: Certified Arborist, Certified Pesticide Applicator
- Maintenance procedural steps, preferred seasonality of work, and proper materials management, in accordance with the *PBOT Maintenance Environmental Handbook* and the *BES Stormwater Operations and Maintenance Manual*.

ACTIVITIES

(Not in any order of priority)

Task 1: Continue to conduct routine condition assessment of MS4 components.

Assignment: Bureau of Environmental Services, Portland Bureau of Transportation Maintenance and Operations

Task 2: Continue maintenance and cleaning of system components.

Assignment: Bureau of Environmental Services, Portland Bureau of Transportation Maintenance and Operations

Task 3: Continue to track and incorporate newly constructed system components into the City's inspection and maintenance database and inspection schedules.

Assignment: Bureau of Environmental Services

Task 4: Continue to conduct staff training.

Assignment: Bureau of Environmental Services, Portland Bureau of Transportation Maintenance and Operations

Other BMP Activities Related to OM-1:

- **OM-2** addresses O&M for public rights-of-way and other City facilities and infrastructure.
- **ND-2** addresses O&M for private facilities.
- While OM-1 includes assessment of system conditions, any resulting structural retrofits that are implemented are included under **STR-1**.

OM-2: Operate and maintain components of public rights-of-way and other City facilities and infrastructure to prevent pollutants in discharges from the municipal separate storm sewer system (MS4).

INTRODUCTION

Public Rights-of-Way

Public right-of-way components managed under this BMP are:

- Paved streets
- Substandard streets (streets not fully improved to City standards)
- Bridges
- Sidewalks
- Utility corridors
- Other right-of-way components

The following are not included:

- Private streets
- Components of the storm drainage system (e.g., stormwater management facilities, catch basins, pipes, etc., which are covered under OM-1)
- Facilities owned and operated by other jurisdictions (e.g., Multnomah County, Oregon Department of Transportation)

Other City Facilities and Infrastructure

This BMP also addresses operations related to:

- City buildings (office buildings, parking structures)
- City properties (e.g., parks, field operations sites)
- Other City infrastructure (e.g., access roads, water lines and tanks, pump stations)

It does not address:

- Private facilities and infrastructure.
- Elements of the municipal separate storm sewer system (included in OM-1).

STRATEGY

Public Rights-of-Way

City operations and maintenance within the public rights-of-way include surface work, street sweeping, and snow/ice removal/sanding. As part of these activities, work procedures focused on erosion prevention/control, spill control and prevention, and other pollution control measures

are implemented to limit pollutant discharges to the MS4. The Portland Bureau of Transportation Maintenance and Operations (PBOT-MO) uses the ODOT *Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices* as guidance for maintenance.

PBOT-MO staff members receive training on O&M-related stormwater issues, maintenance procedural steps, preferred seasonality of work, and proper materials management in accordance with the *PBOT Maintenance Environmental Handbook*. Staff from other City bureaus also receive training concerning limiting pollutant discharges in the right-of-way.

Other City Facilities and Infrastructure

The City has the following strategies in place for operations and maintenance of City facilities and infrastructure:

- **Integrated Pest Management (IPM) Program:** The IPM program is designed to minimize the need for fertilizers, pesticides, and irrigation and is used by multiple City bureaus.
- **Salmon-Safe certification:** The Bureau of Parks and Recreation (PP&R) was certified in 2004 and recertified in 2012 by Salmon Safe, an independent certification organization, as employing design and land management practices that minimize harmful impacts on water quality and fish habitat. The bureau examines its maintenance activities as part of annual compliance requirements for continued Salmon Safe certification.
- **PP&R evaluation of the use of alternative equipment, materials, and modified practices.**
- **Potable Water Discharge Program:** This program assesses the flow rates and pollutant control measures needed to control discharges from tanks, water line flushing, and hydrants.
- **Toxics reduction measures (use, storage, transport, and disposal) used by all bureaus.**
- **Management of discharges from fire response and non-emergency training (discharges currently go to the sanitary system).**
- **Reuse/recycling practices at City sites and properties.**
- **Education and training of bureau staff about stormwater impacts associated with O&M activities and how to minimize these impacts.**

ACTIVITIES

(Not in any order of priority)

Task 1: Continue to implement work procedures in public rights-of-way to limit pollutant discharges to the MS4 (e.g., spill control and prevention; erosion prevention and sediment control; control of other pollutants). Continue to use the ODOT *Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices* as guidance for maintenance.

Assignment: Portland Bureau of Transportation Maintenance and Operations

Task 2: Continue to implement the strategies in place for operations and maintenance of City facilities and infrastructure:

- Integrated Pest Management Program
- Salmon Safe certification
- Potable Water Discharge Program
- Toxics reduction measures
- Management of discharges from fire response and non-emergency training
- Reuse/recycling practices

Assignment: Relevant City bureaus

Task 3: Continue to conduct PBOT-MO staff training.

Assignment: Portland Bureau of Transportation Maintenance and Operations

Task 4: Continue to evaluate the use of alternative equipment, materials, and modified practices.

Assignment: Portland Bureau of Parks & Recreation

Other BMP Activities Related to OM-2:

- **OM-1** addresses O&M for the municipal separate storm sewer system.

Category: INDUSTRIAL/COMMERCIAL CONTROLS (IND)

Purpose: To reduce and control the discharge of pollutants from industrial and commercial facilities to the municipal separate storm sewer system.

Overview:

Some industrial and commercial uses have high potential to contribute pollutants to the storm sewer system. The Industrial/Commercial Controls category includes the following two best management practices (BMPs) that focus on reducing the discharge of pollutants in stormwater runoff from certain commercial and industrial sites through permitting, inspection, and enforcement (IND-1), as well as through outreach and technical assistance (IND-2):

- **IND-1: Implement the Industrial Stormwater Management Program to control the discharge of pollutants from industrial and commercial facilities to the municipal separate storm sewer system.**

This BMP focuses on regulatory approaches through permitting, inspection, and enforcement. Under IND-1, the City administers industrial stormwater NPDES permits for specific industrial and commercial facilities. Under the authority of City Code section 17.39 (Storm System Discharges) the City may also issue a City permit or discharge authorization (DA) or require a stormwater pollution control plan, if appropriate, to manage and control discharges from sites that do not require an NPDES permit, but that may have discharges detrimental to the storm sewer system or receiving waters.

- **IND-2: Provide education and technical assistance to reduce industrial and commercial pollutant discharges to the municipal separate storm sewer system.**

This BMP focuses on non-regulatory approaches to discharge control. It addresses both permitted industries and those not under a permit.

IND-1 and IND-2 are described in detail on the following pages.

Pollutants Addressed:

A wide range of pollutants are associated with commercial and industrial activities. The most common of these are metals (zinc, copper, lead), biochemical oxygen demand (BOD), total suspended solids (TSS), and oil and grease.

IND-1: Implement the Industrial Stormwater Management Program to control the discharge of pollutants from industrial and commercial facilities to the municipal separate storm sewer system.

INTRODUCTION

In 1994, the City of Portland entered into a memorandum of agreement (MOA) with the Oregon Department of Environmental Quality (DEQ) to administer the NPDES industrial stormwater program for facilities required by federal law to obtain permits for discharges to the City's MS4. In 1999, the MOA was revised to give the City administrative authority over all industrial NPDES discharges within the City's urban services boundary (including direct discharges to water bodies and discharges to other jurisdictions' systems). In 2010, the MOA was superseded by an Intergovernmental Agreement that includes City responsibilities to work with applicants applying for their first NPDES permit. The City administers permits and inspects sites for compliance with permit conditions, but DEQ maintains responsibility for enforcing permit conditions and collecting fees.

City Code section 17.39 (Storm System Discharges) gives the City legal authority to control discharges to the storm sewer system. The code was most recently updated in 2014 to reflect changes in the City's enforcement rules.

The Industrial Stormwater Management Program controls discharges from:

- Commercial/industrial facilities with standard industrial codes (SICs) that are listed in the Federal Register [CFR 122.26(b)(14)(I-ix, xi)] as requiring an industrial 1200Z, 1200COLS or 1200A NPDES stormwater permit.
- Commercial/industrial facilities in the Columbia Slough Watershed that require a 1200COLS permit because they have exposure of industrial activities not listed under the federal SIC requirements and may contribute pollutants of concern to the storm drainage system.
- Landfills. (There are 21 closed landfills, mostly for construction waste, within Portland.)
- Industrial facilities subject to Title III of the Superfund Amendments and Reauthorization Act (SARA).
- Any other facility that poses a risk to the MS4 or receiving waters from discharges and/or spills and requires a City permit, discharge authorization, or stormwater pollution control plan.

STRATEGY

Industrial Stormwater Management Program

NPDES INDUSTRIAL STORMWATER GENERAL PERMITS

The Industrial Stormwater Management Program identifies industrial and commercial facilities that may need a 1200Z, 1200A, or 1200COLS permit, using referrals from City staff, field reconnaissance, environmental surveys, and review of building permit applications (which identify SIC codes subject to permits). The program conducts site inspections to assess exposure risk. If exposure of industrial activity to stormwater exists, the facility must either remove the exposure or obtain a permit that specifies operational and structural requirements, including monitoring, to control discharges.³ If a facility has a federally listed SIC code, but has no exposure of industrial activities to stormwater runoff, the facility can submit a No Exposure Certification (NEC) in lieu of a permit. The program verifies that no exposure exists by conducting a site inspection, and the facility submits the NEC directly to the City. The NEC is effective for a five-year period. Upon NEC expiration, the program re-verifies the facility's no exposure status and renews the NEC.

City inspection and monitoring activities include:

- Compliance inspections of permitted facilities.
- Review of each permitted facility's monitoring results and annual report.
- Review and technical assistance for development of stormwater management plans at permitted facilities.
- "Sweeps" to identify facilities required to obtain a permit. This involves surveying facilities and inspecting non-permitted facilities, focusing on specific industry sector, by watershed or other priority area, or for specific facilities otherwise identified as potentially requiring permit coverage.
- Periodic inspections of other non-permitted commercial/industrial facilities (e.g. facilities with NECs).
- Response to complaints and referrals.
- Technical assistance for retrofitting private stormwater drainage systems to maximize infiltration and treatment and minimize the discharge of pollutants at commercial/industrial sites.

³ The number of permitted facilities fluctuates as industrial tenants and activities change. The NPDES MS4 annual compliance reports provide numbers for each permit year.

- Coordination with the State of Oregon on additional strategies to control pollutants in stormwater runoff from industrial and commercial facilities in drainages with watershed-specific or basin-specific TMDLs (total maximum daily loads) or facilities that have specific DEQ cleanup program requirements.

CITY PERMITS AND DISCHARGE AUTHORIZATIONS

The City has developed an updated strategy to implement stormwater control measures for sites that are not required to obtain an NPDES industrial stormwater general permit because 1) they have no exposure, 2) there is a disparity between the facilities' SIC code(s) and those listed in the federal register, or 3) the only risk is from an accidental spill. Under the authority of City Code 17.39 (Storm System Discharges), the City may issue a City permit or discharge authorization (DA), if appropriate. The discharger is required by City Code to allow City staff to inspect the facility to verify site conditions. The discharger may also be required to submit additional information, reports, and plans, such as:

- A Stormwater Pollution Control Plan (SWPCP), which describes site actions taken to prevent contamination of stormwater by materials stored, used, or manufactured onsite
- An Accidental Spill Prevention Plan (ASPP), which describes actions taken to prevent accidental or incidental spills of pollutants from entering the City storm sewer and drainage system
- Monitoring data to characterize the types and loads of pollutants in the discharges

In addition, the City has the authority under City Code to issue DAs to sites and facilities that have non-stormwater discharges to the MS4. These are non-stormwater discharges that are allowed under the 2011 MS4 permit Schedule A(4)(a)(xii), but may require appropriate BMPs to reduce the discharge of pollutants associated with the source.

ACTIVITIES

(Not in any order of priority)

Task 1: Continue to administer NPDES industrial stormwater permits for sites with exposure of industrial activities to stormwater runoff within Portland's urban services boundary.

Assignment: Bureau of Environmental Services

Task 2: Continue to administer City permits and discharge authorizations.

Assignment: Bureau of Environmental Services

Task 3: Identify industries, operating and closed landfills, TSDs, and SARA Title III facilities that may need permits because of new or changed operations that create potential stormwater exposure.

Assignment: Bureau of Environmental Services

Task 4: Continue to conduct “sweeps” to identify facilities required to obtain a permit.
Assignment: Bureau of Environmental Services

Other BMP Activities Related to IND-1:

- **IND-2** addresses education and technical assistance aimed at reducing industrial and commercial pollutant discharges.
- New development and redevelopment are subject to the stormwater management requirements of the City’s *Stormwater Management Manual* and are addressed under **ND-2**. The manual also includes pollution control requirements for industrial and commercial facilities with site characteristics or uses that may generate high pollutant concentrations or specific pollutants of concern.

IND-2: Provide education and technical assistance to reduce industrial and commercial pollutant discharges to the municipal separate storm sewer system.

INTRODUCTION

The City has actively promoted pollution control at the source since before its first NPDES MS4 permit was issued. In addition to the City's Industrial Stormwater Management Program (described under IND-1), the City provides education and technical assistance to commercial and industrial businesses to help them implement best management practices and pollution prevention measures, as described below.

STRATEGY

The City has its own pollution prevention programs and also partners with other organizations, as described below.

BMP Fact Sheets

The City makes BMP fact sheets available to industrial and commercial facilities, including those that have an NPDES permit and those that do not (see IND-1).

Pollution Prevention Outreach (P2O) Team

The City participates in the Pollution Prevention Outreach (P2O) Team, a multi-agency group of air, water, wastewater, energy, hazardous waste, and solid waste professionals that promotes and implements comprehensive pollution prevention programs. The P2O Team supports implementation of the Eco-Logical Business Program, which certifies businesses that use environmentally responsible business practices.

Sustainability at Work Program

The Bureau of Planning and Sustainability, in partnership with multiple City and regional partners, implements this program to assist industries with green practices that conserve energy and water, prevent waste, and address stormwater. Activities include onsite assessments, technical assistance, and certification to recognize achievements. This program serves 1,000 businesses annually.

Columbia South Shore Well Field Wellhead Protection Program

The City provides education and technical assistance to businesses in the Columbia South Shore Well Field Wellhead Protection Area to help them implement best management practices and pollution prevention measures and comply with program requirements. The City works in coordination with the Columbia Corridor Association and Columbia Slough Watershed Council.

ACTIVITIES

(Not in any order or priority)

Task 1: Continue to make BMP fact sheets and other educational materials available to industrial and commercial facilities.

Assignment: Bureau of Environmental Services

Task 2: Continue participation in the P2O Team and Eco-Logical Business Program. Continue to recertify certified Eco-Logical businesses as individual certifications expire.

Assignment: Bureau of Environmental Services

Task 3: Continue the Sustainability at Work program.

Assignment: Bureau of Planning and Sustainability

Task 4: Continue education and technical assistance to regulated businesses in the Columbia South Shore Well Field Wellhead Protection Area.

Assignment: Water Bureau, Portland Fire & Rescue

Task 5: Evaluate new business sectors for targeted outreach, technical assistance, trade group partnerships, and/or implementation of the Eco-Logical Business Program.

Assignment: Bureau of Environmental Services

Other BMP Activities Related to IND-2:

The following BMPs also include tasks related to industrial and commercial facilities:

- **IND-1** includes implementation of the Industrial Stormwater Management Program to control the discharge of pollutants from industrial and commercial facilities.
- **PI-1** addresses general public outreach and education associated with the NPDES stormwater program.

Category: ILLICIT CONNECTIONS AND ILLICIT DISCHARGES CONTROLS (ILL)

Purpose: To identify, investigate, and eliminate illicit connections and illicit discharges to the municipal separate storm sewer system.

Overview:

The City of Portland's activities in this category are included under one best management practice:

- **ILL-1: Identify, investigate, and eliminate illicit connections and illicit discharges (illegal dumping and spills) to the municipal separate storm sewer system.**

Evaluate and, if appropriate, control non-stormwater discharges to the municipal separate storm sewer system.

ILL-1 is described in detail on the following pages.

Pollutants Addressed:

The City's activities under ILL-1 address most pollutants commonly found in urban runoff. The type and amount of pollutants addressed depend on the pollutant source(s). For example, eliminating an illicit wash water discharge would address detergents (surfactants, phosphorous and nitrogen), solids, and oil and grease. Pollutants addressed by controlling non-stormwater discharges (such as discharges from flushing of water systems, pumped groundwater, or air conditioner condensate) include chlorine, phosphorus, and metals.

ILL-1: Identify, investigate, and eliminate **illicit connections and illicit discharges** (illegal dumping and spills) to the municipal separate storm sewer system. Evaluate and, if appropriate, control **non-stormwater discharges** to the municipal separate storm sewer system.

INTRODUCTION

Illicit connections are piped connections to the City's storm sewer and drainage system not approved by the City or not in compliance with a valid City permit. An example is a toilet plumbed into the stormwater system instead of the sanitary system.

Illicit discharges include:

- **Illegal dumping.** This includes solid and liquid wastes. Examples include dumping garbage or used motor oil into storm drains.
- **Spills.** These include accidental or unplanned discharges into the storm drain system. Examples include fluids released from vehicle accidents or leaking storage containers.

Non-stormwater discharges include 24 types of discharges listed in schedule A.4.xii. of the 2011 NPDES MS4 permit. The Bureau of Environmental Services (BES) *Industrial Stormwater Program Implementation Manual*, last updated in 2013, identifies the non-stormwater and other types of discharges that may require a City discharge authorization or permit.

STRATEGY

The City has the following strategies in place to address illicit connections, illicit discharges, and non-stormwater discharges.

Enforcement

In 2013, the City completed an update of City Code and administrative rules for the City's enforcement program for illicit connections and illicit discharges to stormwater systems. The administrative rules identify the enforcement tools that can be used for violations, as well as penalties and cost recovery.

Illicit Discharge Detection and Elimination (IDDE) Program

The City's Illicit Discharge Detection and Elimination (IDDE) Program, initiated in 1994, includes the following elements:

- Identifying and eliminating illicit connections to the system.
- Monitoring major and priority outfalls during dry weather to identify and eliminate illicit or non-stormwater discharges of concern. (Major outfalls and priority outfalls are defined in Portland's NPDES MS4 permit #101314, dated January 31, 2011.)
- Implementing the 2014 *Illicit Discharge Detection and Elimination (IDDE) Procedures*.

Industrial Stormwater Management Program

Under the Industrial Stormwater Management Program (as described in BMP IND-1), illicit discharges and connections from commercial/industrial facilities may be identified through inspections. The program addresses prohibited discharges and other non-stormwater discharges to the storm sewer system through code, policies, control measures, and/or enforcement actions, as appropriate.

Spill Response and Pollution Complaints

BES's **Spill Response Program** was developed in 1994 to provide immediate response to spills (liquid and solid) and investigate pollution complaints. BES implements the program in accordance with the 2014 *Spill Protection and Citizen Response (SPCR) Duty Officer Procedures*. Staff investigate reports of stormwater pollution and problems in the sewage and drainage collection system, and monitor cleanups. The program's spill response hotline is monitored 24 hours a day, 365 days a year, and staff respond to reported spills, sheens, and other unknown discharges. The program also makes referrals to other enforcement agencies as appropriate.

The **Regional Spill Response Committee** is a multi-agency committee established in 1995 to coordinate, share information, consult, and debrief on spill response. The committee meets quarterly and is chaired by BES.

Solid Waste and Recycling Programs

The Bureau of Planning and Sustainability (BPS) manages residential and commercial **solid waste and recycling programs** to prevent illegal dumping of solid and liquid wastes. These programs include curbside recycling (including used motor oil) and yard debris collection.

Non-Stormwater Discharges

A non-stormwater discharges evaluation report was completed and submitted to DEQ as part of the City's *NPDES MS4 Permit Interim Evaluation Report (IER)* in May 2006. As a result of that evaluation, some City policies or procedures have been changed to mitigate or limit discharges, require a City permit or discharge authorization, or to require certain discharges to be routed to the sanitary sewer.

ACTIVITIES

(Not in any order of priority)

Task 1: Continue to implement the Illicit Discharge Detection and Elimination Program.

Assignment: Bureau of Environmental Services

Task 2: Continue to identify illicit connections and illicit discharges from commercial/industrial facilities through the Industrial Stormwater Management Program.

Assignment: Bureau of Environmental Services

Task 3: Continue to lead the Regional Spill Response Committee.

Assignment: Bureau of Environmental Services

Task 4: Continue to implement the City’s Spill Response Program.

Assignment: Bureau of Environmental Services

Task 5: Continue to implement solid waste programs (curbside recycling, yard debris collection) to minimize or prevent illegal dumping.

Assignment: Bureau of Planning and Sustainability

Task 6: Continue to limit impacts from non-stormwater discharges to the MS4, including issuing City permits or discharge authorizations.

Assignment: Bureau of Environmental Services

Other BMP Activities Related to ILL-1:

The following BMPs also include tasks related to preventing or addressing illicit discharges:

- **PI-1** includes volunteer education and outreach activities, such as marking storm drain inlets with “Dump No Waste” messages.
- Illicit discharges associated with City facilities or rights-of-way are addressed by standard maintenance practices of the City (see **OM-1 and OM-2**).

Category: NEW DEVELOPMENT STANDARDS (ND)

Purpose: To prevent and mitigate pollutant discharges and other water quality impacts associated with new development and redevelopment during and after construction.

Overview:

The design and construction of new development and redevelopment can have significant impacts on water quality. If not properly managed, ground-disturbing construction can result in erosion and the discharge of sediment and other pollutants. Without appropriate stormwater management, impervious surfaces created by new development can increase the volume and peak rate of stormwater runoff, which can cause erosion and flooding. Oils and grease, metals, and other pollutants from parking lots, roadways, rooftops, and other impervious surfaces may be transported to streams and rivers by stormwater runoff.

The New Development Standards category includes the following two best management practices (BMPs):

- **ND-1: Control erosion, sediment, and pollutant discharges from active construction sites.**

This BMP addresses erosion, sediment, and pollution control requirements for private property and public works builders/contractors during any ground-disturbing construction.

- **ND-2: Implement and refine stormwater management requirements for new development and redevelopment projects to minimize pollutant discharges and hydrologic impacts from stormwater flows.**

This BMP addresses stormwater management requirements that developers/builders must incorporate into new development and redevelopment to mitigate stormwater impacts after project completion (for the life of the project). These requirements are primarily implemented through the *Stormwater Management Manual* (SWMM).

ND-1 and ND-2 are discussed in detail on the following pages.

Pollutants Addressed:

The main pollutants addressed by ND-1 are total suspended solids (TSS). Construction site controls also reduce the discharge of floatable litter and debris, concrete washwater, bacteria, slurry, and paints.

ND-2 addresses most pollutants commonly found in urban runoff.

ND-1: Control erosion, sediment, and pollutant discharges from active construction sites.

INTRODUCTION

Five City bureaus manage erosion, sediment, and pollutant control on construction sites:

- The Bureau of Development Services (BDS) administers and enforces City requirements pertaining to erosion, sediment, and pollutant control for private development.
- The public works bureaus (Water, Environmental Services, Transportation, and Parks and Recreation) manage erosion, sediment, and pollutant control for their own public works permit projects.

STRATEGY

The City has the following strategies in place to address erosion, sediment, and pollutant control.

Title 10 and Erosion Control Manual

Title 10 of City Code and the City's [Erosion and Sediment Control Manual](#) (updated March 2008) are the basis of the City's comprehensive, citywide erosion and construction site pollutant control program. The Title 10 regulations and the manual cover site planning and use of best management practices (BMPs) for any ground-disturbing activity, as well as inspection and enforcement measures.

Title 10 specifies the following applicability and requirements:

- Applies to any ground-disturbing activity, regardless of site size.
- Allows no visible or measurable offsite discharge at any time during construction.
- Requires compliance with the *Erosion and Sediment Control Manual*.
- Requires the same standards for private construction sites and public works permit projects.

The City's public works bureaus review and revise their contract specifications and permit conditions as needed to comply with Title 10 requirements and the most recent *Erosion and Sediment Control Manual*.

Training and Technical Assistance

The City provides training on erosion, sediment, and pollutant control requirements to City staff and technical assistance to contractors/permit applicants. Publications, information, and advice are also available to the public online and through BDS's Development Services Center.

Enforcement Hotline

BDS operates a hotline and website for receiving erosion, sediment, and other complaints. After receiving an erosion-related complaint, BDS and the Bureau of Environmental Services (BES) identify and implement an appropriate response, which may include education, technical assistance, or enforcement. The response process applies to permitted and non-permitted construction activities.

Construction-Related NPDES Permits

The City's public works bureaus obtain construction-related NPDES permits (1200C) for each project site over 1 acre in size from the Oregon Department of Environmental Quality (DEQ). In lieu of individual 1200C site permits, the Portland Bureau of Transportation and Bureau of Parks and Recreation hold agency program permits (1200CA permits, which are currently under administrative extension) that cover all development-related activities. Private developers are required to obtain 1200C permits directly from DEQ if the project site is over 1 acre in size.

ACTIVITIES

(Not in any order of priority)

Task 1: Continue to implement the requirements of Title 10 and the *Erosion and Sediment Control Manual*. Provide technical assistance to contractors/permit applicants.

Assignment: Bureaus of Development Services, Water, Environmental Services, Transportation, and Parks and Recreation

Task 2: Review the *Erosion and Sediment Control Manual* and update as needed. Research other manuals, including the DEQ manual, and incorporate relevant/appropriate revisions.

Assignment: Bureau of Development Services

Task 3: Continue to provide erosion, sediment, and pollutant control training to City staff.

Assignment: Bureaus of Development Services, Water, Environmental Services, Transportation, Maintenance, and Parks and Recreation

Task 4: Continue to review and revise construction and contract specifications for erosion, sediment, and pollutant control requirements, as needed.

Assignment: Bureaus of Water, Environmental Services, Transportation, and Parks and Recreation

Task 5: Continue to implement site plan review procedures that ensure that stormwater BMPs are appropriate and address the construction activities being proposed.

Assignment: Bureau of Development Services

Task 6: Continue to operate a hotline to receive complaints and respond to erosion, sediment, and pollutant problems.

Assignment: Bureau of Development Services

Task 7: Continue to conduct and document erosion control checks during building permit inspection for land-disturbing activities.

Assignment: Bureau of Development Services

Other BMP Activities Related to ND-1:

None

ND-2: Implement and refine stormwater management requirements for new development and redevelopment projects to minimize pollutant discharges and hydrologic impacts from stormwater flows.

INTRODUCTION

The City has legal responsibility (Portland City Charter Title 3.13) to provide stormwater service (implemented through City Code Chapter 17.38) to all new development and redevelopment sites. To accomplish this, the Bureau of Environmental Services (BES) reviews development proposals and the availability/adequacy of storm sewer service.

The City requires new development and redevelopment projects to mitigate stormwater impacts by managing stormwater onsite to the maximum extent practicable. The planning and permitting processes for development approval provide the opportunity to incorporate design features that will provide post-construction stormwater management and treatment.

STRATEGY

The City has the following strategies in place to address stormwater management for new development and redevelopment.

Stormwater Management Manual

Portland City Code chapter 17.38 gives the City legal authority to limit stormwater runoff flow (volume and rate) and pollutant discharges from new development and redevelopment. The City's [Stormwater Management Manual](#) (SWMM) identifies stormwater management principles and techniques that help preserve or mimic the natural hydrologic cycle and achieve water quality goals.

The SWMM was adopted by City Council in July 1999, with updates in September 2000, September 2002, September 2004, August 2008, and January 2014.

BES staff continually track, evaluate, and develop new technologies and stormwater management approaches and incorporate them into the SWMM as appropriate. BES also provides training and technical assistance to familiarize City staff and the public with the SWMM's requirements, procedures, and techniques.

BES conducts plan reviews and onsite inspections to ensure that installed facilities comply with the SWMM.

Maintenance Inspection Program

The Maintenance Inspection Program (MIP), established in 2003, verifies that facilities required by the SWMM to have O&M plans are properly operated and maintained. The program provides technical assistance, with the authority to enforce provisions of City Code, specifically City Code Chapter 17.38. During inspections, MIP staff provide facility-specific O&M guidance to site owners/operators. The program also distributes educational information. An MIP database inventories and maps all private stormwater management facilities that are required by the SWMM to have an O&M plan and documents all post construction inspections.

ACTIVITIES

(Not in any order of priority)

Task 1: Continue to implement requirements of the *Stormwater Management Manual*.

Assignment: Bureau of Environmental Services

Task 2: Review and revise, if appropriate, the *Stormwater Management Manual*.

Assignment: Bureau of Environmental Services

Task 3: Continue to track, evaluate, and develop new technologies and stormwater management approaches.

Assignment: Bureau of Environmental Services

Task 4: Continue to provide training and technical assistance to City staff and the public.

Assignment: Bureau of Environmental Services

Task 5: Continue to conduct plan reviews and onsite inspections to ensure that facilities comply with the SWMM.

Assignment: Bureau of Environmental Services

Task 6: Continue to implement the Maintenance Inspection Program to ensure that facilities required under the SWMM to have O&M plans are properly operated and maintained after construction.

Assignment: Bureau of Environmental Services

Other BMP Activities Related to ND-2:

- **OM-1** addresses operations and maintenance for public facilities.
- **STR-1** addresses best management practices for existing development.

Category: STRUCTURAL CONTROLS (STR)

Purpose: To implement structural modifications (constructed facilities)⁴ to existing systems/development to reduce pollutants in discharges from the municipal separate storm sewer system.

Overview:

While the City's *Stormwater Management Manual* (see ND-2) addresses new development and redevelopment, there is also the need to mitigate impacts from existing development. Measures that are implemented through STR-1 to address existing development are critical to the success of the City's overall stormwater management program.

The City of Portland's activities in this category are included under one best management practice:

- **STR-1: Structurally modify components of the storm drainage system to reduce pollutant discharges. Implement structural retrofits/improvements to existing development to reduce pollutants in discharges from the municipal separate storm sewer system.**

This BMP is implemented by public and private entities to reduce pollutant discharges from public and private properties.

STR-1 is described in detail on the following pages.

Pollutants Addressed:

The City's activities under this BMP address most pollutants commonly found in urban runoff.

⁴ Structural modifications include constructed facilities such as swales, wetlands, ponds, piped systems, filter strips, landscaped stormwater planters, infiltration basins, manufactured unit-type facilities, porous pavement, detention basins, disconnected downspouts, ecoroofs, and removal of impervious surfaces. Even if these facilities are vegetated, they are considered structural if they involve any construction activity.

STR-1: Structurally modify components of the storm drainage system to reduce pollutant discharges. Implement structural retrofits/improvements to existing development to reduce pollutants in discharges from the municipal separate storm sewer system.

INTRODUCTION

STR-1 addresses structural modifications/improvements to:

- Storm sewer system components such as pipes, inlets, ditches, and stormwater management facilities (SMFs)
- Existing rights-of-way and roads
- Other existing public and private development

STRATEGY

The City has the following strategies in place.

Retrofits of Existing Storm Drainage System

During routine operations and maintenance (see BMP OM-1), City bureaus (including Environmental Services, Parks and Recreation, Water, and Transportation) identify opportunities and needs to retrofit the existing storm drainage system to improve stormwater management. Examples include ditch-to-swale retrofits and the addition of water quality management to flow control facilities.

Portland Watershed Management Plan

The 2005 *Portland Watershed Management Plan* (PWMP) is a citywide strategy to identify opportunities and actions to improve the conditions of Portland's urban watersheds. It encompasses the five watersheds within Portland's jurisdiction:

- Willamette River
- Johnson Creek
- Tryon Creek
- Fanno Creek
- Columbia Slough

Watershed staff for each of the City's five watersheds identify, assess, and implement projects that reduce pollutants in discharges from the storm drainage system (e.g., construction of stormwater management facilities, reduction of effective impervious area).

Stormwater System Plan

BES periodically conducts systems planning for the infrastructure systems it manages, including the combined sewer system, the sanitary sewer system, and the separated storm sewer system. BES completed the combined and sanitary sewer elements of its most recent *System Plan* in 2012 and is currently working on the *Stormwater System Plan* (SWSP).

The SWSP will identify high-priority areas for pollution reduction retrofits. It will include an alternatives analysis to identify the preferred control measures for the highest-priority retrofit areas. The highest-priority projects will be recommended for capital improvement program (CIP) funding.

Green Streets Policy and “% for Green”

The Portland Green Streets Policy, adopted by City Council in 2007, includes establishment of the “% for Green” fund. City-funded projects that are not considered to be new development or redevelopment, but that require a street-opening permit or occur in the right-of-way, must pay into the “% for Green” fund (1% of the project construction costs). The “% for Green” fund supports facilities in areas with system deficiencies, including water quality retrofits.

Technical Assistance, Incentives, and Grants Programs

The City has technical assistance, incentives, and grants programs that result in onsite retrofits or improvements to existing development. These can vary as funding and priorities evolve. Current programs include:

- Community Stewardship Grants Programs (see BMP PI-1 for description)
- Stormwater Implementation and Technical Assistance (including the Clean River Rewards program to promote private stormwater management and the Ecoroof Program)
- Green Building and Development Program

ACTIVITIES

(Not in any order of priority)

Task 1: Continue to implement retrofits to the existing storm drainage system, as identified during routine operations and maintenance.

Assignment: Bureaus of Environmental Services, Parks, Water, and Transportation

Task 2: Continue to identify, assess, and implement watershed projects that reduce pollutants in discharges from the storm drainage system.

Assignment: Bureau of Environmental Services

Task 3: Continue to develop the *Stormwater System Plan* element of the *BES System Plan*.

Assignment: Bureau of Environmental Services

Task 4: Continue the application of the “% for Green” funds to address system deficiencies.
Assignment: Bureaus of Environmental Services, Transportation

Task 5: Continue technical assistance, incentives, and grants programs that result in onsite retrofits/improvements.
Assignment: Bureaus of Environmental Services, Planning and Sustainability

Other BMP Activities Related to STR-1:

- **ND-1** and **ND-2** address best management practices for new development and redevelopment during and after construction.
- **OM-1** and **OM-2** address the initial assessment of system and facility conditions through routine operations and maintenance, which may result in retrofits addressed under this BMP.

Category: PROGRAM MANAGEMENT (PM)

Purpose: To conduct effective program management, coordination, and reporting.

Overview:

A key focus of the City is to provide program management, coordination, and reporting to effectively implement the comprehensive *Stormwater Management Plan* (SWMP) and comply with permit conditions. This involves multiple City bureaus, the City's co-permittee (the Port of Portland), and other MS4 jurisdictions.

The City's activities in this category are included under one best management practice:

- **PM-1: Conduct program management, coordination, and reporting activities.**

PM-1 is discussed in more detail on the following pages.

Pollutants Addressed:

This BMP does not in itself reduce pollutants; rather, it facilitates pollutant reduction by ensuring that the *Stormwater Management Plan* is effectively implemented.

PM-1: Conduct program management, coordination, and reporting.

INTRODUCTION

BES administers and manages the NPDES MS4 permit and SWMP. The Director of BES provides oversight and certifies compliance deliverables on behalf of the City.

STRATEGY

The City has the following strategies in place for effective program management, coordination, and reporting.

City Management and Coordination

BES's Stormwater Program Manager is responsible for overall project management, compliance reporting, policy development, and coordination of the MS4 program. Because the permit is citywide, staff from many other City bureaus are also involved with stormwater program development, implementation, and reporting.

Co-Permittee Coordination

The City coordinates with Portland's co-permittee, the Port of Portland, to share information about program implementation and coordination, monitoring, and other issues related to the permit.

Coordination with Other Jurisdictions

The City coordinates and addresses stormwater issues with other jurisdictions in the state through the Oregon Association of Clean Water Agencies (ACWA).

Annual Compliance Report

The City and its co-permittee, the Port of Portland, submit [Annual Compliance Reports](#) to the Oregon Department of Environmental Quality (DEQ) by November 1 of each year. The purpose of the reports is to convey clear, succinct program information for the previous fiscal year (July 1 - June 30), in compliance with the annual reporting requirements of the permit. The reports also provide other interested parties with an overview of the SWMP's implementation status.

ACTIVITIES

(Not in any order of priority)

Task 1: Continue to provide overall program management and to work with other City bureaus as necessary to implement the SWMP.

Assignment: Bureau of Environmental Services

Task 2: Continue to coordinate with the Port of Portland.

Assignment: Bureau of Environmental Services

Task 3: Continue to coordinate with other jurisdictions.
Assignment: Bureau of Environmental Services

Task 4: Continue to submit annual compliance reports.
Assignment: Bureau of Environmental Services

Other BMP Activities Related to PM-1:

Project management provides oversight and reporting on all other BMPs.

MEASURABLE GOALS

PUBLIC INVOLVEMENT (PI)

- Provide approximately 425 programs (classroom lessons, field science programs, tours, etc.) annually to K-12 and college students.
- Award at least \$50,000 in community stewardship grants annually.
- Involve approximately 10,000 participants in community events, workshops, stewardship projects, and restoration events annually.
- Distribute the Riverviews mailer at least three times during the permit term to over 300,000 water and sewer customers.
- Conduct a community assessment activity at least two times during the permit term.
- Provide opportunities for public review and comment for annual reports, any SWMP revisions, and any other permit-identified items.

OPERATIONS AND MAINTENANCE (OM)

- Inspect 100 percent of the following stormwater system components annually:
 - Green streets
 - Manufactured stormwater treatment devices
 - Regional stormwater treatment sites
- Maintain green streets
 - Perform 12,500 routine maintenance treatments over the permit term.
- Clean the following stormwater system components over the permit term:
 - 275,000 lineal feet of ditches
 - 50,000 inlets and catch basins
 - 500 manufactured stormwater treatment devices
 - 50 stormwater treatment sites
- Evaluate and update the BES *Stormwater Operations and Maintenance Manual* once during the permit term.
- Provide annual training to applicable PBOT-MO staff members.

INDUSTRIAL/COMMERCIAL CONTROLS (IND)

- Inspect all permitted (1200A, 1200Z, 1200COLS) facilities once per year.
- Review each permitted facility's monitoring and annual report each year.
- Assess 100 percent of newly identified industrial and commercial facilities that may need a 1200Z, 1200A, or 1200COLS permit to determine the need for further evaluation and/or inspection that will establish whether an NPDES permit is required.
- Every 5 years, inspect facilities (individual sites) that were previously certified as having no exposure and not required to obtain a permit.
- Under the Eco-Logical Business Program, recertify 10 auto shops during the permit term.

ILLICIT CONNTECTIONS AND ILLICIT DISCHARGES CONTROLS (ILL)

- Conduct dry weather inspections and collect samples if flow is present at all major City-owned outfalls at least once during the permit term.
- Inspect priority City-owned outfalls a minimum of three times a year.
- Review priority outfall monitoring results and update the priority outfall list annually, as appropriate.
- Maintain the spill response hotline 24 hours a day.

NEW DEVELOPMENT (ND)

- Evaluate the *Erosion and Sediment Control Manual* (at least once during the permit cycle) and update as needed; conduct public involvement on updates.
- Inspect public sites with erosion control permits daily during construction during the wet season and weekly during the dry season.
- Inspect 100 percent of active private development construction sites subject to erosion control requirements. At a minimum, inspections will occur (1) after initial temporary erosion control measures are installed, and (2) near completion of development after permanent erosion control measures are in place. Conduct interim checks as part of routine building permit inspections for land-disturbing activities

-
- Inspect 1,500 private stormwater facilities or 450 properties annually. Use education and enforcement tools to ensure that stormwater management operations and maintenance plans are followed.
 - Revise the *Stormwater Management Manual* during the permit term.
 - Track the number, type, drainage area, and location of private facilities constructed annually that are required by the SWMM to have O&M plans.

STRUCTURAL CONTROLS (STR)

- Complete the following public facilities by the end of the permit term:
 - Construct NE Columbia Blvd. stormwater management facilities (Columbia Slough Watershed).
 - Construct NE Sandy and NE 122nd Ave. stormwater management facilities (Columbia Slough watershed).
 - Convert 10,000 to 15,000 linear feet of roadside ditches to swales (Tryon Creek and Fanno Creek watersheds).
 - Construct a stormwater management facility at SW Beaverton-Hillsdale Highway and SW Shattuck (Fanno Creek watershed)
 - Construct green street facilities at SE Foster east of SE 111th (Johnson Creek watershed).
 - Construct one green street on N Lagoon Ave. and three green streets along NW Front Ave. (Willamette Watershed).
- Track the number, type, drainage area, and location of public facilities constructed annually.

PROJECT MANAGEMENT (PM)

- Submit annual reports by November 1 of each year.

PORTLAND STORMWATER MANAGEMENT PLAN (SWMP) SUMMARY OF PROPOSED CHANGES

Permit Requirement

B.6: MS4 Permit Renewal Application Package

...The application package must include an evaluation of the adequacy of the proposed SWMP modifications in reducing pollutants in discharges from the MS4 to the MEP. The application package must contain:

- a. Proposed program modifications including the modification, addition or removal of BMPs incorporated into the SWMP, and associated measurable goals.

The City of Portland's 2011 NPDES MS4 permit requires the City's permit renewal application package to include proposed modifications to the City's 2011 Stormwater Management Plan (SWMP), including best management practices (BMPs) and measurable goals. This document summarizes the modifications that have been incorporated into the proposed SWMP and the reasons for them. The permit renewal application to be submitted to the Oregon Department of Environmental Quality (DEQ) on July 31, 2015, will describe how the City assessed its current stormwater program and identified proposed modifications and will demonstrate that the proposed program meets the permit requirement to reduce the discharge of pollutants from the MS4 to the maximum extent practicable (MEP).

SWMP INTRODUCTION

- Made minor text edits to reflect current conditions (e.g., dates; MS4 area) and to reflect the proposed BMP changes.
- Deleted "Stormwater Management Program Organization and Coordination" section because the information is outdated, is not a permit requirement, and/or is included in other SWMP sections.
- Deleted Table 2 ("Permit Requirements the BMPs Address") because some of the existing permit requirements have been completed, some are not applicable, and the new permit will have different requirements.

BEST MANAGEMENT PRACTICES (BMPs)

Public Involvement: PI-1

- Removed the Regional Coalition for Clean Rivers and Streams (RCCRS). BES has a robust public involvement and education program that uses public events, print and electronic communications, and social media and addresses the same issues and communities as the RCCRS.
- Removed the Education Advisory Committee because this committee no longer exists.
- Removed “Coordination among City Programs” because this is a normal practice that is common to all City programs.
- Added section for “Watershed Council Support.”
- Added “Citywide Education and Stewardship” to include citywide programs implemented by BES in coordination with the Bureau of Parks and Recreation and community partners. (These programs were previously included under BMP NS-1.)
- Included a community assessment activity in place of focus groups to allow for more options in the type of activity conducted.

Operations and Maintenance: OM-1

- Updated the Strategy section as needed to reflect current strategies and responsible staff and to remove unnecessary detail.
- Deleted “Research and Pilot Testing of New O&M Practices” under the Strategy section and as Task 4 because it is considered an ongoing function that is integrated into the overall O&M program rather than a specific strategy or activity.
- Under Task 1, deleted “Develop a protocol for prioritizing major public facilities for annual inspection” because it has been completed. Moved the annual inspection of facilities from Task 1 to a measurable goal.
- Deleted Task 6 (development of a training handbook) because it has been completed.
- Updated “Other BMP Activities Related to OM-1” to reflect that OM-2 and OM-3 have now been combined.

Operations and Maintenance: OM-2 and OM-3

- Combined OM-2 and OM-3 to eliminate duplication.
- Deleted “remove” pollutants from the OM-2 description because these strategies prevent, rather than remove, pollutants.

Changes from OM-2:

- Removed tree planting strips as a component under the Introduction because the City does not have O&M responsibility for them.
- Updated the Strategy section as needed to reflect current strategies and responsible staff and remove unnecessary detail.
- Deleted pilot testing from the Strategy section and Task 2 because it is considered an ongoing function that is integrated into the overall O&M program rather than a specific strategy or activity.
- Deleted Task 5 (training handbook) because it has been completed.
- Deleted Task 6 (Street Leaf Removal Program) because it is in the combined sewer area.

Changes from OM-3:

- Under Strategy and Task 4, deleted the Pesticide Free Park Program because all of these parks are in the combined sewer area. Pesticides management is addressed under the Integrated Pest Management (IPM) Program and Salmon Safe certification.
- Made other updates to the Strategy section to reflect current activities.
- Deleted Task 2 (evaluation of facilities, structures, and activities) because it has been completed.

Industrial/Commercial Controls: IND-1

- Added “City Permits and Discharge Authorizations” into the Strategy and tasks (new Task 2).
- Deleted Task 3 (“Revise City Code Title 17.39”) because it has been completed.
- Reworded Task 4 to more accurately reflect the ongoing implementation activities of the Industrial Stormwater Program.

Industrial/Commercial Controls: IND-2

- Updated the Strategy section as needed to reflect current strategies.
- Changed the BEST Program to its new name: Sustainability at Work.
- Deleted “Partnerships” under the Strategy and as former Task 5 because it is already included under the P2O team strategy and task.
- Deleted targeted education and outreach activities under former Task 6 because they have been completed.
- Deleted former Task 7 because it has been completed.

Illicit Connections and Illicit Discharges Controls: ILL-1

- Changed the BMP category and BMP title to include “Illicit Connections” separate from “Illicit Discharges” for consistency with definitions in City Code 17.39.
- Updated the Introduction and Strategy sections to reflect current program activities and remove unnecessary detail.
- Deleted former Task 3 (revising monitoring protocols for sampling) because it has been completed.

New Development: ND-1

- Under Task 1, replaced “Track and analyze enforcement actions to evaluate program effectiveness” with “Provide technical assistance to contractors/permit applicants” (previously under Task 3) to focus on promoting compliance with Title 10 and the *Erosion and Sediment Control Manual*.
- Updated Task 5 by changing “document site plan review procedures” to “implement site review procedures.”
- Edited Task 7 to clarify that the task applies to sites with land-disturbing activities (i.e., not to sites with only interior work).

New Development: ND-2

- Changed the BMP description from “...and erosive stormwater flows” to “...and hydrologic impacts from stormwater flows.”
- Under Strategy, deleted the description of the Stormwater Management Manual’s main elements (unnecessary detail).
- Edited Task 5 so the wording is consistent with the description under the Strategy.

Structural Controls: STR-1

- Under the Strategy, updated the BES System Plan description; rewrote/updated the Green Streets description; and updated the examples under “Technical Assistance.”
- Revised the tasks to be consistent with the changes made under the Strategy.

Natural Systems: NS-1

- Deleted this category/BMP because it is not related to permit requirements for the MS4. The City implements and reports on activities to protect and restore natural areas and vegetation under its Total Maximum Daily Load (TMDL) program, as described in the *TMDL Implementation Plan for the Willamette River and Tributaries* (February 28, 2014). Activities that BES implements in coordination with the Bureau of Parks and Recreation and community partners and that involve public participation are now included under PI-1.

Program Management: PM-1

- Made minor edits for clarification/readability.

MEASURABLE GOALS

Public Involvement (PI)		
Current (2011 permit)	Proposed	Comments
<ul style="list-style-type: none"> • Provide outreach to approximately 15,500 K-12 students annually (classroom programs, education field programs). • Award at least \$50,000 in community stewardship grants annually. • Involve approximately 10,000 participants in community events, workshops, stewardship projects, and restoration events annually. • By May 2011, develop and distribute a public education bill insert to over 200,000 water and sewer customers. 	<ul style="list-style-type: none"> • Provide approximately 425 programs (classroom lessons, field science programs, tours, etc.) annually to K-12 and college students. • Award at least \$50,000 in community stewardship grants annually. • Involve approximately 10,000 participants in community events, workshops, stewardship projects, and restoration events annually. • Distribute the Riverviews mailer at least three times during the permit term to over 300,000 water and sewer customers. • Conduct a community assessment activity at least two times during the permit term. • Provide opportunities for public review and comment for annual reports, any SWMP revisions, and any other permit-identified items. 	<ul style="list-style-type: none"> • Revised the measurable goal for outreach to K-12 students because past data show that the number of education programs (classroom lessons, field trips, tours, etc.) is a more stable indicator of performance than the number of students. It also is a better indicator of BES’s current focus, which has shifted from broad programming to large audiences (e.g. assembly programs) to more in-depth work in watershed monitoring, stormwater/wastewater and pollution prevention programs.

Operations and Maintenance (OM)		
Current (2011 permit)	Proposed	Comments
<ul style="list-style-type: none"> • Develop a training handbook for PBOT-MO staff during the permit term. • Provide the following maintenance actions over the five-year permit cycle: <ul style="list-style-type: none"> – Clean 31,000 lineal feet of culverts. – Repair 10,000 lineal feet of culverts. – Clean 250,000 lineal feet of ditches. – Clean 38,000 inlets and catch basins. – Repair 1,500 inlets and inlet leads. – Clean 135 major stormwater management facilities/pollution reduction facilities. – Repair 40 pollution reduction facilities. • Sweep arterials six times per year. • Inspect, and maintain as necessary, all stormwater and stormwater containment and pollution prevention facilities in City maintenance yards annually. 	<ul style="list-style-type: none"> • Inspect 100 percent of the following stormwater system components annually: <ul style="list-style-type: none"> – Green streets – Manufactured stormwater treatment devices – Regional stormwater treatment sites • Maintain green streets: <ul style="list-style-type: none"> – Perform 12,500 routine maintenance treatments over the permit term. • Clean the following stormwater system components over the permit term: <ul style="list-style-type: none"> – 275,000 lineal feet of ditches – 50,000 inlets and catch basins – 500 manufactured stormwater treatment devices – 50 stormwater treatment sites • Evaluate and update the BES <i>Stormwater Operations and Maintenance Manual</i> once during the permit term. • Provide annual training to applicable PBOT-MO staff members. 	<ul style="list-style-type: none"> • Deleted the training handbook because it has been completed; included one revision during next permit term. • Deleted numbers of repair activities, since this cannot be predicted. • Updated the type and number of maintenance actions. • Deleted arterial sweeping to focus resources on increased cleaning of stormwater system components. • Deleted annual inspection/maintenance of maintenance yards because the yards are all in the combined sewer area.

Industrial/Commercial Controls (IND)		
Current (2011 permit)	Proposed	Comments
<ul style="list-style-type: none"> • Inspect all permitted (1200Z, 1200COLS) facilities once per year. • Review each permitted facility’s monitoring and annual report each year. • Survey 100 percent of newly identified facilities to determine the need for NPDES permits. • Every 5 years, inspect industries (individual sites) previously identified as having no exposure and not required to obtain a permit. • Complete revision of City Code Title 17.39 by 2012. • Under the Eco-Logical Business Program, certify 10 additional auto shops and 20 additional landscape firms that provide services within the City Portland by 2015. • Evaluate one new business sector for implementation of the Eco-Logical Business Program. 	<ul style="list-style-type: none"> • Inspect all permitted (1200A, 1200Z, 1200COLS) facilities once per year. • Review each permitted facility’s monitoring and annual report each year. • Assess 100 percent of newly identified facilities to determine the need for further evaluation and/or inspection that will establish whether an NPDES permit is required. • Every 5 years, inspect facilities (individual sites) that were previously certified as having no exposure and not required to obtain a permit. • Under the Eco-Logical Business Program, recertify 10 auto shops during the permit term. 	<ul style="list-style-type: none"> • Deleted revision of City Code Title 17.39 because it has been completed. • Previous goals for Eco-Logical Business Program have been completed; set new goal.

Illicit Connections and Illicit Discharges Controls (ILL)		
Current (2011 permit)	Proposed	Comments
<ul style="list-style-type: none"> • Conduct dry weather sampling at all major City-owned outfalls at least once annually. • Inspect the priority outfalls a minimum of three times a year. • Expand the IDEP program to include the CSO system below diversion structures, where the outfalls discharge stormwater only and should have no dry-weather flows. Currently, the program addresses all of the westside outfalls and 25 percent of the eastside outfalls. Expand the program to all eastside outfalls by December 2013. • Maintain the spill response hotline 24 hours a day. 	<ul style="list-style-type: none"> • Conduct dry weather sampling at all major City-owned outfalls at least once during the permit term. • Inspect priority City-owned outfalls a minimum of three times a year. • Review priority outfall monitoring results and update the priority outfall list annually, as appropriate. • Maintain the spill response hotline 24 hours a day. 	<ul style="list-style-type: none"> • Revised the type/frequency of outfall sampling/monitoring. BES has monitored major stormwater outfalls annually for the last five years. Most of these outfalls have no dry weather flow or have well-characterized non-stormwater flows allowed by schedule A.4.a.xii of the NPDES MS4 permit (e.g. groundwater). BES therefore proposes to shift resources from annual major stormwater outfall monitoring. Instead, BES will add any major outfalls with potential discharge issues to the priority list; monitor priority outfalls at least three times a year; and review the priority outfalls list annually and update it as appropriate. • Deleted expansion of the IDEP program because it has been completed.

New Development Standards (ND)		
Current (2011 permit)	Proposed	Comments
<ul style="list-style-type: none"> • Evaluate the <i>Erosion and Sediment Control Manual</i> and update as needed (at least once during the 2011-2016 permit cycle); conduct public involvement on updates. • Inspect public sites with erosion control permits daily during construction. • Inspect 100 percent of active private development construction sites subject to erosion control requirements. At a minimum, inspections will occur (1) after initial temporary erosion control measures are installed, and (2) near completion of development after permanent erosion control measures are in place. Conduct interim checks as part of routine building permit inspections. • Inspect 1,500 private stormwater facilities or 450 properties annually. Use education and enforcement tools to ensure that stormwater management operations and maintenance plans are followed. 	<ul style="list-style-type: none"> • Evaluate the <i>Erosion and Sediment Control Manual</i> (at least once during the permit cycle) and update as needed; conduct public involvement on updates. • Inspect public sites with erosion control permits daily during construction during the wet season and weekly during the dry season. • Inspect 100 percent of active private development construction sites subject to erosion control requirements. At a minimum, inspections will occur (1) after initial temporary erosion control measures are installed, and (2) near completion of development after permanent erosion control measures are in place. Conduct interim checks as part of routine building permit inspections for land-disturbing activities • Inspect 1,500 private stormwater facilities or 450 properties annually. Use education and enforcement tools to ensure that stormwater management operations and maintenance plans are followed. 	<ul style="list-style-type: none"> • Changed inspection frequency for public construction sites during dry weather from daily to weekly to focus inspections on wet weather conditions when erosion is likely to occur. • Clarified that the measurable goal related to interim inspections applies to sites with land-disturbing activities (i.e., not to sites with only interior work).

<ul style="list-style-type: none"> • Revise the SWMM during the 2011-2016 permit term. • Track number, type, size, drainage area and location of private facilities constructed annually. 	<ul style="list-style-type: none"> • Revise the <i>Stormwater Management Manual</i> during the permit term. • Track the number, type, drainage area, and location of private facilities constructed annually that are required by the SWMM to have O&M plans. 	
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Structural Controls (STR)		
Current (2011 permit)	Proposed	Comments
<ul style="list-style-type: none"> • Construct the following public facilities to provide treatment for stormwater runoff from approximately 336 acres: <ul style="list-style-type: none"> – Construct the NE 148th Avenue stormwater management facility by FY 2014-15. – Construct stormwater management facilities in the NE 122nd Ave subbasin by December 2012 (Columbia Slough Watershed). – Convert 5,000 linear feet of roadside ditches to swales or porous shoulder (Tryon Creek and Fanno Creek watersheds) during the permit term. – Construct stormwater management facilities along SW Beaverton-Hillsdale Highway and SW Barbur Blvd. and in commercial and multi-family residential areas (Tryon Creek and Fanno Creek watersheds) during the permit term. • Track the number, type, drainage area, and location of public facilities constructed annually. 	<ul style="list-style-type: none"> • Complete the following public facilities by the end of the permit term: <ul style="list-style-type: none"> – Construct NE Columbia Blvd. stormwater management facilities (Columbia Slough Watershed). – Construct NE Sandy and NE 122nd Ave. stormwater management facilities (Columbia Slough watershed). – Convert 10,000 to 15,000 linear feet of roadside ditches to swales (Tryon Creek and Fanno Creek watersheds). – Construct a stormwater management facility at SW Beaverton-Hillsdale Highway and SW Shattuck (Fanno Creek watershed) – Construct green street facilities at SE Foster east of SE 111th (Johnson Creek watershed). – Construct one green street on N Lagoon Ave. and three green streets along NW Front Ave. (Willamette Watershed). • Track the number, type, drainage area, and location of public facilities constructed annually. 	<ul style="list-style-type: none"> • Updated the list of public facilities projects to reflect most current BES stormwater facility planning.

Natural Systems (NS)		
Current (2011 permit)	Proposed	Comments
<ul style="list-style-type: none"> Plant 20,000 trees, and initiate revegetation work on 70 acres by the end of the permit cycle. Acquire 50 acres of land by the end of the permit cycle. Update the Portland Plan (an update to the City's Comprehensive Plan) by December 2013. 	N/A	This BMP has been deleted. (See explanation on page 5, above.)
Program Management (PM)		
Current (2011 permit)	Proposed	Comments
<ul style="list-style-type: none"> Submit annual reports by November 1 of each year. 	<ul style="list-style-type: none"> Submit annual reports by November 1 of each year. 	

III. EVALUATION OF STORMWATER MANAGEMENT PROGRAM

Permit Requirement

B.6: MS4 Permit Renewal Application Package

...The application package must include an evaluation of the adequacy of the proposed SWMP modifications in reducing pollutants in discharges from the MS4 to the MEP. The application package must contain:

b. The information and analysis necessary to support the Department's independent assessment that the co-permittee's stormwater management program addressed the requirements of the existing permit. Co-permittees must also describe how the proposed management practices, control techniques, and other provisions implemented as part of the stormwater program were evaluated using a co-permittee-defined and standardized set of objective criteria relative to the following MEP general evaluation factors:

- i. Effectiveness – program elements effectively address stormwater pollutants
- ii. Local Applicability – program elements are technically feasible considering local soils, geography, and other locale specific factors
- iii. Program Resources – program elements are implemented considering availability to resources and the co-permittees stormwater management program priorities.

INTRODUCTION

To address permit requirement B.6, this evaluation has two parts:

- How the existing stormwater management program addressed 2011 permit requirements
- How the proposed stormwater management program for the upcoming term meets the MEP requirement

HOW THE EXISTING STORMWATER MANAGEMENT PROGRAM ADDRESSED 2011 PERMIT REQUIREMENTS

The City's overall stormwater management program comprises activities outlined in its Stormwater Management Plan (SWMP), environment monitoring, and additional permit-defined regulatory programs and submittals. The following sections summarize how the program met permit requirements and how the SWMP (as a subset of the City's overall program) was adaptively managed.

Overall Permit Requirements

Per Schedule A.2 of the permit:

Compliance with this permit and implementation of a stormwater management program, including the Department-approved Stormwater Management Plan, establishes this MEP requirement" (to reduce pollutants to the MEP).

The City of Portland met all of its 2011 permit requirements, as shown in Appendix A. The City's existing program has therefore met the MEP requirement.

In addition, the City has met all of the measurable goals included in its SWMP to date, as reported in each annual report and summarized in Appendix B.

Annual Adaptive Management Process

Per Schedule D.4 of the permit:

Each co-permittee must follow an adaptive management approach to assess annually and modify, as necessary, any or all existing SWMP components and adopt new or revised SWMP components to achieve reductions in stormwater pollutants to the MEP.

The City has conducted an annual adaptive management process to determine if the City's stormwater program was being implemented in accordance with the SWMP; determine if measurable goals were being met or progress was being made toward them (as applicable); and identify whether any program adjustments were needed. This annual process was conducted in accordance with the City's *Adaptive Management Process* (submitted to DEQ on November 1, 2011) and included the following components:

- Review of best management practice (BMP) tasks and measurable goals
- Consideration of relevant monitoring information
- Consideration of any public comment received
- Consideration of relevant research and evaluation
- Ongoing staff review and evaluation
- Ongoing discussions with other jurisdictions

The results of this process were used to assess whether any program adjustments were needed to continue to reduce the discharge of pollutants from the MS4 to the MEP and to meet permit requirements. Based on these annual assessments, and as reported in the annual reports, no program adjustments were identified.

HOW THE PROPOSED STORMWATER MANAGEMENT PROGRAM FOR THE UPCOMING TERM MEETS THE MEP REQUIREMENT

The City's adaptive management process (submitted to DEQ on November 1, 2011, per permit requirement D.4) requires the City to conduct a comprehensive assessment of the stormwater management program at the end of the permit term, with the results to be used to identify proposed program modifications submitted as part of the permit renewal package.

This section provides background information about the City's ongoing compliance with the MEP standard; identifies the components and results of the City's comprehensive assessment of the current program; summarizes proposed program revisions based on these results; and identifies the maximum extent practicable (MEP) criteria the City used to evaluate the proposed stormwater management program.

MEP Background

MS4 permittees initially developed and established their SWMPs that met MEP as part of their original 1993 permit applications. Those SWMPs have become the foundation for each permittee's program—a foundation that has been continuously evaluated and improved through adaptive management since 1995. As a result, the BMPs described in the permittee's proposed SWMP are the result of the cumulative effect of implementing, continuously evaluating, and making corresponding changes (i.e., adaptive management) to a variety of technically and economically feasible BMPs that ensure that the most appropriate controls are implemented in the most effective manner based on site-specific conditions. Up until the submittal of this permit renewal application, the City has followed the following process to ensure its SWMP meets the MEP standard:

- **Original development of the SWMP submitted with the 1993 permit application:** All Phase I National Pollutant Discharge Elimination System (NPDES) MS4 permit applicants were encouraged by the U.S. Environmental Protection Agency to design programs tailored for local problems, priorities, resources, and objectives. The co-applicants for the permit (at the time, this included the City of Portland, Port of Portland, Multnomah County, and the Oregon Department of Transportation) employed a coordinated and comprehensive structured approach to planning and decision-making over a 2-year period. Participants met in a series of technical workshops to discuss objectives and results and to conduct detailed evaluations and ratings of 115 candidate BMPs. The BMPs were evaluated with respect to meeting permit requirements, addressing pollutants of concern, implementation costs, maintenance costs, and public acceptance. The City developed a SWMP to include the selected BMPs.

Issuance of the first NPDES MS4 permit by DEQ, which included implementation of the SWMP, was regarded as acceptance of a program that met the MEP standard.

- **Overall SWMP review conducted for the Interim Evaluation Report (IER) due in 2006:** The 2004 permit required an Interim Evaluation Report to be submitted to DEQ in 2006. As part of the IER, the City reviewed each SWMP element (i.e., BMP) to determine if implementation of the SWMP was sufficient to reduce the discharge of pollutants to the MEP. The City submitted details on how each of the elements was addressed and the rationale for the continued existing or revised level of implementation. This comprehensive evaluation and refinement process resulted in a revised SWMP designed to maintain conformance with the MEP standard. The City began to implement the revised SWMP on July 31, 2006.
- **Overall SWMP review conducted for the 2008 permit renewal application:** As part of the adaptive management process, the City prepared a revised SWMP for the 2008 permit renewal application. This process included a comprehensive review and evaluation of the revised SWMP with respect to three evaluation criteria, as required by DEQ: program effectiveness, local applicability, and program resources. The revised SWMP also included measurable goals.

Because of ongoing permit renewal negotiations (2007-11) this proposed SWMP was not implemented. DEQ required the City to revise the SWMP in August 2010 and again in April 2011. The 2006 SWMP remained in effect until the April 2011 (current) SWMP came into effect.

- **Continual adaptive management reported in annual reports (1993–present):** The City has evaluated the effectiveness of its SWMP annually to ensure that it continues to meet the MEP standard. This involves reviewing and, if needed, modifying how the SWMP BMPs are implemented to ensure the most efficient and effective approaches.

Current Assessment Components and Results

The City has conducted a comprehensive assessment of the following current program components to determine the need for any proposed modifications:

- Cumulative Annual Adaptive Management Results
- Monitoring Information (Trend Results)
- Evaluations and Reports
- End of Permit Term SWMP Review Process
- Public Comment

The results of these assessments are provided below.

CUMULATIVE ANNUAL ADAPTIVE MANAGEMENT RESULTS

Section I, above, describes the annual adaptive management process. The cumulative results of this annual process showed that SWMP tasks and measurable goals were being achieved and that no adjustments to the SWMP were needed during the permit term.

MONITORING INFORMATION (TREND RESULTS)

The City's 19th Annual Compliance Report submitted to DEQ on November 1, 2014 included water quality trends analyses based on the results of environmental monitoring in the Columbia Slough, Fanno Creek, and the Willamette River and its tributaries (Johnson Creek and Tryon Creek). The trends analyses was based on City of Portland data collected during both dry and wet weather seasons at 12 fixed monitoring locations within the five watersheds. Trends analyses for these water bodies reflect from 8 to 17 years of data collected from 1996 through June 2013, depending on the parameter. A total of 17 parameters were analyzed. Because water quality conditions at the monitoring locations may also reflect the effects of runoff from other jurisdictions, the wet season trends analyses summarized below are intended as a general indicator of water quality to support stormwater management decisions and not to reflect only City stormwater runoff conditions or quality.

- **Columbia Slough:** Decreasing (i.e., improving) trends were evident for two parameters at the upstream monitoring location (total lead and total suspended solids [TSS]) and for ten parameters at the downstream monitoring location (total copper, dissolved copper, total mercury, total lead, total zinc, ammonia, nitrate, total phosphorus, E. coli, and TSS). The other parameters had no observable trend.
- **Willamette River:** Decreasing (i.e., improving) trends were evident for seven parameters (total lead, dissolved lead, total zinc, dissolved zinc, ammonia, ortho-phosphorus, and total phosphorus). For dissolved oxygen, the trend was increasing (i.e., improving). The other parameters had no observable trend.
- **Johnson Creek:** At the upstream monitoring location, decreasing (i.e., improving) trends were evident for two parameters (total copper, dissolved lead). For dissolved oxygen, the trend was increasing (i.e., improving). At the downstream monitoring location, four parameters had decreasing (i.e., improving) trends (total copper, dissolved copper, dissolved lead, and dissolved zinc). The other parameters had no observable trend.
- **Tryon Creek:** At the upstream monitoring location, decreasing (i.e., improving) trends were evident for two parameters (nitrate and total phosphorus). At the downstream monitoring location, dissolved zinc showed an increasing (i.e., declining) trend. The other parameters had no observable trend.
- **Fanno Creek:** Decreasing (i.e., improving) trends were evident for two parameters (total lead, and dissolved oxygen). For dissolved oxygen, the trend was increasing (i.e., improving).

Ortho-phosphorus showed an increasing (i.e., declining) trend. The other parameters had no observable trend.

The observed water quality trends are predominately improving. The Columbia Slough, Willamette River, and Johnson Creek all had improving or no observable water quality trends. Fanno Creek and Tryon Creek had the only declining trends: ortho-phosphorus (Fanno Creek) and dissolved zinc (Tryon Creek). However, these watersheds also had some improving water quality trends or no observable trends.

Because extensive development and population increase occurred within Portland during the 17-year span over which the trend analyses data were collected, the improving trends and no detectable trends are a positive result. These trends analyses did not result in any adjustments to the City's SWMP.

EVALUATIONS AND REPORTS

As stated in the City's adaptive management process, the City reviewed the results of the following deliverables (required under the current permit and submitted to DEQ in November 2014) to determine if they indicated the need for any program adjustments.

- *Hydromodification Assessment*
- *Retrofit Strategy*
- *303(d) Evaluation*
- *TMDL Pollutant Load Reduction Evaluation*
- *Public Education Effectiveness Evaluation*

Hydromodification Assessment

The Hydromodification Assessment evaluates hydromodification impacts related to discharges from the City of Portland's MS4. These impacts include erosion, sedimentation, and alteration to stormwater flow, volume, and duration that may cause or contribute to water quality degradation.

The assessment includes streams in the Fanno/Tryon Watershed, Willamette subwatersheds, and Johnson Creek Watershed. It does not include the Willamette River mainstem, the Columbia Slough, or the Columbia River. The Willamette and Columbia Rivers and the Lower Columbia Slough are excluded because City MS4 stormwater discharges account for a very small fraction of a percent of the total flow in these water bodies. The Middle and Upper Columbia Slough are not included because that system is managed for both water level and flow.

The assessment identified 34 hydromodification impact sites related to the City MS4 (12 in the Fanno/Tryon Watershed, 11 in the Willamette subwatersheds, and 11 in the Johnson Creek Watershed). Most of these identified impacts are near-field (related mostly to the concentration of flow energy around an outfall pipe). Few far-field impacts (beyond the direct influence of outfall hydraulics) were identified. This is because the majority of the City was developed in the late-19th to early- to mid- 20th centuries, and stream channels have adjusted to the hydromodification effects that followed that development.

Several stream reaches were identified as being potentially susceptible to hydromodification impacts if dramatic future changes in hydrologic characteristics were to occur as a result of large-scale development. This is, however, considered unlikely to happen because most development occurring today is infill development or redevelopment on a relatively small (lot-by-lot) scale. In addition, *Stormwater Management Manual* requirements mitigate the alterations to hydrology normally associated with new development and redevelopment.

The City has been implementing stormwater management measures for water quality and flow control under the NPDES permit program since 1995. The City's *Retrofit Plan* (see below) identifies the various existing City policies, programs, and plans that support measures to reduce water quality impacts from existing development that drains to the MS4. Because many of these measures also address stormwater flow control for both new development and redevelopment, they also reduce the potential for MS4 hydromodification impacts. In addition, the City is currently developing its long-term *Stormwater System Plan* (SWSP), which will include elements related to reducing or minimizing hydromodification impacts.

Retrofit Strategy

The City has been implementing retrofit control measures since the beginning of the first permit term (1995) to reduce water quality impacts from existing development that drains to the MS4. A number of policies, programs, and plans support those retrofit measures, and numerous public stormwater quality facilities have been constructed. Approximately 125 additional acres will be treated by new public stormwater quality facilities anticipated to begin construction in fiscal years 2014-15 and 2015-16.

The City's long-term retrofit strategy is being integrated into the *Stormwater System Plan* (SWSP) planning process. This approach avoids duplication and ensures that the long-term retrofit strategy is addressed within the overall context of comprehensive stormwater system planning. The SWSP will identify high-priority areas for pollution reduction retrofits. It will include an alternatives analysis to identify the preferred control measures for the highest-priority retrofit areas. The highest-priority projects that meet the retrofit objectives will be recommended for CIP funding, at which point a construction timeline and a planning-level cost estimate will be developed.

303(d) Evaluation

The applicable pollutants included in the 303(d) evaluation are the Willamette River listing for chlordane, hexachlorobenzene, and cyanide. For these three parameters, the 303(d) evaluation results in the following conclusions:

- It is unlikely that stormwater discharges from the MS4 cause or contribute to the water quality degradation of receiving waters.
- The City's *Stormwater Management Plan* includes BMPs that address these parameters and are effective at reducing them to the maximum extent practicable.
- No SWMP revisions are necessary.

TMDL Pollutant Load Reduction Evaluation

The evaluation showed that benchmarks were met for all pollutants and watersheds except for E. coli in Springbrook Creek. (As discussed in Section VII, a benchmark is an estimated total pollutant load reduction for each TMDL parameter or surrogate for which a wasteload allocation (WLA) was approved by the Environmental Protection Agency by January 31, 2014). It is likely that the E. coli benchmark for Springbrook Creek has been achieved if non-structural BMPs are considered, evidenced by monitoring results close to the mouth of Springbrook Creek that indicate a significantly improving trend in E. coli concentration.

WLAs were met for the following TMDL parameters:

- Fanno Creek: Total suspended solids (TSS)
- Rock Creek: Total phosphorus, TSS, bacteria (E. coli)
- Willamette River—Balch Creek and mainstem: Bacteria (E. coli)
- Johnson Creek: DDT

WLAs were not met for the following TMDL parameters:

- Columbia Slough: Total phosphorus, biochemical oxygen demand (BOD), bacteria (E. coli), TSS
- Fanno Creek: Total phosphorus
- Willamette River—Springbrook Creek, Stephens Creek, Tanner Creek, Tryon Creek: Bacteria (E. coli)
- Johnson Creek: Bacteria (E. coli)

Section VII of this submittal discusses how the City has developed benchmarks for the next permit term for areas where TMDLs have not been met. The benchmarking process included identifying structural stormwater management facilities that will be implemented during the next permit term to contribute toward reducing pollutant loads and making progress toward achieving WLAs. These facilities are included in the proposed SWMP (see Section II) under Structural Controls (STR).

Public Education Effectiveness Evaluation

The *Public Education Effectiveness Evaluation* demonstrates that the City of Portland has had a robust public education program in place since the beginning of its first NPDES MS4 permit term in 1995. The program includes education and stewardship activities to promote overall public understanding of and involvement in watershed protection and stormwater management. It also targets pollution prevention education to businesses. The City employs a variety of strategies to educate and involve numerous audiences (e.g., school children, adults, businesses, neighborhood associations, watershed councils). Information is provided in a variety of media (print and online), and hands-on opportunities are stressed. These activities are documented in the *Stormwater Management Plan* (SWMP) and annual reports. In addition, the City has consistently met, and usually exceeded, its measurable goals for its public involvement BMP throughout this permit term.

END OF PERMIT TERM SWMP REVIEW PROCESS

The City reviewed its current SWMP to evaluate the need for revisions. MS4 program staff met with staff from all relevant bureaus to examine each BMP and its associated tasks and measurable goals. This comprehensive review ensured that all staff members directly involved in implementation of the SWMP participated in the review and were able to contribute to the overall evaluation process.

PUBLIC COMMENT

In accordance with permit requirements, the City has provided the public the opportunity to comment on the monitoring plan submitted to DEQ on June 1, 2011, annual reports, SWMP revisions, TMDL benchmark development, and the retrofit strategy. One comment was received on the *Retrofit Report* concerning the ongoing need for projects that improve water quality in SW Portland.

As required by the permit, the City provided a public review and comment period from June 18 to July 3, 2015 for the proposed *Stormwater Management Plan* (section II of this submittal), summary of proposed revisions (section II of this submittal), and summary of projected benchmarks (section VII of this submittal). The City placed a notice of the review and comment period on the BES website: <https://www.portlandoregon.gov/bes/67885>. No public comments were submitted.

Proposed SWMP Revisions

The results of the assessment process described above show that the program in place has been effective and has been meeting permit requirements and MEP. In general, therefore, the City's proposed SWMP does not include any substantive changes to the previous SWMP. The majority of changes involve eliminating tasks that had a specified end date and have now been completed; updating measurable goals, and making other updates and revisions to improve clarity and/or efficiencies.

Section II of this submittal provides the proposed SWMP and summarizes the proposed changes.

MEP Evaluation

As described above, the City of Portland initially developed and established a program that met the MEP standard as part of its original 1993 permit application and has continuously evaluated and improved its program over the years through the adaptive management process. As part of this submittal, the City conducted a comprehensive assessment of the current program, using the assessment components and results described above, and identified proposed SWMP revisions. The City also considered the three MEP evaluation factors listed in the current permit: program effectiveness, local applicability, and program resources. As required by the permit, Phase I jurisdictions coordinated an approach to defining and standardizing objective criteria related to these three MEP evaluation factors. This coordinated approach included identification of example criteria for consideration. Each jurisdiction scored and ranked the example criteria

based on importance and applicability. The highest-ranking criteria were acceptable by all participating jurisdictions. The City also included several criteria that it considered relevant to its MEP evaluation.

These criteria are listed below. The City has developed and adaptively managed the proposed SWMP with the goal of addressing each of them and continuing to meet MEP during the next permit term.

PROGRAM EFFECTIVENESS

- The program includes a range of BMPs that encompass pollution prevention, source control, and treatment approaches.
- The program includes BMPs that are technically feasible, effective, and implementable.
- The program includes BMPs that target applicable 303(d) parameters, help achieve TMDL pollutant load reduction benchmarks, and make progress toward TMDL wasteload allocations.
- The program targets pollutant discharges from existing development, redevelopment, and new development activities.

LOCAL APPLICABILITY

- The program is consistent with local ordinances and current legal authority.
- Stormwater design standards implemented as part of the program reflect local conditions specific to soils, rainfall, infiltration rates, and stream conditions.
- The program encourages and solicits feedback and involvement from stakeholders to ensure consistency with community-wide goals and objectives.

PROGRAM RESOURCES

- The program is included in the current budget allocations.
- The program considers implementation costs and practicability within the overall context of permittee priorities and resources.

APPENDIX A: 2011 PERMIT REQUIREMENTS MET

DUE DATE	PERMIT REQUIREMENT	PERMIT SECTION	STATUS
<ul style="list-style-type: none"> April 1, 2011 	<p>SWMP:</p> <ul style="list-style-type: none"> Revise to include new permit requirements. 	<ul style="list-style-type: none"> D.6 	<ul style="list-style-type: none"> Revised and submitted to DEQ April 1, 2011.
<ul style="list-style-type: none"> June 1, 2011 July 1, 2011 	<p>Monitoring Plan:</p> <ul style="list-style-type: none"> Submit plan to DEQ. Implement approved plan. 	<ul style="list-style-type: none"> B.2 B.2 	<ul style="list-style-type: none"> Submitted QAMP to DEQ June 1, 2011. DEQ conditionally approved QAMP July 1, 2011; City began implementation July 1, 2011. City submitted addendum November 2, 2011 to clarify role of monitoring in adaptive management of stormwater program.
<ul style="list-style-type: none"> November 1, 2011 	<p>Adaptive Management:</p> <ul style="list-style-type: none"> Submit adaptive management approach. 	<ul style="list-style-type: none"> D.4 	<ul style="list-style-type: none"> Submitted to DEQ November 1, 2011.
<ul style="list-style-type: none"> November 1, 2011 November 1, 2011 	<p>ILL-1</p> <ul style="list-style-type: none"> Document enforcement response procedures. Develop or identify pollutant parameter action levels and report them to DEQ. 	<ul style="list-style-type: none"> A.4.a.ii A.4.a.iii 	<ul style="list-style-type: none"> Contained in City code and admin. rules; provided this information to DEQ in a letter dated November 1, 2011. Submitted action levels to DEQ November 21, 2011.

<ul style="list-style-type: none"> January 1, 2012 	<p>PI-1</p> <ul style="list-style-type: none"> Reconvene SAC (or other advisory committee). 	<ul style="list-style-type: none"> D.6.a 	<ul style="list-style-type: none"> BES convened Portland Watershed Management Plan (PWMP) Stakeholder Committee to provide input into PWMP update, which includes stormwater issues (reported in Annual Report 16).
<ul style="list-style-type: none"> January 1, 2012 	<p>OM-1 & OM-2:</p> <ul style="list-style-type: none"> Complete and implement the materials management section of the PBOT training guide. 	<ul style="list-style-type: none"> D.6.d 	<ul style="list-style-type: none"> Completed/implemented in FY 10-11 (reported in Annual Report 16).
<ul style="list-style-type: none"> July 1, 2012 	<p>ILL-1</p> <ul style="list-style-type: none"> Identify and map dry-weather screening priority locations; conduct annual inspections. 	<ul style="list-style-type: none"> A.4.a.iv 	<ul style="list-style-type: none"> Completed the revised list of priority outfalls by July 1, 2012; started inspecting these priority outfalls three times per year in FY12-13.
<ul style="list-style-type: none"> Beginning January 1, 2013 	<p>IND-1</p> <ul style="list-style-type: none"> Conduct annually an industrial facilities inspection “sweep” in at least one targeted area. 	<ul style="list-style-type: none"> D.6.h 	<ul style="list-style-type: none"> Done.
<ul style="list-style-type: none"> January 1, 2013 	<p>OM-1:</p> <ul style="list-style-type: none"> Inventory and map stormwater management facilities and controls. Implement a program to verify that facilities and controls are inspected, operated, and maintained. (for public facilities) 	<ul style="list-style-type: none"> A.4.h.i 	<ul style="list-style-type: none"> Done.
<ul style="list-style-type: none"> January 1, 2013 	<p>ND-2:</p> <ul style="list-style-type: none"> Inventory and map stormwater management facilities and controls. Implement a program to verify that facilities and controls are inspected, operated, and maintained. (for private facilities) 		<ul style="list-style-type: none"> Done.
<ul style="list-style-type: none"> January 1, 2013 	<p>OM-3:</p> <ul style="list-style-type: none"> Identify, evaluate, and prioritize stormwater pollution prevention opportunities and improvements to reduce potential impacts at City-owned and operated properties. 	<ul style="list-style-type: none"> D.6.f 	<ul style="list-style-type: none"> Done.

<ul style="list-style-type: none"> January 1, 2013 January 1, 2013 	<p>IND-1</p> <ul style="list-style-type: none"> Implement an updated industrial and commercial facility inspection and stormwater control strategy. Inventory, assess, and implement a strategy to reduce impacts from municipal facilities that treat, store, or transport municipal waste. 	<ul style="list-style-type: none"> A.4.b.iii A.4.g.iii 	<ul style="list-style-type: none"> Done. Not applicable. Sutherland Yard is the only such City facility and has a separate solid waste permit.
<ul style="list-style-type: none"> January 1, 2013 	<p>IND-2</p> <ul style="list-style-type: none"> Evaluate one new business sector for implementation of the Ecological Business Program. 	<ul style="list-style-type: none"> D.6.j 	<ul style="list-style-type: none"> Expanded the program into the car washing sector in FY10-11; reported in Annual Report 16.
<ul style="list-style-type: none"> November 1, 2013 	<p>Retrofit Strategy:</p> <ul style="list-style-type: none"> Identify one stormwater quality improvement project. 	<ul style="list-style-type: none"> A.6.c 	<ul style="list-style-type: none"> Done; identified NE 148th Avenue Water Quality Facility
<ul style="list-style-type: none"> January 1, 2014 January 1, 2014 January 1, 2014 	<p>ND-2</p> <ul style="list-style-type: none"> Implement a post-construction site runoff program that meets designated permit conditions. Identify, minimize, or eliminate barriers in ordinances, code, and development standards that inhibit LID/green infrastructure. Develop or reference an enforceable post-construction stormwater management manual or equivalent document. 	<ul style="list-style-type: none"> A.4.f.i A.4.f.ii A.4.f.iii 	<ul style="list-style-type: none"> Covered by City’s Stormwater Management Manual (SWMM). Done. Covered by SWMM.
<ul style="list-style-type: none"> November 1, 2014 	<p>Retrofit Strategy:</p> <ul style="list-style-type: none"> Develop a retrofit strategy and submit plan to DEQ. 	<ul style="list-style-type: none"> A.6.b 	<ul style="list-style-type: none"> Submitted November 1, 2014
<ul style="list-style-type: none"> November 1, 2014 	<p>PI-1</p> <ul style="list-style-type: none"> Conduct or participate in effectiveness evaluation; report results to DEQ. 	<ul style="list-style-type: none"> A.4.d.vi 	<ul style="list-style-type: none"> Submitted as Part F of FY13-14 annual report
<ul style="list-style-type: none"> November 1, 2014 	<p>Hydromodification Assessment:</p> <ul style="list-style-type: none"> Conduct assessment and submit report. 	<ul style="list-style-type: none"> A.5 	<ul style="list-style-type: none"> Submitted November 1, 2014
<ul style="list-style-type: none"> November 1, 2014 (4th annual report) 	<p>303(d) Listed Pollutants</p> <ul style="list-style-type: none"> Submit evaluation report in fourth annual report. 	<ul style="list-style-type: none"> B.5.j 	<ul style="list-style-type: none"> Submitted as Part B of FY13-14 annual report

<ul style="list-style-type: none"> • November 1, 2014 (4th annual report) • November 1, 2014 (4th annual report) 	<p>TMDLs</p> <ul style="list-style-type: none"> • Submit Wasteload Allocation Attainment Assessment. • Submit TMDL Pollutant Load Reduction Evaluation. 	<ul style="list-style-type: none"> • B.5.j D.3.b • B.5.j D.3.c 	<ul style="list-style-type: none"> • Submitted as Part E of FY13-14 annual report • Submitted as Parts C and D of FY13-14 annual report
<ul style="list-style-type: none"> • January 1, 2015 	<p>OM-1 & OM-2:</p> <ul style="list-style-type: none"> • Complete and implement the remainder of the PBOT training guide. 	<ul style="list-style-type: none"> • D.6.d 	<ul style="list-style-type: none"> • Done.
<ul style="list-style-type: none"> • July 30, 2015 (180 days before permit expiration) 	<p>TMDLs</p> <ul style="list-style-type: none"> • Submit TMDL benchmarks. 	<ul style="list-style-type: none"> • D.3.d 	<ul style="list-style-type: none"> • Submitted as part of the permit renewal package
<ul style="list-style-type: none"> • July 30, 2015 (180 days before permit expiration) 	<p>Permit Renewal</p> <ul style="list-style-type: none"> • Submit permit renewal application package. 	<ul style="list-style-type: none"> • B.6 	<ul style="list-style-type: none"> • Submitted July 31, 2015
<ul style="list-style-type: none"> • Permit expiration 	<p>Retrofit Strategy:</p> <ul style="list-style-type: none"> • Initiate, construct, or implement one stormwater quality improvement project. 	<ul style="list-style-type: none"> • A.6.c 	<ul style="list-style-type: none"> • NE 148th Avenue Water Quality Facility construction completed in FY 14-15

APPENDIX B: MEASURABLE GOALS MET

The following table identifies the status of measurable goals as of the end of FY2013-14 (June 30, 2014); results are not yet available for FY2014-15.

Measurable Goal	Status as of June 30, 2014 (end of FY13-14)	Notes
PI-1		
Provide outreach to approximately 15,500 K-12 students annually (classroom programs, education field programs).	Achieved or exceeded each year	
Award at least \$50,000 in community stewardship grants annually.	Exceeded each year	
Involve approximately 10,000 participants in community events, workshops, stewardship projects, and restoration events annually.	Exceeded each year	
By May 2011, develop and distribute a public education bill insert to over 200,000 water and sewer customers.	Achieved in FY10-11; in addition, public education bill inserts have been distributed in all following years.	
OM-1		
Develop a training handbook for PBOT-MO staff during the permit term.	Completed	
Provide the following maintenance actions over the five-year permit cycle: <ul style="list-style-type: none"> - Clean 31,000 lineal feet of culverts. - Repair 10,000 lineal feet of culverts. - Clean 250,000 lineal feet of ditches. - Clean 38,000 inlets and catch basins. - Repair 1,500 inlets and inlet leads. - Clean 135 major stormwater management facilities/pollution reduction facilities. - Repair 40 pollution reduction facilities. 	<ul style="list-style-type: none"> - Exceeded - Repaired 9,560 linear feet to date - Cleaned 236,894 linear feet to date - Exceeded - Repaired 901 inlets and inlet leads - Exceeded - Exceeded 	<ul style="list-style-type: none"> - Will be achieved by FY14-15 - Will be achieved by FY14-15 - No additional repairs were needed

OM-2		
Sweep arterials six times/ year.	Achieved each year	
Develop a training handbook for PBOT-MO staff during the permit term.	Completed	
OM-3		
Inspect, and maintain as necessary, all stormwater and stormwater containment and pollution prevention facilities in City maintenance yards annually.	Achieved each year	
IND-1		
Inspect all permitted (1200Z, 1200COLS) facilities once per year.	Achieved each year	
Review each permitted facility’s monitoring and annual report each year.	Achieved each year	
Survey 100 percent of newly identified facilities to determine the need for NPDES permits.	Achieved each year	
Every 5 years, inspect industries (individual sites) previously identified as having no exposure and not required to obtain a permit.	Achieved	
Complete revision of City Code Title 17.39 by 2012.	Completed	
IND-2		
Under the Eco-Logical Business Program, certify 10 additional auto shops and 20 additional landscape firms that provide services within the City Portland by 2015.	4 auto shops and 15 landscape firms newly certified to date during this permit term	Program has also been expanded into the car washing sector, with 12 new car washing businesses added.
Evaluate one new business sector for implementation of the Eco-Logical Business Program.	Achieved	

ILL-1		
Conduct dry weather sampling at all major City-owned outfalls at least once annually.	Achieved each year	
Inspect the priority outfalls a minimum of three times a year.	Achieved each year	
Expand the IDEP program to include the CSO system below diversion structures, where the outfalls discharge stormwater only and should have no dry-weather flows. Currently, the program addresses all of the westside outfalls and 25 percent of the eastside outfalls. Expand the program to all eastside outfalls by December 2013.	Completed	
Maintain the spill response hotline 24 hours/day.	Achieved each year	
ND-1		
Evaluate the <i>Erosion and Sediment Control Manual</i> and update as needed (at least once during the 2011-2016 permit cycle); conduct public involvement on updates.	Evaluated and determined that no update was necessary	
Inspect public sites with erosion control permits daily during construction.	Achieved each year	
Inspect 100 percent of active private development construction sites subject to erosion control requirements. At a minimum, inspections will occur (1) after initial temporary erosion control measures are installed, and (2) near completion of development after permanent erosion control measures are in place. Conduct interim checks as part of routine building permit inspections.	Achieved each year	

ND-2		
Inspect 1,500 private stormwater facilities or 450 properties annually. Use education and enforcement tools to ensure that stormwater management operations and maintenance plans are followed.	Exceeded each year	
Revise the SWMM during the 2011-2016 permit term.	Completed	
Track number, type, size, drainage area and location of private facilities constructed annually.	Achieved each year	
STR-1		
<p>Construct the following public facilities to provide treatment for stormwater runoff from approximately 336 acres:</p> <ul style="list-style-type: none"> • Construct the NE 148th Avenue stormwater management facility by FY 2014-15. • Construct stormwater management facilities in the NE 122nd Ave subbasin by December 2012 (Columbia Slough Watershed). • Convert 5,000 linear feet of roadside ditches to swales or porous shoulder (Tryon Creek and Fanno Creek watersheds) during permit term. 	<ul style="list-style-type: none"> • Achieved; completed construction in FY14-15, treating stormwater runoff from 180 acres • Achieved; constructed eight water quality planters treating stormwater runoff from 2.89 acres. • Total conversion as of FY13-14 is 4,671 linear feet, managing 2.15 acres of road runoff. 	<p>Total acreage treated for stormwater runoff exceeded 336 acres as a result of construction of the facilities identified below plus construction of additional facilities (as identified in annual reports).</p> <ul style="list-style-type: none"> • Expect to achieve total of 5,000 linear feet in FY14-15

<ul style="list-style-type: none"> Construct stormwater management facilities along SW Beaverton-Hillsdale Highway and SW Barbur Blvd. and in commercial and multi-family residential areas (Tryon Creek and Fanno Creek watersheds) during the permit term. 	<ul style="list-style-type: none"> Achieved; total facilities constructed as of FY13-14 treat 15.55 acres. 	
Track the number, type, drainage area, and location of public facilities constructed annually.	Achieved each year	
NS-1		
Plant 20,000 trees and initiate revegetation work on 70 acres by the end of the permit cycle.	Exceeded	
Acquire 50 acres of land by the end of the permit cycle.	Exceeded	
Update the <i>Portland Plan</i> (an update to the City's <i>Comprehensive Plan</i>) by December 2013.	Completed	
PM-1		
Submit annual reports by November 1 of each year.	Achieved each year.	

IV: SERVICE AREA EXPANSION

Permit Schedule

B.6. e. A description of any service area expansions that are anticipated to occur during the following permit term and a finding as to whether or not the expansion is expected to result in a substantial increase in area, intensity or pollutant loads.

The City of Portland expects to have only minor expansion of its urban service area during the next permit term. The City has evaluated the impacts of the expected expansion, based on the requirements for a Land Use Compatibility Statement (LUCS) in Oregon Administrative Rule (OAR) 340-018-0050 shown below. The City concludes that the expansion will not result in substantial increases in permitted area, runoff intensity, or pollutants loads.

Oregon Administrative Rule (OAR) 340-018-0050(2)(b) states:

An applicant's submittal of a LUCS is required for the renewal or modification of the permits identified in OAR 340-018-0030 if the Department determines the permit involves a substantial modification or intensification of the permitted activity.

A permit renewal requires a LUCS if the renewal involves any of the following modifications:

(B)(i) The permitted source or activity relates to the use of additional property or a physical expansion on the existing property. The LUCS applies to physical changes on the property not to existing permit conditions;

(ii) The permitted source or activity involves a significant increase in discharge to state waters or into the ground;

(iii) The permitted source or activity involves the relocation of an outfall outside of the source property;

The City submitted a LUCS to DEQ on January 18, 2005, for the 2004 MS4 permit renewal. The City's findings in that LUCS concluded that the issuance of the 2004 permit and the permitted activities met the policies of the City's Comprehensive Plan and the standards of the Zoning Code that relate to stormwater management. For the 2011 permit renewal, the City determined that a LUCS was not required because there was no substantial modification or intensification of the activities allowed under the previous permit. Similarly, the 2015 renewal continues the activities allowed under the 2011 permit and does not involve substantial modification or intensification. None of the permit modification factors identified in OAR 340-018-0050(2)(b)(B) apply, as shown below.

(B)(i) The permitted source or activity relates to the use of additional property or a physical expansion on the existing property. The LUCS applies to physical changes on the property not to existing permit conditions;

This factor does not apply for the following reason:

- It is anticipated that there will be no substantial expansion of the urban services boundary during the next permit term that would bring new lands into the permit coverage area. Recent annexations have been on an individual lot-by-lot basis. Based on these past annexations, it is estimated that approximately 2 acres (three to five individual residential lots) may be incorporated into the USB annually during the permit term. Any development or redevelopment of these parcels will be subject to the requirements of the City's *Stormwater Management Manual* and City policy that states that "the quality of stormwater leaving the site after development shall be equal to or better than the quality of stormwater leaving the site before development, as much as is practicable..." (City Code 17.38.025). As a result, these annexations would result in little or no net increase in stormwater discharge to Portland's MS4 and would not constitute the "use of additional property" as contemplated by OAR 340-018-0050(2)(b)(B)(i).

(ii) The permitted source or activity involves a significant increase in discharge to state waters or into the ground;

This factor does not apply for the following reason:

- As stated under factor (i) above, no substantial increases to the City's MS4 permit coverage area or related increases in stormwater discharges to the MS4 are expected during the next permit cycle.

(iii) The permitted source or activity involves the relocation of an outfall outside of the source property;

This factor does not apply for the following reason:

- It is not anticipated that any City outfalls will be relocated outside of the MS4 permit area.

V: FISCAL EVALUATION

Permit Requirement

Schedule B.6.f

A fiscal evaluation summarizing program expenditures for the current permit cycle and projected program allocations for next permit cycle.

The City of Portland spent approximately \$496.0 million in stormwater management services and facilities during permit years 16 (FY11) through 20 (FY15). The stormwater revenue requirements for permit year 21 (FY16) total approximately \$118.5 million. The City forecasts stormwater revenue requirements to be approximately \$670.9 million during permit years 22 (FY17) through 26 (FY21).¹

Table 1: Actual/Adopted Expenditures, Permit Years 16-20

Fiscal Year (FY)	Actual Expenditures (\$m)				Adopted FY15 PY20
	FY11	FY12	FY13	FY14	
Permit Year (PY)	PY16	PY17	PY18	PY19	
Enforcement/Development Review	\$5.8	\$6.7	11.2	13.6	13.4
Watersheds & Habitat Restoration	18.3	14.2	13.9	12.5	13.9
Facilities Operations/Maintenance	21.0	23.2	29.0	24.5	21.5
Capital Improvements	45.8	47.0	46.0	55.0	59.5
Total Stormwater Requirements	\$90.9	\$91.1	\$100.1	\$105.6	\$108.3

Note: PY21 (FY16) is not shown in this table because the permit expires mid-year.

Table 2: Forecasted Requirements, Permit Years 22– 26

Fiscal Year (FY)	Forecasted Requirements (\$m)				
	FY17	FY18	FY19	FY20	FY21
Permit Year (PY)	PY22	PY23	PY24	PY25	PY26
Operating Programs	\$62.7	\$66.1	\$67.2	\$73.2	\$76.1
<ul style="list-style-type: none"> • Enforcement/Development Review • Watersheds & Habitat Restoration • Facilities Operations/Maintenance 					
Capital Improvements	\$59.6	\$61.9	\$66.8	\$67.2	\$70.1
Total Stormwater Requirements	\$122.3	\$128.0	\$134.0	\$140.4	\$146.2

¹ Current permit expires in mid-FY16. Permit reissuance is assumed to occur in FY17.

The City relied on stormwater utility user fees to pay for an average of 88 percent of total annual utility requirements during permit years 16 through 20. Utility user fees will finance approximately 92 percent of total stormwater utility requirements in permit year 21. During permit years 22 through 26, the City expects to rely on stormwater utility user fees for 90-95 percent of total utility revenue requirements.

Table 3: Adopted Stormwater Utility User Rates, Permit Years 16– 21

	Adopted Rates					
	FY11	FY12	FY13	FY14	FY15	FY16
	PY16	PY17	PY18	PY19	PY20	PY21
Single-Family Residential Charge	\$21.79	\$22.36	\$23.90	\$24.88	\$25.72	\$26.59
Residential rate per 1,000 square feet of impervious area	\$9.08	\$9.32	\$9.96	\$10.36	\$10.72	\$11.08
Non-residential rate per 1,000 square feet of impervious area	\$9.66	\$9.97	\$10.55	\$10.97	\$11.19	\$11.55

Table 4: Forecasted Stormwater Utility User Rates, Permit Years 22– 26

	Forecasted Rates				
	FY17	FY18	FY19	FY20	FY21
	PY22	PY23	PY24	PY25	PY26
Single-Family Residential Charge	\$27.75	\$28.96	\$30.20	\$31.48	\$32.78
Residential rate per 1,000 square feet of impervious area	\$11.56	\$12.06	\$12.58	\$13.12	\$13.66
Non-residential rate per 1,000 square feet of impervious area	\$12.05	\$12.58	\$13.12	\$13.67	\$14.24

VI: POLLUTANT LOADING

Permit Requirement

Schedule B.6.c

An updated estimate of total annual stormwater pollutant loads for applicable TMDL pollutants or applicable surrogate parameters, and the following pollutant parameters: BOD₅, COD, nitrate, total phosphorus, dissolved phosphorus, cadmium, copper, lead and zinc. The estimates must be accompanied by a description of the procedures for estimating pollutant loads and concentrations, including any modeling, data analysis and calculation methods.

UPDATED ESTIMATES

The City of Portland has calculated total annual pollutant loads for the parameters designated in permit section B.6.c. Table 1 shows pollutant loads by land use for TMDL pollutants/surrogates that did not meet TMDL wasteload allocations during the current permit term, as determined by the TMDL Pollutant Load Reduction Evaluation the City conducted in 2014 (submitted as Part C of *Annual Compliance Report No. 19*). Table 2 shows total annual pollutant loads for the other designated parameters.

The City previously provided estimates of total annual pollutant loads in the 1993 Part 2 permit application and 2008 permit renewal submittal. However, the 2015 total annual pollutant loads are not directly comparable to the previous results for the following reasons:

- Revisions to the delineated permit area (28,761 acres in 1993, 15,754 acres in 2008 and 15,307 acres in 2015).¹
- Different datasets for parameter concentrations: The 1993 calculations were based on data collected from 1991 to 1993, while the 2008 and 2015 calculations are based on land use data collected from 1990 to 1996.
- Different land use distribution in the permit area: Industrial and residential land use areas increased from 2008 to 2015, and vacant land area decreased. Vacant areas generally have lower pollutant concentration associated with them compared with other land use categories. Because the estimate is for total pollutant loads and does not consider the effect of BMPs, some 2015 annual pollutant load estimates appear higher than in 2008.
- Different modeling approaches.

¹ The City has refined its delineation of catchment areas that drain to the MS4, in accordance with definitions provided in the Code of Federal Regulations [40 CFR 122.26(b)(8)] and in Schedule F of the permit. Based on those definitions, only those areas within Portland's urban services boundary that drain to the MS4 before discharging to receiving waters are now included in the permit area delineation.

METHODOLOGY

For the 2015 estimated pollutant load model, the City used the Polygon model, a modified version of the GRID model. The GRID model was used to model pollutant loads for the 2008 permit renewal submittal. The main difference between the two models is the modeling unit used. While the GRID model divides each MS4 watershed area into 100-foot by 100-foot grid cells, the Polygon model divides each MS4 watershed area into smaller polygons, using MS4 and zoning boundaries to define the polygons.

Similar to the GRID model, the Polygon model gathers data about MS4 drainage areas, land uses, and pollutant concentrations applied to each land use category. The following data are provided for each polygon:

- Polygon area estimated based on the shape of the polygon.
- Land use (approximated by zoning and vacant land overlay) and the typical percentage of impervious surface area for the specific land use. This information, along with polygon area, is used to determine the gross runoff volume from the polygon.
- Typical runoff pollutant concentration associated with the land use. The pollutant concentration is applied to the net polygon runoff, resulting in the gross pollutant load for the polygon.

The methodology and assumptions used in the modeling process are summarized below.

MS4 Delineation

The City has delineated its MS4 permit area in accordance with definitions provided in the Code of Federal Regulations [40 CFR 122.26(b)(8)] and in Schedule F of the permit. Based on those definitions, only those areas within Portland's urban services boundary that drain to the MS4 before discharging to receiving waters are included in the permit area delineation. This does not include:

- Stormwater that flows to sumps
- Stormwater that flows to the combined sewer area
- Natural stream systems
- Direct stormwater discharges from private property to natural stream systems (without entering the MS4)
- Areas with no public stormwater infrastructure
- Discharges from facilities that have individual, general, or industrial stormwater permits

Land Use

The specific land use assigned to each polygon is based primarily on the City's current zoning layer and a vacant land overlay (i.e., vacant land was assigned the Parks and Open Space designation even if the vacant land has a different zoning designation). The zoning layer uses detailed zoning codes, which are grouped into more generalized land use designations for use in the model, as follows:

- Commercial
- Industrial
- Multi-family residential
- Single-family residential
- Parks and Open Space

A typical percentage of imperviousness is assigned to each land use designation in order to estimate runoff volume from that land use.

Typical Land Use Runoff Concentrations

Typical runoff pollutant concentrations are assigned to each land use designation to estimate the pollutant loads associated with runoff from that land use. The primary source for the land use concentrations is a report titled *Analysis of Oregon Urban Runoff Water Quality Monitoring Data Collected from 1990 to 1996* (Association of Clean Water Agencies [ACWA], 1997). The ACWA data typically represent stormwater runoff from areas without any structural BMPs in place, so this element of the modeling reflects baseline pollutant loadings for each parameter of concern (i.e., loadings before structural BMPs are implemented).

Table 1: TMDL TOTAL ANNUAL POLLUTANT LOADS BY LAND USE						
	Precipitation (inches)	Total Annual Pollutant Loads (lbs)				
		Total	Land Use			
			COM	IND	SFR/MFR	POS/VAC
Columbia Slough						
Total Phosphorus	9.58	2,459	115	1,921	406	16
BOD	36.50	620,717	13,767	568,447	36,862	1,641
E. Coli	36.50	6.96E+13	6.56E+12	2.86E+13	3.43E+13	1.97E+11
TSS (surrogate for dissolved lead, DDE/DDT, dioxin, PCBs, dieldrin)	36.50	3,051,909	94,867	2,641,268	300,356	15,418
Fanno Creek						
Total Phosphorus	6.80	345.52	32.46		309.75	3.32
Lower Willamette River						
E. Coli (Springbrook Creek)	36.96	4.74E+11	0.00E+00	0.00E+00	4.73E+11	1.12E+09
E. Coli (Stephens Creek)	36.96	1.00E+13	1.72E+12	0.00E+00	8.28E+12	2.00E+10
E. Coli (Tanner Creek)	36.96	4.56E+12	1.13E+12	6.80E+11	2.68E+12	7.24E+10
E. Coli (Tryon Creek)	36.96	3.32E+13	3.05E+12	6.61E+10	3.00E+13	5.83E+10
Johnson Creek						
E. Coli	35.34	2.21E+13	1.10E+12	1.25E+12	1.97E+13	8.74E+10
Runoff Volume (ft³)						
Columbia Slough						
	9.58	86,674,343	4,877,222	60,515,335	19,185,064	2,096,722
	36.50	330,231,031	18,582,312	230,564,668	73,095,497	7,988,554
Fanno Creek						
	6.80	26,173,192	1,861,898		23,691,058	620,236
Lower Willamette River						
Springbrook Creek	36.96		-	-	1,007,708	45,437
Stephens Creek	36.96	23,330,443	4,859,597		17,659,660	811,186
Tanner Creek	36.96	17,330,427	3,187,121	5,484,921	5,721,330	2,937,055
Tryon Creek	36.96	75,597,276	8,636,612	533,327	64,059,737	2,367,600
Johnson Creek						
	35.34	8,683,207	3,120,568	10,075,355	41,939,925	3,547,359
NOTES:						
Median concentrations are used for estimate TP loading for Fanno Creek						
COM-Commercial; IND- Industrial; SFR/MFR- Single Family and Multiple Family Residential; POS/VAC- Parks, Open Space and Vacant Land						

Table 2: TOTAL ANNUAL POLLUTANT LOADS FOR OTHER PARAMETERS, BY LAND USE					
Pollutant	Total Annual Pollutant Loads (lbs)				
	Land Use				
	Total	COM	IND	SFR/MFR	POS/VAC
BOD ₅	1,279,320	65,139	1,012,443	195,064	6,674
COD	4,244,906	356,350	2,623,148	1,225,770	39,637
Total Phosphorus	23,550	2,080	13,039	8,188	243
Ortho-Phosphorus ¹	7,792	591	4,423	2,697	81
Nitrate	33,184	2,080	6,136	21,915	3,054
Total Cadmium	107.79	6.08	88.72	12.76	0.23
Total Copper	1,648	157	1,163	323	5.1
Total Lead	1,958	296	1,235	426	1.7
Total Zinc	20,683	931	17,232	2,505	15.8
Runoff Volume (ft ³)	9.18E+08	8.79E+07	4.11E+08	3.87E+08	3.25E+07
NOTES:					
1. Ortho-P is used in place of dissolved Phosphorus					
Annual total rainfall depth is 36.5 inches based on Portland Airport precipitation data					
COM-Commercial					
IND- Industrial					
SFR/MFR- Single Family and Multiple Family Residential					
POS/VAC- Parks, Open Space and Vacant Land					

VII: BENCHMARKS

Permit Requirement

Schedule B.6.h; D.3.a; D.3.d

Establishment of TMDL Pollutant Reduction Benchmarks: A TMDL pollutant reduction benchmark must be developed for each applicable TMDL parameter where existing BMP implementation is not achieving the WLA.

INTRODUCTION

The Oregon Department of Environmental Quality (DEQ) maintains a list—called the 303(d) list—of reaches of various water bodies within the state of Oregon that are “water quality limited” because they do not meet water quality standards for certain pollutants (for example, bacteria or phosphorus). DEQ then establishes total maximum daily loads (TMDLs) for 303(d) listed pollutants. A TMDL establishes the load capacity, which is the maximum amount of a pollutant a water body can assimilate without violating a water quality standard. A wasteload allocation (WLA) identifies the amount of a given pollutant that a source with a National Pollutant Discharge Elimination System (NPDES) permit (e.g., an industry or a municipality such as Portland) is allowed to discharge to the water body. WLAs can be expressed in a variety of ways, including an actual load, a load reduction percentage, or a concentration.

The City of Portland’s current (2011) NPDES Municipal Separate Storm Sewer System (MS4) permit requires the City to develop benchmarks for areas where TMDLs have been established and existing best management practices (BMPs) are not achieving the WLA. A benchmark is an estimated total pollutant load reduction for each TMDL parameter (or surrogate) for which a WLA was approved by the Environmental Protection Agency (EPA) by January 31, 2014⁷—for example, the total reduction of bacteria entering the Columbia Slough as a result of implementing best management practices (BMPs). Benchmarks are pollutant load reduction goals, not numeric effluent limits. They are used to evaluate the overall effectiveness of the City’s Stormwater Management Plan and, over the long term, to measure progress toward achieving wasteload allocations. As stated in the permit, the intent is to ensure that pollutant discharges for TMDL parameters are reduced to the maximum extent practicable.

Within Portland’s MS4 permit area, TMDLs and WLAs have been established for the Columbia Slough, Tualatin River, Johnson Creek, and Willamette River watersheds for the following parameters:

⁷ 2011 NPDES MS4 permit Schedule D(3)(a)

Table 1: EPA-Approved TMDL WLAs

Columbia Slough Watershed	Willamette River Watershed^a	Johnson Creek Watershed	Tualatin River Watershed^b
<ul style="list-style-type: none"> • Dissolved oxygen (addressed by biochemical oxygen demand - BOD) • Bacteria • Phosphorus (also addresses pH and chlorophyll a) • Dissolved lead • Dioxin • DDE/DDT • PCBs • Dieldrin 	<ul style="list-style-type: none"> • Bacteria 	<ul style="list-style-type: none"> • Bacteria • DDT 	<ul style="list-style-type: none"> • Bacteria • Dissolved oxygen (addressed by total settleable volatile solids) • Phosphorus
<p>^a Includes the mainstem and tributaries Balch Creek, Springbrook Creek, Tanner Creek, and Tryon Creek.</p> <p>^b The Fanno Creek Watershed and Rock Creek Watershed are subbasins of the Tualatin River Watershed within the City's NPDES MS4 permit area.</p>			

The City evaluated progress toward 2013 benchmarks (which were set in the 2008 NPDES MS4 permit renewal submittal) in its November 1, 2014 *NPDES MS4 Annual Compliance Report No. 19* (section C). As required by the permit, the evaluation also included an assessment of achieving WLAs. Table 2 shows TMDL parameters or surrogates that were met, and Table 3 shows those that were not met.

Table 2: WLAs Met

Fanno Creek
Total Suspended Solids (surrogate for dissolved oxygen)
Rock Creek
Total Phosphorus
Total Suspended Solids (surrogate for dissolved oxygen)
Bacteria (E. coli)
Willamette River: Bacteria (E. coli)
Balch Creek
Mainstem
Johnson Creek
DDT

Table 3: WLAs Not Met

Columbia Slough
Total Phosphorus
Biochemical Oxygen Demand
Bacteria (E. coli)
Total Suspended Solids (surrogate for dissolved lead, dioxin, DDE/DDT, PCBs, dieldrin)
Fanno Creek
Total Phosphorus
Willamette River: Bacteria (E. coli)
Springbrook Creek
Stephens Creek
Tanner Creek
Tryon Creek
Johnson Creek
Bacteria (E. coli)

In accordance with current permit renewal requirements, the City has established benchmarks for TMDL parameters for the Columbia Slough, Fanno Creek, Willamette River and tributaries, and Johnson Creek watersheds for which TMDL WLAs have not been achieved (Table 3). The benchmarks are set for 2021 to reflect the anticipated end of the next permit term. The process the City used and the resultant benchmarks are presented below.

POLYGON MODEL

The City selected the Polygon model, a modified version of the GRID model that was used to model pollutant loads and develop benchmarks in the 2008 permit renewal submittal and 2014 benchmark evaluation. The methods and most of the assumptions used in the runoff and pollutant loading estimation applied in the Polygon model are the same as those used in the GRID model. The main difference between the two models is the modeling unit used. While the GRID model divides each MS4 watershed area into 100-foot by 100-foot grid cells, the Polygon model divides each MS4 watershed area into smaller polygons, using MS4, zoning, and BMP drainage boundaries to define the polygons.

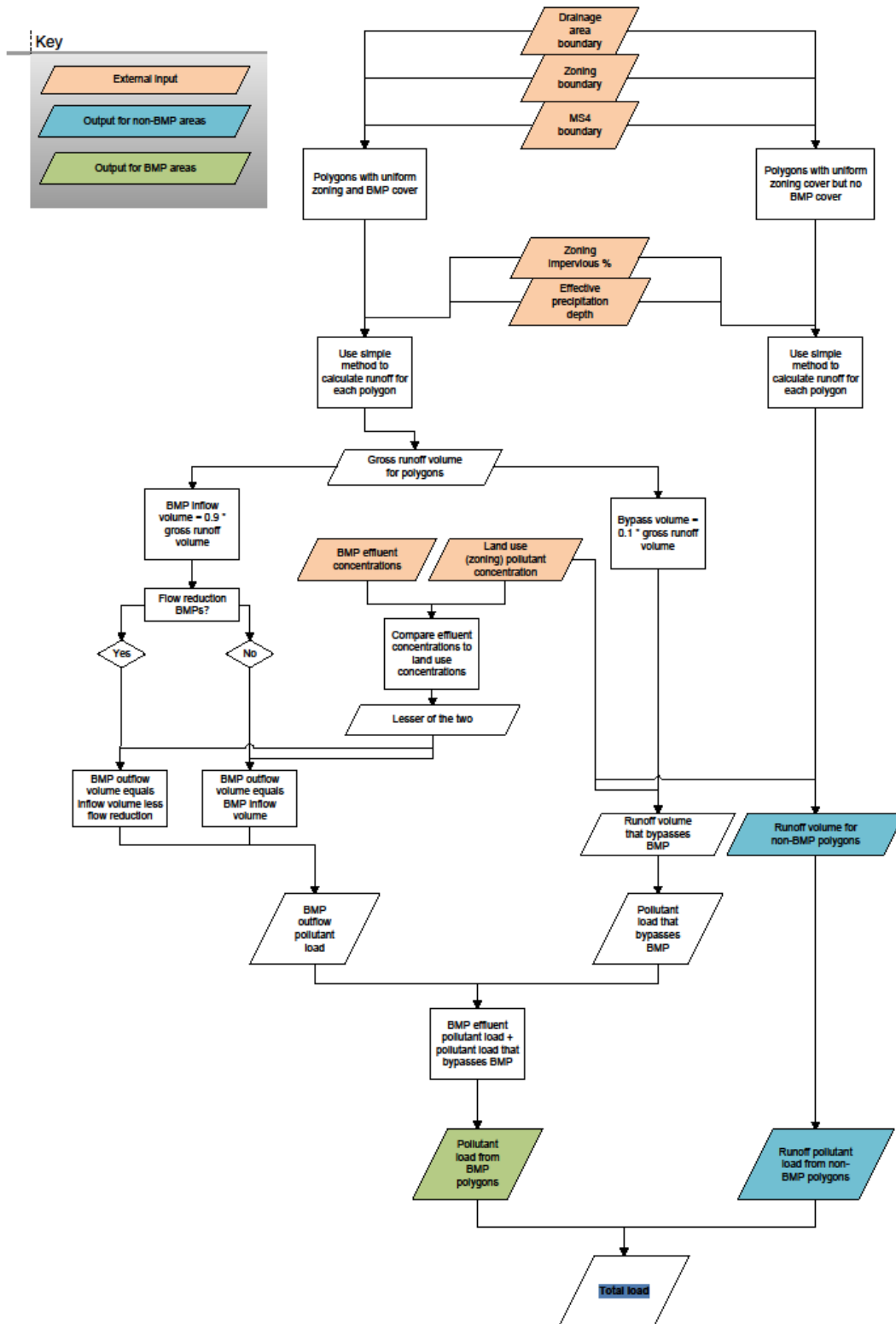
With the GRID model, there are sometimes boundary cells where multiple land uses or BMPs exist. The applied runoff volume and pollutant loading estimation, therefore, are sometimes approximations in these boundary grid cells. The major advantage of using polygons is that there are no boundary cells because each polygon has a unique shape defined by area draining to the MS4, zoning, and BMP drainage boundaries, with no overlapping.

Similar to the GRID model, the Polygon model gathers data about MS4 and BMP drainage areas, land uses, pollutant concentrations applied to each land use category, and type and level of BMP implementation. Using these input data, the model evaluates the effectiveness of structural BMPs in reducing pollutant loads. The following data are provided for each polygon:

- **Polygon area** estimated based on the shape of the polygon.
- **Land use** (approximated by zoning and vacant land overlay) and the typical percentage of impervious surface area for the specific land use. This information, along with polygon area, is used to determine the gross runoff volume from the polygon.
- **Flow reduction BMP(s)**, if any, that apply to the polygon. The amount of flow reduction achieved by the BMPs is subtracted from the gross cell runoff to determine the net runoff from the polygon.
- **Typical runoff pollutant concentration** associated with the land use. The pollutant concentration is applied to the net polygon runoff, resulting in the gross pollutant load for the polygon.
- **Typical BMP effluent concentration** from specific structural BMPs overlapping with the polygon. If a pollution reduction BMP applies to the polygon, the amount of pollution reduction it achieves (based on typical effluent concentrations from structural BMPs) is subtracted from the gross pollutant load to determine the net pollutant load for the polygon. This is done for each parameter of concern.

The methodology and assumptions used in the modeling process are illustrated in the figure on the following page and summarized below. The following section then provides the modeling results and benchmarks.

Polygon Model Inputs and Methodology



METHODOLOGY AND ASSUMPTIONS

MS4 Delineation

For both the Tualatin River and Columbia Slough TMDLs, DEQ developed wasteload allocations based on the assumption that the entire watersheds within the City's urban growth boundaries drain to the MS4, with the exception of combined sewer areas, sumped areas, and industrial permitted areas. For this benchmark development process, the City has delineated its MS4 permit area in accordance with definitions provided in the Code of Federal Regulations [40 CFR 122.26(b)(8)] and in Schedule F of the permit. Based on those definitions, only those areas within Portland's urban services boundary that drain to the MS4 before discharging to receiving waters are included in the permit area delineation. This does not include:

- Stormwater that flows to sumps
- Stormwater that flows to the combined sewer area
- Natural stream systems
- Direct stormwater discharges from private property to natural stream systems (without entering the MS4)
- Areas with no public stormwater infrastructure
- Discharges from facilities that have individual, general, or industrial stormwater permits

In developing benchmarks, the City used wasteload allocations and pollutant load estimates that are based on the redefined MS4 permit area.

Land Use

The specific land use assigned to each polygon is based primarily on the City's current zoning layer and a vacant land overlay (i.e., vacant land was assigned the Parks and Open Space designation even if the vacant land has a different zoning designation). The zoning layer uses detailed zoning codes, which are grouped into more generalized land use designations for use in the model, as follows:

- Commercial
- Industrial
- Multi-family residential
- Single-family residential
- Parks and Open Space

A typical percentage of imperviousness is assigned to each land use designation in order to estimate runoff volume from that land use.

Typical Land Use Runoff Concentrations

Typical runoff pollutant concentrations are assigned to each land use designation to estimate the pollutant loads associated with runoff from that land use. The primary source for the land use concentrations is a report titled *Analysis of Oregon Urban Runoff Water Quality Monitoring Data Collected from 1990 to 1996* (Association of Clean Water Agencies [ACWA], 1997). The

ACWA data typically represent stormwater runoff from areas without any structural BMPs in place, so this element of the modeling reflects baseline pollutant loadings for each parameter of concern (i.e., loadings before structural BMPs are implemented).

Best Management Practices

STRUCTURAL BMPS

The model currently focuses on accounting for the effectiveness of structural BMPs. These are systems where pollutant removals can be reported quantitatively, and are based on the results of scientific research and quantifiable accounting practices (i.e., effluent concentrations and mass removal rates). Examples include swales, wetlands, ponds, filter strips, soakage trenches, landscaped stormwater planters, infiltration basins, manufactured stormwater facilities, and detention basins.

The City compiled inventories of both private and public structural BMPs and the drainage areas they treat for inclusion in the modeling. The private BMPs have been constructed as a result of development codes or policies that have been in place since 1990 in the Tualatin River Watershed and since 1997 in the Columbia Slough, Willamette River, and Johnson Creek Watersheds. Most of the public BMPs have been constructed following the initial NPDES MS4 permit (issued in 1995). Given these timeframes, it was assumed for modeling purposes that all of these BMPs were implemented after the ACWA land use runoff concentrations were determined—i.e., after baseline conditions.

Structural BMPs do not include instream BMPs (such as stream restoration projects) that are located in areas that are not part of the MS4 system.

There is very limited information about the effectiveness of non-structural BMPs—measures such as public education, illicit discharge investigations, erosion control, industrial inspections, and street maintenance. These BMPs are not included in the modeling process at this time. It is clear, however, that these non-structural practices are worthwhile and are essential elements of an effective stormwater management program.

FLOW REDUCTION BMPS

The model accounts for pollutant reduction as a result of flow reduction from BMPs. For example, if a BMP includes infiltration (e.g., swales, infiltration basins, or soakage trenches), the model accounts for the losses in pollutant load resulting from reduced flow volumes.

TYPICAL EFFLUENT CONCENTRATIONS

Typical effluent concentrations for the various BMPs are used as input to the model to determine the effectiveness of the BMPs in reducing pollutants loads. The primary data source is a BMP database developed by an ACWA consultant, which summarizes national and regional literature regarding BMP effectiveness. Several additional sources of data, such as local data collected by the City of Portland, are also used. Effluent concentrations are used instead of percentage of pollutant removal because they vary less widely and are more statistically consistent.

The Polygon model is able to account for BMPs in a series (i.e., BMPs with overlapping drainage areas); if one area has more than one BMP application applied to it, the model chooses the BMP with the lowest effluent concentration (i.e., the most effective BMP) for the area. Some TMDLs are expressed as a mean load or concentration, while others are expressed as a median. For that reason, the ACWA data sources for both land use runoff concentrations and BMP effluent concentrations are expressed as both means and medians, allowing each jurisdiction to use the appropriate statistics. In addition, ranges around the means and medians are identified to allow benchmarks to be reported as a range to reflect the significant variability that exists in the data.

Benchmark Development

The Polygon model was run to simulate a 2015 existing conditions scenario—i.e., current pollutant loads with and without structural BMPs in place. The projected future baseline pollutant loads (i.e., without structural BMPs) in 2021 are assumed to be the same as the 2015 baseline loads. New development and redevelopment are not considered in the 2021 baseline loads projection for the following two reasons:

1. Because Portland is predominately built out, loading changes resulting from new development are considered to be negligible on a watershed scale.
2. Redevelopment in any land use category is assumed to be redeveloped to the same land use and therefore will have the same baseline loads.

The projected 2021 pollutant loads with both existing and planned structural BMPs in place are estimated as the 2015 pollutant loads with existing BMPs minus the loading reductions provided by future private and public BMPs. Future BMPs refer to the BMPs that are planned to be implemented during the 2015-2021 time period.

Post-model processing was used to determine load reductions by future BMPs. For private BMPs, the average annual rate of redevelopment was estimated by land use category and BMP facility type from data collected from 2010 to 2014 and extrapolated to predict redevelopment from 2015 to 2021. MS4 areas to be served by public BMPs are mostly based on available design information included in the CIP about planned facilities. The load reductions from these future BMPs are estimated using the baseline loads minus the post-BMP loads based on BMP types and BMP contributing areas, using the same equations as in the Polygon model.

MODEL RESULTS AND BENCHMARKS

Estimated Benchmarks for the Upcoming Permit Term (2016-2021)

For each applicable watershed, the net pollutant loads for every geographic polygon were added together to arrive at the total net pollutant load for each TMDL parameter in the watershed. Benchmarks were calculated based upon:

- The estimated pollutant load that would be expected if no structural BMPs were in place (i.e., baseline conditions).
- The estimated pollutant load that is expected, given the implementation of existing and planned structural BMPs.

Because stormwater quality data are highly variable, the estimated pollutant loads are expressed as a range that encompasses the mean or median, the upper value of the range (UVR), and the lower value of the range (LVR). The upper and lower values of the range are based on the upper and lower 95 percent confidence interval around the mean or median of the land use runoff concentrations. The confidence interval around the mean or median is a measure of the probability that the mean or median is actually located within this interval.

The benchmark for each parameter is the difference between the 2021 pollutant load with no BMPs in place and the 2021 pollutant load with structural BMPs in place. Benchmarks were established using the following procedure:

1. Subtract the mean or median of the 2021 pollutant load with structural BMPs in place from the mean or median of the 2021 pollutant load with no BMPs in place. This is the benchmark mean or median.
2. Calculate the percent difference from the mean or median of the 2021 pollutant loads with and without BMPs to the LVR with and without BMPs, respectively.
3. Calculate the percent difference from the mean or median of the 2021 pollutant loads with and without BMPs to the UVR with and without BMPs, respectively.
4. Average the percent differences between the 2021 pollutant loads with and without BMPs and the respective LVRs. This is the lower percent difference.
5. Average the percent differences between the 2021 pollutant loads with and without BMPs and the respective UVRs. This is the upper percent difference.
6. Subtract the average lower percent difference from the benchmark mean or median to calculate the lower value of the benchmark range.
7. Add the average upper percent difference to the benchmark mean or median to calculate the upper value of the benchmark range.

Summary of Benchmarks

Table 4 summarizes the 2021 benchmarks for each parameter by watershed. As stated previously, the benchmarks are estimated total pollutant load reductions for each EPA- approved TMDL parameter (or surrogate).

The benchmark results do not reflect the effects of the numerous non-structural BMPs implemented by the City. They also do not reflect the effects of the many instream BMPs that have been constructed, since natural waterways are not part of the MS4.

Table 4: 2021 Benchmarks

TMDL Parameter or Surrogate	Lower Value of the Range	Upper Value of the Range
Columbia Slough		
Total Phosphorus	649 lbs	1,134 lbs
Biochemical Oxygen Demand	176,417 lbs	406,062 lbs
Bacteria (E. coli)	7.29×10^{12} colonies	3.06×10^{13} colonies
Total Suspended Solids	777,193 lbs	1,976,451 lbs
Fanno Creek		
Total Phosphorus	51.4 lbs	73.4 lbs
Willamette River (Bacteria (E. coli))		
Springbrook Creek	9.54×10^9 colonies	2.60×10^{10} colonies
Stephens Creek	1.08×10^{12} colonies	3.38×10^{12} colonies
Tanner Creek	2.72×10^{11} colonies	1.02×10^{12} colonies
Tryon Creek	5.09×10^{12} colonies	1.56×10^{13} colonies
Johnson Creek		
Bacteria (E. coli)	3.28×10^{12} colonies	1.08×10^{13} colonies

COMPARISON OF ESTIMATED 2021 POLLUTANT LOADS (WITH AND WITHOUT BMPS) TO WASTELOAD ALLOCATIONS

As stated above, DEQ sets WLAs for various TMDL parameters and streams (DEQ 1998; DEQ, 2001; DEQ, 2006). The City of Portland continues to make progress toward meeting these WLAs through implementation of its SMWP. Table 5 shows WLAs and estimated 2021 loadings without and with the effectiveness of structural BMPs for applicable TMDL parameters.

Stormwater pollutant load concentrations show large variability. This variability is factored into the load calculations by including a confidence interval around the mean or median concentration and expressing TMDL parameter pollutant loads as a range. The loadings shown in Table 5 include the lower value of the range (LVR) loading, based on the lower confidence level of stormwater runoff concentrations and the mean or median loadings.

WLAs can be expressed in a variety of ways—for example, as a percent load reduction (e.g., E. coli in Johnson Creek), an instream or stormwater concentration (e.g., total phosphorus in Fanno Creek), or a flow-dependent concentration (e.g., Columbia Slough TMDL parameters). For purposes of comparison with the 2021 predicted loadings, the WLAs included in the table are represented as pollutant loads, independent of how they are expressed in the TMDLs issued by DEQ.

Table 5: Comparison of 2021 Estimated Pollutant Loadings with and without BMPs to TMDL WLAs

TMDL Parameter or Surrogate	Units	2021 Loading without BMPs		2021 Loading with BMPs		WLA Load	WLA Concentration or Percent Reduction ²
		Lower Value of the Range	Mean / Median	Lower Value of the Range ¹	Mean / Median		
		Columbia Slough					
Total Phosphorus	lbs	1879	2459	1152	1588	379	0.07 mg/L
Biochemical Oxygen Demand	lbs	412,541	620,725	203,562	341,033	61,664	2.99 mg/L
Bacteria (E. coli)	colonies	3.33E +13	6.96E+13	3.05E+13	5.54E+13	1.25E+13	134 CFU/100 mL
Total Suspended Solids	lbs	1,961,769	3,051,954	1,052,283	1,789,179	1,031,168	50 mg/L
Fanno Creek							
Total Phosphorus	lbs	266	346	219	279	212	0.13 mg/L
Willamette River (Bacteria) (E. coli)							
Springbrook Creek	colonies	2.78E+11	4.75E+11	2.72E+11	4.59E+11	9.50E+10	80%
Stephens Creek	colonies	5.65E+12	1.00E+13	4.48E+12	8.08E+12	1.00E+12	90%
Tanner Creek	colonies	2.38E+12	4.56E+12	2.43E+12	4.07E+12	1.00E+12	78%
Tryon Creek	colonies	1.91E+13	3.32E+13	1.38E+13	2.43E+13	1.63E+13	51%
Johnson Creek							
Bacteria (E. coli)	colonies	1.25E+13	2.21E+13	9.13E+13	1.63E+13	4.86E+12	78%

¹ LVR = lower value of the range around the mean or median loading based in the lower confidence level of stormwater runoff concentrations

² WLA Concentrations for Columbia Slough calculated from 1998 Columbia Slough TMDL; WLA loads for Fanno Creek calculated from instream concentrations; WLA loads for Willamette River, including Johnson Creek, estimated based on a percent reduction of the exiting loading without BMPs. The load reduction for each tributary was estimated using the load duration curve.

STORMWATER MANAGEMENT PLAN (SWMP) CONTRIBUTION TO REDUCING TMDL POLLUTANTS

As required by Section D.3.d.ii.2 of the current permit, the following text describes how implementation of the City's SWMP will contribute to the overall reduction of the TMDL pollutants during the next permit term:

- The benchmark modeling process included projected pollutant load reductions from the planned construction of public structural stormwater management facilities during the permit term, based mostly on design information about planned facilities that is included in the City's CIP. These facilities are included in the SWMP as measurable goals under BMP STR-1.
- STR-1 also includes the following strategies and tasks that will contribute to the reduction of TMDL pollutants:
 - Other watershed projects (e.g., construction of stormwater management facilities, reduction of effective impervious area)
 - Retrofits of existing storm drainage system to improve stormwater management (e.g., ditch-to-swale retrofits and the addition of water quality management to flow control facilities)
 - Development and implementation of the *Stormwater System Plan*, which will identify high-priority areas for pollution reduction retrofits
 - Green streets and the “% for Green” fund
 - Tracking, evaluation, and development of new technologies and stormwater management approaches
- The benchmark modeling process also included projected pollutant load reductions from the planned construction of private structural stormwater management facilities. BMP ND-2 requires implementation of the City's *Stormwater Management Manual (SWMM)*. The SWMM requires onsite stormwater infiltration using vegetated facilities to the maximum extent feasible for public and private new development and redevelopment projects.
- Non-structural BMPs are not included in the benchmark modeling process because there is very limited quantitative information about their effectiveness. It is clear, however, that these non-structural practices are worthwhile and are essential elements of an effective stormwater management program. Specifically, public education, technical assistance, incentives, and grant programs can be expected to contribute to pollutant reduction over time by educating and involving additional participants in pollution reduction actions. BMPs PI-1, IND-2, and ND-2 include strategies and tasks aimed at the general public, business, and industry.
- Elimination of illicit connections and illicit discharges that can contribute to pollutant reduction is addressed through the Illicit Discharge Detection and Elimination (IDDE) program in ILL-1 and the Industrial Stormwater Management Program in IND-1.

As required by section D.3.d.ii.3 of the current permit, the following text identifies additional or modified BMPs that will result in further reductions in the discharge of the applicable TMDL pollutants, including the rationale for proposing the BMPs:

As discussed above, the benchmark modeling process included projected pollutant load reductions from the planned construction of structural stormwater management facilities during the permit term. Projected public facilities were identified in watersheds with EPA-approved TMDL WLAs, based mostly on design information about planned facilities included in the City's CIP. The CIP is developed through a multi-step process to identify, develop, review, score, and rank projects for funding and scheduling priority. The bureau focuses on comprehensive, multipurpose solutions in the highest-priority areas. For private BMPs, the average annual rate of redevelopment was estimated by land use category and BMP facility type from data collected from 2010 to 2014 and extrapolated to predict redevelopment from 2015 to 2021.

REFERENCES

Oregon Department of Environmental Quality (DEQ). 1998. Columbia Slough Total Maximum Daily Load.

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Oregon Department of Environmental Quality (DEQ). 2007. Stipulated Implementation Order Willamette Basin TMDL.