

City of Lake Oswego Stormwater Management Plan (2010)

1.0 STORMWATER MANAGEMENT PLAN ORGANIZATION

The City of Lake Oswego’s 2010 Stormwater Management Plan (“SWMP”) is prepared to comply with the federal National Pollutant Discharge Elimination System requirements of 40 CFR 122.26(d)(2)(iv)(A through D) and the City’s MS4 NPDES Permit (#101348) requirements listed in Schedule A.4 of the April 30, 2010 draft Municipal Separate Storm Sewer System (MS4) NPDES permit, issued by DEQ.

The SWMP is organized into the eight major stormwater program elements listed below. The eight major elements correspond to those outlined in the MS4 NPDES permit (i.e., Schedule A(4)(a-h).

- Element #1: Illicit Discharge Detection and Elimination
- Element #2: Industrial and Commercial Facilities
- Element #3: Construction Site Runoff Control
- Element #4: Education and Outreach
- Element #5: Public Involvement and Participation
- Element #6: Post-Construction Site Runoff
- Element #7: Pollution Prevention for Municipal Operations
- Element #8: Structural Stormwater Facilities and Controls Operations and Maintenance

Each of the eight SWMP element sections begins with the applicable permit requirements and contains a description of applicable Best Management Practices (BMPs). At the end of each section, a table (BMP fact sheet) specifies the measurable goals associated with the BMP(s) and tracking measures that the City will report on for the MS4 annual reports.

Each BMP has an assigned prefix, number, and name that help in identifying the activity and associated responsible party. Table 1 provides a summary of the BMP number prefixes and associated BMP categories and indicates the relevant SWMP element.

Table 1 BMP Name and Category Designations

BMP Number Prefix	Associated BMP category	Associated SWMP Element
ILL	Illicit Discharge Detection and Elimination	Element #1 and #7
IND	Industrial and Commercial Facilities	Element #2
EC	Construction and Erosion Control	Element #3
PE	Public Education and Outreach	Element #3, #4, and #7
PI	Public Involvement and Participation	Element #5
DEV	Planning and Development	Element #6 and #7
OM	Operations and Maintenance	Elements #4, #7, and #8
PEST	Landscape Practices and Pest Management	Element #7

2.0 ELEMENT #1 – ILLICIT DISCHARGE DETECTION AND ELIMINATION

The City of Lake Oswego prohibits illicit discharges to the storm sewer system by the provisions of Lake Oswego Code (LOC) Article 38.26. Specifically, LOC 38.26.920 prohibits connection of a sanitary sewer or wastewater pipe to the City's surface water drainage system. This code section also prohibits dumping of pollutants into the surface water drainage system. LOC 38.26.935 provides the code authority to enforce and issue penalties for Code violations, and LOC 34.04.106 provides the City with the legal authority to investigate potential illicit connections.

In an effort to proactively ensure that illicit discharges are not occurring, the City implements a program of inspections, dry weather field screening, and monitoring to eliminate any potential illicit discharges to the MS4 system.

The City of Lake Oswego also implements spill response measures through coordination with the City's Fire Department to ensure all spills are reported (if necessary) and promptly addressed and contained, to the MEP. Spill prevention and illicit discharge prevention and reporting are conducted by the City through specific public education and outreach activities and campaigns, as described under SWMP Element #4 (Section 5.0).

2.1 BMP ILL1 – Implement the Illicit Discharge Detection and Elimination Program

NPDES permit requirements are listed below, as pertaining to BMP ILL1. Applicable provisions are outlined under Schedule A.4.a of the City's MS4 NPDES Permit.

***NPDES Permit Requirement** – (i) Prohibit, through ordinance or other regulatory mechanism, illicit discharges into the permittee's MS4.*

***NPDES Permit Requirement** – (ii) Describe in an enforcement response plan or similar document, November 1, 2011, the enforcement response procedures the permittee will implement when an illicit discharge investigation identifies a responsible party.*

***NPDES Permit Requirement** – (iii) Develop or identify dry-weather field screening pollutant parameter action levels that will be used as part of the field analysis to identify the source of an illicit discharge or other type of discharge....by November 1, 2011*

***NPDES Permit Requirement** – (iv) Conduct annual dry-weather inspection activities during the term of the permit. By June 30, 2012, the dry-weather inspection activities must include annual field screening of all priority locations identified and documented by the co-permittee.... The dry-weather field screening activities must be documented and include: 1) General observation; 2) Field Screening; and 3) Laboratory Analysis.*

NPDES Permit Requirement – (v) *Require investigations of portions of the MS4 that, based on the results of general observations, field screening, laboratory analysis or other relevant information, indicates the presence of illicit discharges or non-stormwater discharges not exempted under the provisions of 4.a.xii of this section.*

NPDES Permit Requirement – (vii) *Once the source of an illicit discharge is determined, the permittee must take appropriate action to eliminate the illicit discharges, including an initial evaluation of the feasibility to eliminate the discharge within 5 working days. If it has been determined that removal of the illicit discharge will take more than 5 working days due to technical or other reasonable issues, the co-permittee must notify the Department within 5 working days of detection. The co-permittee must develop an action plan to eliminate the illicit discharge and submit the action plan to the Department within 15 working days of detection. The action plan must include an appropriate timeframe for elimination.*

NPDES Permit Requirement – (viii) *Maintain a system for documenting and procedures for responding to known or suspected illicit discharges or public complaints relating to illicit discharges.*

NPDES Permit Requirement – (ix) *In the case of a known illicit discharge that originates within the City’s permitted area and that discharges directly to a storm sewer system or property under the jurisdiction of another municipality, the City must notify the affected municipality as soon as practicable, but no longer than one working day.*

NPDES Permit Requirement – (x) *In the case of a known illicit discharge that is identified within the City’s permitted area, but is determined to originate from a contributing storm sewer system or property under the jurisdiction of another municipality, the City must notify the contributing municipality or municipality with jurisdiction as soon as practicable, but no longer than one working day.*

NPDES Permit Requirement – (xi) *Maintain maps identifying major MS4 outfalls discharging to waters of the State. The dry-weather screening locations must be uniquely identified.*

NPDES Permit Requirement – (xii) *Unless identified as a significant source of pollutants to waters of the State by a co-permittee or the Department, the following non-stormwater discharges are not considered illicit discharges: (see Schedule A.4.a.xi for list of discharges). If a non-stormwater discharge is identified as a significant source of pollutants, the co-permittees must develop and require implementation of appropriate BMPs to reduce the discharge of pollutants associated with the source.*

The City of Lake Oswego has the authority to prohibit illicit discharges in accordance with LOC 38.26.920 and 38.26.935.

The City of Lake Oswego conducts inspections to identify potential illicit discharges on an annual basis, typically during dry-weather conditions (between July and September) at all

of the City's priority outfalls. Priority outfalls are identified based on the City's outfall reconnaissance survey conducted August 2009-August 2010. Priority outfalls were identified based on a process identified by the Center for Watershed Protection. Inspections are also conducted in accordance with citizen complaints as received via the Watershed Hotline, a City-operated call number for citizens to report watershed concerns, illicit discharges and spills. This activity is further described under Element #4 (Section 5.0).

City personnel complete data inspection forms that are consistent with those shown in Part 1 of the City's original NPDES Permit Application while inspecting priority outfalls. The City also uses a tracking database system to monitor the inspection results. The City will refine these inspection forms to better address pollutants of concern in the urban services boundary of Lake Oswego and make consistent with language outlined in the City's MS4 NPDES permit.

Dry weather inspections are conducted in conjunction with the Center for Watershed Protections Illicit Discharge Detection and Elimination (IDDE) manual (*Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection and Robert Pitt (2004)*). Dry weather flows are initially inspected for a variety of visual characteristics, and sources of flows are characterized as either permissible (listed in Schedule A.4.xii of the MS4 NPDES permit) or potentially non-permissible. If potentially non-permissible discharges are discovered, the City of Lake Oswego conducts sampling, analysis, and investigation to the MEP in conjunction with the following procedure:

1. Use a drainage map and other source identification data, to attempt to locate the potential sources upstream of the discharge location.
2. Investigate potential sources using one or more of the following techniques: onsite inspections, dye-testing, smoke testing, and/or TV inspection of lines.
3. Collect a water sample and analyze it for the suspected contaminant group. The City will review, and if necessary revise its current pollutant parameter action levels taken from the Center for Watershed Protection IDDE manual referenced above to ensure local applicability..

Results of field screening activities are recorded and entered into a database. The City Public Works Director or Appointee will be notified of all positive identifications of illicit connections and the City will take all necessary steps to eliminate them as quickly as possible (to the MEP). Illicit discharge complaints that are registered in the City's call center software will indicate the resolutions to illicit discharge investigations. Guidelines related to appropriate follow-up time frames, notification procedures, and enforcement activities will be incorporated into the City's procedures for illicit discharge detection and elimination investigations.

If necessary, in accordance with the annual dry-weather inspection activities, the City updates their GIS files related to existing and priority outfall locations.

At the end of the permit cycle, the City’s overall illicit discharge detection and elimination program, including inspections and follow up measures, will be reviewed to determine whether significant improvements to the MS4 system have been made as a result of the outfall inspections, investigation activities and follow up measures. Resources may be adjusted as necessary to ensure that the City continues to meet their MEP standard.

2.2. BMP ILL2 – Implement the Spill Response Program

NPDES permit requirements are listed below, as pertaining to BMP ILL2. Applicable provisions are outlined under Schedule A.4.a of the City’s MS4 NPDES Permit.

***NPDES Permit Requirement** – (vi) Require spill preventative measures, and upon notification, respond to, contain and mitigate spills that may discharge into the MS4. Spills that may endanger health or the environment must be reported in accordance with all applicable federal and state laws including proper notification to the Oregon Emergency Response Systems.*

The City of Lake Oswego implements spill prevention in accordance with public education BMPs described under Element #4 (Section 5.0).

Emergency response to chemical and hazardous waste spills within the City is under the authority and administration of the Lake Oswego Fire Department. The City of Lake Oswego Fire Department utilizes the Tualatin Valley Fire and Rescue (TVFR) to respond to hazardous waste spills. City Public Works personnel serve in a support and advisory role under the Fire Department and are responsible for notification (as necessary) of 1) the Tyron Creek Treatment Plant, 2) the Lake Oswego Corporation, 3) Clean Water Services and 4) the City of Portland Environmental Services personnel.

The City operates the Watershed Hotline (503-675-3982), a call number for citizens to report watershed concerns, illicit discharges or spill activity. This hotline is advertised on the City’s website and periodically in the City’s monthly newsletter “Hello LO”. During normal business hours, the City’s Engineering staff answer this phone line and respond to non-emergency calls within one business day. Emergency calls taken during normal office hours are redirected to the City of Lake Oswego Fire Department. All calls reporting a spill are forwarded to LOCOM (503-635-0238 - Lake Oswego Non Emergency Number) for Fire Department dispatch. If received after hours, calls are prioritized based on the status of the spill (emergency or non-emergency).

Fire Department personnel notify TVFR regarding hazardous materials if they determine the situation warrants. Notification of the Oregon DEQ will be conducted by the hazardous material team or the Incident Commander. LOCOM shall also notify the Operations Division of Public Works (formerly Maintenance Division) “stand-by” personnel if the event occurs outside normal working hours.

Fire Department spill response is outlined in the City of Lake Oswego Hazardous Materials Annex (2008). General spill response procedures are as follows:

1. Spill reported to City of Lake Oswego (via email, phone, and personal contact).
2. City of Lake Oswego Fire Department called and alerted to “Level 1 Emergency”.
3. City Water Quality Program Coordinator and City Stormwater Superintendent alerted to incident.
4. City Fire Department acts as point of contact for incident; maintenance and engineering services act in supportive role.
5. Nature of spill or illicit discharge is determined by Lake Oswego Fire Department or related emergency management division; containment and cleanup measures are identified.
6. If spill is determined hazardous, TVFR is notified and presence is requested onsite. Notification to the Oregon Emergency Response System is initiated and Clean-up options are identified.
7. If spill is determined to be non-hazardous, and a responsible party can be identified, the City will direct that entity to provide resources to mitigate the spill. If no responsible party can be identified or the responsible party does not have the resources to mitigate the spill, Public Works Operations and Engineering staff are responsible for either conducting the spill clean-up or contacting a qualified private vendor for cleanup activities. The City then bills the responsible party for such clean up activity, if a responsible party can be identified.
8. If hazardous, TVFR will coordinate spill response with DEQ.
9. All spills to natural waterways **OR** over 42 gallons on land are reported to DEQ by the City of Lake Oswego.

BMP Fact Sheet:

Element #1 – Illicit Discharge BMPs (ILL)

Introduction	The purpose of this BMP category is to improve water quality by implementing measures to prevent, contain, and remove illicit discharges to the City's MS4 system.
Measurable Goals and Tracking Measures	<p>BMP ILL1 – Implement the Illicit Discharge Detection and Elimination Program</p> <ul style="list-style-type: none"> • Measurable Goal: Conduct dry weather inspections at 100% of priority outfalls within the City annually. <ul style="list-style-type: none"> ○ Tracking Measure: Number and percent of priority outfalls inspected annually. • Measurable Goal: Based on the results of the annual inspections and any citizen reports, conduct follow up investigations and take enforcement actions to address all non-permissible discharges. <ul style="list-style-type: none"> ○ Tracking Measure: Describe results of all follow up investigations conducted. <p>BMP ILL2 – Implement the Spill Response Program</p> <ul style="list-style-type: none"> • Measurable Goal: Respond to all spills reported to the City using the general procedures outlined under BMP ILL2. <ul style="list-style-type: none"> ○ Tracking Measure: Number of spills reported annually. ○ Tracking Measure: Number of spills responded to by City Operations staff. ○ Tracking Measure: Describe activities conducted as a result of each spill that City Operations staff responds to annually.
Additional Commitments (to be referenced in the annual reports as applicable)	<p>BMP ILL1 – Implement the Illicit Discharge Detection and Elimination Program</p> <ul style="list-style-type: none"> • Additional Commitment: Update the City's Illicit Discharge Detection and Elimination standard operating procedures (SOP) (or SWMP provisions) to reference appropriate time frames for notification and follow up to illicit discharges and enforcement procedures by November 1, 2011.
Adaptive Management Strategy	The Illicit Discharge Detection and Elimination Program, including inspections and follow up measures, will be reviewed to determine whether significant improvements to the MS4 system have been made as a result of the outfall inspections, investigation activities and follow up measures. Tasks may be adjusted and resources allocated differently but still consistent with the City's MEP criterion, in order for the City to adaptively manage their program. Such modifications would be specified in the NPDES annual reports.

BMP Fact Sheet: Element #1 – Illicit Discharge BMPs (ILL)

Related Documents	<p><i>Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments</i>, Center for Watershed Protection and Robert Pitt (2004)</p> <p><i>Hazardous Materials Annex (2008)</i> (City of Lake Oswego Fire Department)</p>
Relationship to TMDLs	<p>Phosphorus. Illicit discharge and spill response BMPs may reduce the volume of organics discharged to the stormwater conveyance system and thus reduce phosphorus.</p> <p>Bacteria. Illicit discharges BMPs will reduce the human and potentially reduce the pet-related sources of bacteria as associated with non-permissible discharges and sanitary cross-connections.</p> <p>Settleable Volatile Solids. Illicit discharge and spill response BMPs may reduce the volume of organics discharged to the stormwater conveyance system and thus reduce the sediment oxygen demand.</p>

3.0 ELEMENT #2 – INDUSTRIAL AND COMMERCIAL FACILITIES

The City does not contain any open or closed municipal landfills, hazardous waste treatment disposal and recovery facilities, or industrial facilities that are subject to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). The City has a limited number of industrial facilities and potential high pollutant source (commercial and industrial) facilities. The City of Lake Oswego has developed an inventory of all industrial sources of stormwater discharge in the City. The City will conduct industrial facility screening activities and initiate a program to conduct inspections of potential high pollutant source facilities.

3.1 BMP IND1 – Screen Existing and New Industrial Facilities

NPDES permit requirements are listed below, as pertaining to BMP IND1. Applicable provisions are outlined under Schedule A.4.b of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – (i) Screen existing and new industrial facilities to assess whether they have the potential to be subject to an industrial stormwater NPDES permit or have the potential to contribute a significant pollutant load to the MS4.

NPDES Permit Requirement – (ii) Within 30 days after the facility is identified, notify the industrial facility and the Department that an industrial facility is potentially subject to an industrial stormwater NPDES permit.

The City of Lake Oswego currently has an inventory of industrial facilities within the City limits, and no facilities on the list currently operate under a 1200-Z general industrial stormwater permit. The City will update this inventory as necessary with new industrial facilities (by review of building permit applications) and potential high pollutant source facilities (by review of the City’s business license inventory). Potential high pollutant source facilities will be determined based on past knowledge of water quality related issues onsite, results of past illicit discharge investigations, continuing inquiries and complaints made to the City, and facility age and the types of activities conducted onsite.

Annually, the inventory of industrial facilities will be reviewed to determine whether any new facility has the potential to be subject to an industrial stormwater NPDES permit. If identified, such facility and DEQ shall be notified within 30 days.

3.2 BMP IND2 – Conduct Inspections of High Pollutant Source Facilities

NPDES permit requirements are listed below, as pertaining to BMP IND2. Applicable provisions are outlined under Schedule A.4.b of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – (iii) *Implement a program that establishes the priorities and procedures for inspection of and implementation of stormwater control measures for discharges from industrial or commercial areas that have been identified as sources that contribute a significant pollutant load to the MS4.*

Development of an inventory of high pollutant source facilities is outlined under BMP IND1.

High pollutant source facilities will be inspected annually, and such inspections may be conducted in conjunction with illicit discharge investigations or independently. Such independent inspections may be conducted during Pretreatment Inspections or Building Inspections. Development of an inspection form and/or process will be developed.

BMP Fact Sheet:

Element #2 – Industrial and Commercial Facilities

(IND)

Introduction:	The purpose of this BMP category is to improve water quality by tracking and proactively inspecting industrial discharges and other potential high pollutant source facilities to the City's MS4 system.
Measurable Goals and Tracking Measures:	<p>BMP IND1 – Screen Existing and New Industrial Facilities</p> <ul style="list-style-type: none"> • Measurable Goal: Update the list of industrial dischargers and potential high pollutant source facilities to the City's MS4 system annually during the permit term. <ul style="list-style-type: none"> ○ Tracking Measure: Number of industrial dischargers and potential high pollutant source facilities identified annually. • Measurable Goal: Notify the industrial facility and DEQ when industrial facilities are identified that are subject to an industrial stormwater NPDES permit during the annual update of the list of industrial dischargers and potential high pollutant source facilities. Notification shall occur within 30-days of identification. <ul style="list-style-type: none"> ○ Tracking Measure: Number of industrial facilities requiring permits identified annually. <p>BMP IND2 – Conduct Inspections of High Pollutant Source Facilities</p> <ul style="list-style-type: none"> • Measurable Goal: Conduct inspections of potential high pollutant source facilities annually. <ul style="list-style-type: none"> ○ Tracking Measure: Number of facility inspections conducted at potential high pollutant source facilities and the results of such inspections.
Additional Commitments (to be referenced in the annual reports as applicable)	None.
Adaptive Management Strategy	The industrial screening and high pollutant source facility inspection BMPs will be reviewed regularly during the permit term to determine whether significant improvements to the MS4 system have been made as a result of the efforts. Tasks may be adjusted and resources allocated differently to promote more education or structural BMP implementation instead of inspections and monitoring. Efforts would still be consistent with the City's MEP, in order for the City to adaptively manage their program. Such modifications would be specified in the NPDES annual reports.
Relationship to TMDLs	<p>Phosphorus. Industrial source-control related BMPs may result in the reduction of nutrient related pollutants (including total phosphorus) discharged to the stormwater conveyance system.</p> <p>Bacteria. Industrial source control BMPs targeting prevention and removal of any illicit discharges may result in the reduction of bacteria sources discharged to the stormwater conveyance system.</p> <p>Settleable Volatile Solids. Industrial source-control related BMPs may result in the reduction of organics discharged to the stormwater conveyance system and thus reduce the sediment oxygen demand.</p>

4.0 ELEMENT #3 – CONSTRUCTION SITE RUNOFF CONTROL

The City of Lake Oswego implements a number of BMPs associated with construction activities, erosion and sediment control. Specific erosion and sediment control requirements are outlined in LOC Chapter 52. In summary, erosion and sediment control must be addressed and an erosion control plan submitted for development, involving more than a 500 square foot disturbance (with some limited exceptions), and the plans must be submitted with the development construction plans or the building permit application. Exceptions to this threshold (e.g. certain types of residential landscape activities) are listed in LOC 52.02.040. Erosion and sediment plan requirements are tracked through the issuance of the City's Erosion and Sediment Control permits.

To maintain regional consistency, Lake Oswego has adopted BMPs and erosion control procedures in the *Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual* (2008), which is used by other local jurisdictions within Clackamas County. This manual provides comprehensive information, descriptions, and details of structural and non-structural erosion control measures and practices, as well as information to help assist contractors and developers in designing effective erosion control plans to effectively minimize disturbance. The manual also outlines housekeeping measures to prevent or control non-stormwater waste that may cause adverse impacts to water quality.

The City also references use of their *Design and Construction Standards for Sanitary Sewer and Surface Water Management* (2008). This technical specification references LOC Chapter 52 for erosion control associated with construction of sanitary and storm sewer pipe including the laying and jointing of pipe; the installation of pipe, manholes, catch basins, and other appurtenances; testing; and quality assurance and control.

BMPs related to education and training of construction site operators is addressed under Component #4 (Section 5.0).

4.1 BMP EC1 – Implement the Adopted Erosion and Sediment Control Planning and Design Manual and Associated City Ordinances Related to Erosion Control

NPDES permit requirements are listed below, as pertaining to BMP EC1. Applicable provisions are outlined under Schedule A.4.c of the City's MS4 NPDES Permit.

NPDES Permit Requirement – (i) Include ordinances or other enforceable regulatory mechanism that requires erosion and sediment controls designed, implemented, and maintained to prevent adverse impacts to water quality and minimize the transport of contaminants to waters of the State.

NPDES Permit Requirement – (ii) Require construction site operators to develop site plans and implement and maintain effective erosion and sediment control best management practices.

NPDES Permit Requirement – (iii) Require construction site operators to prevent or control non-stormwater waste that may cause adverse impacts to water quality such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste.

NPDES Permit Requirement – (iv) Establish site plan review procedures to ensure stormwater BMPs are appropriate and address the construction activities being proposed. At a minimum, construction site erosion and sediment control plans for sites disturbing one acre or greater must be developed in accordance with the State of Oregon’s 1200-C permit requirements.

LOC Chapter 52 requires that erosion prevention and sediment control plans (EPSCP) be provided for all residential and commercial construction involving disturbance of more than 500 square feet of land and that the EPSCP (Erosion Prevention and Sediment Control Plan) be submitted as part of the development permit process. As mentioned for the previous BMP, exceptions to this threshold (e.g. certain types of residential landscape activities) are listed in LOC 52.02.040. In addition, LOC Chapter 52 dictates that regardless of the approved EPSCP, additional measures and practices must be implemented as needed to effectively address erosion and sediment control on the construction site. As a courtesy to the developer or applicant, if the development requires a DEQ issued 1200-C permit, the DEQ approved erosion and sediment plan may be submitted with some additional provisions to meet the City’s erosion control requirements. EPSCP submission is tracked through the City-issued Erosion and Sediment Control permits.

Requirements of the EPSCP submittal are outlined in the *Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual*. In summary the EPSCP must include information on site topography, area of disturbance, nearby waterways, and stormwater drainage facilities, and must show locations and protection of sensitive lands, wetlands, and significant tree groves, as development and site disturbing activity is restricted from these areas. The EPSCP must also list structural and non-structural BMPs to be applied on site, selected in accordance with site and weather conditions. The manual also outlines various runoff control practices, sediment control practices, and other pollution control BMPs including inspection and maintenance of BMPs that would need to be included in the EPSCP submittal.

Structural and non-structural BMP application varies depending on the construction activity. Issuance of the City’s erosion and sediment control permit requires proper installation and maintenance of both temporary and permanent erosion control measures. On all residential and smaller commercial sites, the BMPs must include perimeter protection, inlet protection, and construction entrances designed to minimize disturbance. Commercial scale developments must include all the residential elements, as well as

staging and storage areas, concrete truck wash out areas, wheel washes where appropriate, and crew parking areas. All erosion and sediment control measures must be pre-approved, either through inclusion of the adopted *Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual*, in approved city details and specifications, or through approval of City engineering staff.

4.2 BMP EC2 – Conduct Erosion Control Inspections and Enforcement

NPDES permit requirements are listed below, as pertaining to BMP EC2. Applicable provisions are outlined under Schedule A.4.c of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(v) Perform on-site inspections in accordance with documented procedures and criteria to ensure the approved erosion and sediment control plan is properly implemented.... Inspections must be documented, including photographs and monitoring results as appropriate.*

NPDES Permit Requirement – *(vi) Describe in an enforcement response plan or similar document the enforcement response procedures the permittee will implement. The enforcement response procedures must use all means necessary to ensure construction activities are in compliance with the ordinances or other regulatory mechanisms.*

All construction sites that file an EPSCP are inspected by City inspection staff a minimum of two times during construction: once at the beginning of the project and once before foundations or other concrete structures are poured. All required structural BMPs must be properly installed and in good working order, as defined in the *Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual*. Sites with steep grades, significant aquatic resources, highly erosive soils, or a history of non-compliance or failed inspections are visited more regularly via unscheduled inspections, to the MEP. These inspections are generally scheduled and conducted on a case-by case basis. Finally, any site that is under an active enforcement action is also inspected per the schedule identified in correction notices, to the MEP.

All active large-scale sites, operating under NPDES 1200-C coverage, must be inspected by an Oregon Department of Environmental Quality designated inspector. Typically the inspection frequency is defined in the 1200-C application, and is required daily during periods of rainfall during active construction and at least weekly during non-rainfall periods.

If any inspection identifies the need for additional erosion and sediment control measures, the additional BMPs must be installed within 24 hours.

As erosion and sediment control permits must be obtained per City code, which requires submittal of an EPSCP and the installation and maintenance of required erosion and sediment control measures, the Lake Oswego Code provides enforcement authority. Enforcement action is taken for those sites where efforts to gain voluntary compliance

aren't effective. Typically, the first level of enforcement comes in the form of a verbal warning that is issued by the City Erosion Control Inspector. The inspector typically identifies the deficiencies in the BMPs, explains why additions or modifications to the BMPs are necessary, and outlines the required corrective action. The timeframe associated with the correction is typically between 24-48 hours, depending upon the conditions. If corrective actions are not implemented in the necessary timeframe, secondary enforcement may be issued which includes a municipal court citation and/or a Stop Work Order. The timeframe for correction depends upon the severity of the violation, weather factors, the level of activity on the site, and the potential for significant impact to water quality.

BMP Fact Sheet:

Element #3 – Construction Site Runoff Control BMPs (EC)

Introduction:	The purpose of this BMP category is to improve water quality by implementing control measures including inspections and enforcement to reduce or prevent soil erosion from occurring during development.
Measurable Goals and Tracking Measures:	<p>BMP EC1 – Implement the Adopted Erosion and Sediment Control Planning and Design Manual and Associated City Ordinances Related to Erosion Control</p> <ul style="list-style-type: none"> • Measurable Goal: Throughout the permit term implement erosion and sediment control requirements through issuance of city permits and tracking of DEQ permits. <ul style="list-style-type: none"> ○ Tracking measure: Number of city-issued erosion and sediment control permits issued annually. <p>BMP EC2 – Conduct Erosion Control Inspections and Enforcement</p> <ul style="list-style-type: none"> • Measurable Goal: Conduct an initial and a final inspection for all new residential and commercial construction sites requiring a city issued erosion and sediment control permit and submittal of an ESPCP. <ul style="list-style-type: none"> ○ Tracking Measure: Number of initial and final inspections conducted annually. • Measurable Goal: Conduct additional inspections for any large scale developments that are potentially problematic (steep grade, proximity to sensitive features, sites where an enforcement action has already occurred) . <ul style="list-style-type: none"> ○ Tracking Measure: An estimate of the inspection frequency for large scale developments and potentially problematic sites. • Measurable Goal: In conjunction with construction activities requiring a city issued erosion and sediment control permit, implement an escalating enforcement matrix which includes written warnings, Stop Work Orders, and Civil Citations. <ul style="list-style-type: none"> ○ Tracking Measure: Number of enforcement actions including written warnings (Deficiency Notice or similar action), Stop Work Orders, and Civil Citations.
Additional Commitments (to be referenced in the annual reports as applicable)	<p>Training and education activities related to erosion and sediment control are also referenced under Element #4.</p> <p>BMP EC1 – Document updates to the <i>Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual</i> and the City's <i>Design and Construction Standards for Sanitary Sewer and Surface Water Management</i>, as necessary.</p> <p>BMP EC1 – Provide annual notification of wet-weather construction requirements to active, city-issued erosion and sediment control permit holders.</p>
Adaptive Management Strategy	Tasks may be adjusted and resources allocated differently but still consistent with the City's MEP, in order for the City to adaptively manage their erosion and sediment control program. Such modifications would be specified in the NPDES annual reports.

BMP Fact Sheet:

Element #3 – Construction Site Runoff Control BMPs (EC)

Related Documents	<p><i>Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual (2008).</i> http://www.co.clackamas.or.us/wes/designmanual.htm</p> <p>The City of Lake Oswego <i>Design and Construction Standards for Sanitary Sewer and Surface Water Management.</i></p>
Relationship to TMDLs	<p>Phosphorus. The City's erosion and sediment control program was established under the Tualatin Basin Rule, in order to meet the phosphorus wasteload allocations as established in the Tualatin River TMDL.</p> <p>Settleable Volatile Solids. Erosion and sediment control BMPs reduce the discharge of organic matter and sediment (total and suspended), which results in reduced sediment oxygen demand in receiving waters.</p>

5.0 ELEMENT #4 – PUBLIC EDUCATION AND OUTREACH

Public education, outreach, and training activities are conducted as required in the City of Lake Oswego’s MS4 NPDES permit.

Although not specifically outlined as a requirement in the permit, coordination with other jurisdictions and involvement in stormwater related professional groups is necessary for the training of City staff and to continue to ensure sound stormwater management related decisions and adaptive management. Coordination with other jurisdictions and involvement in stormwater related professional groups is implemented to the MEP. BMPs associated with intergovernmental coordination are provided in this Section as well.

5.1 BMP PE1 – Provide Public Education and Outreach Materials Regarding Stormwater Management

NPDES permit requirements are listed below, as pertaining to BMP PE1. Applicable provisions are outlined under Schedule A.4.c of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(i) Continue to implement a documented public education and outreach strategy that promotes pollutant source control and a reduction of pollutants in stormwater discharges....The public education and outreach strategy may incorporate cooperative efforts with other MS4 regulated permittees or efforts by other groups or organizations provided a mechanism is developed and implemented to track the public education and outreach efforts within the MS4 regulated area and the results of such efforts are reported annually.*

NPDES Permit Requirement – *(ii) Provide educational materials to the community or conduct equivalent outreach activities describing the impacts of stormwater discharges on water bodies and the steps or actions the public can take to reduce pollutants in stormwater runoff.*

NPDES Permit Requirement – *(iii) Provide public education on the proper use and disposal of pesticides, herbicides, fertilizers and other household chemicals if identified as a concern by the co-permittees.*

NPDES Permit Requirement – *(vi) Conduct or participate in an effectiveness evaluation to measure the success of public education activities during the term of this permit. The effectiveness evaluation must focus on assessing changes in targeted behaviors. The results of the effectiveness evaluation must be used in the adaptive management of the education and outreach program.*

NPDES Permit Requirement – *(viii) Promote, publicize and facilitate public reporting of illicit discharges through the use of newspapers, newsletters, utility bills, door hangars, radio public service announcements, videos, televised council meetings, brochures, signs, posters or other effective methods.*

The City employs a public education strategy aimed at reducing the discharge of pollutants associated with a variety of activities. The focus of Public Education and Outreach strategies will be on pollutant source control and the reduction of pollutants in stormwater.

The City provides a variety of educational information to the public through the City's website and the City's newsletter. Educational information is also relayed to the public through ancillary programs or facilities that the City develops (e.g., during the opening of the dog park at Hazelia Field in Lake Oswego, City staff promoted the "Canines for Clean Water Campaign"). The City also works with many watershed education entities (Oswego Lake Watershed Council, Friends of Tryon Creek, Lake Oswego School District, Lake Oswego Corporation) to provide local educational opportunities related to pollution prevention and pollutant minimization.

Educational information is generally related to impacts of pesticides, herbicides, and fertilizers on water quality, proper pet waste disposal, recycling and litter control, and locations and times for oil, paint, and hazardous material recycling and disposal. Specifically, article topics in periodicals and newsletters(including the City's newsletter "Hello LO", weekly publications ("LODown", Council Digest) the Lake Oswego Review, the Oregonian and on the City's website) cover current Capital Improvement Program (CIP) projects, BMP implementation for residential lots (rain gardens), lawn watering practices, car washing, roof cleaning, fertilizer and pesticide use, stream bank health on private property, leaf disposal, construction site erosion control, vehicle maintenance, low impact development, and a variety of sustainability practices related to stormwater management.

Finally, the surface water hotline (Watershed Hotline), a City-operated call number for citizens to report illicit discharges and spills, is publicized on the City's website and on the storm drain markers that are placed by volunteers. The hotline is also featured in the City's monthly newsletter, and inspections are conducted in accordance with citizen reports and inquires as received by the City.

To aid in public education related to proper disposal of waste materials, the City of Lake Oswego conducts City-wide catch basin marking. Engineering and Planning staff coordinate with area volunteers to complete the marking. Storm Drain Marking is currently conducted on a volunteer basis and staffed solely by volunteers. The City has developed the "*Storm Drain Marker Project Leadership Guide*" to assist volunteer organizations in organizing, identifying, and placing these markers.

The City also uses outreach information and materials from METRO and the Regional Coalition of Clean Rivers and Streams, of which the City is a member, to further educate the public regarding proper disposal of waste products and the impacts of chemical landscaping products on receiving water quality.

By November 1, 2014, the City of Lake Oswego will coordinate with its Clackamas County Phase I MS4 co-permittee jurisdictions to provide information related to an education and outreach effectiveness evaluation. The effectiveness evaluation information will focus on assessing changes in targeted behaviors and will allow for additional information that can be used in adaptive management of the City's education and outreach strategy.

5.2 BMP PE2 – Provide Educational Training Opportunities for Construction Site Operators

NPDES permit requirements are listed below, as pertaining to BMP PE2. Applicable provisions are outlined under Schedule A.4.d of the City's MS4 NPDES Permit.

NPDES Permit Requirement – (v) *Provide notice to construction site operators concerning where education and training to meet erosion and sediment control requirements can be obtained.*

To assist engineers, contractors and developers, the City of Lake Oswego provides physical and online access to the adopted *Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual*, which provides in-depth information on the causes and effects of erosion, information on the types and proper installation procedures for BMPs, as well as detailed information on designing an effective erosion control plan.

Landscape projects and small construction projects that don't trigger formal erosion control permits or submittal of an ESPCP are provided information on the City's storm water system and information about how sediment and pollutants adversely affect water quality. Additionally, all permit holders are provided with specific information on the Wet Weather Season (October 1 through May 31) construction requirements.

The City also participates in the Regional Erosion Prevention Awards program, designed to provide onsite instruction on the proper use and installation of BMPs, as well as recognize excellence in construction site erosion prevention.

5.3 BMP PE3 – Conduct Staff Training for Pest Management

NPDES permit requirements are listed below, as pertaining to BMP PE3. Applicable provisions are outlined under Schedule A.4.d of the City's MS4 NPDES Permit.

NPDES Permit Requirement – (vii) *Include training for municipal employees involved in MS4-related activities, as appropriate. The training should include stormwater pollution prevention and reduction from municipal operations, including, but not limited to, parks and open space maintenance, fleet and building maintenance, new municipal facility construction and related land disturbances, design and construction of street and storm drain systems, discharges from non-emergency fire fighting-related training activities, and stormwater system maintenance.*

The City of Lake Oswego ensures that all City employees performing pesticide application are trained and licensed in accordance with the Oregon Department of Agriculture regulations.

As the City's Integrated Pest Management Practices are updated, in conjunction with BMP PEST2, City staff will also be trained accordingly.

5.4 BMP PE4 – Conduct Staff Training in Spill Response

NPDES permit requirements are listed below, as pertaining to BMP PE4. Applicable provisions are outlined under Schedule A.4.d of the City's MS4 NPDES Permit.

NPDES Permit Requirement – *(vii) Include training for municipal employees involved in MS4-related activities, as appropriate. The training should include stormwater pollution prevention and reduction from municipal operations, including, but not limited to, parks and open space maintenance, fleet and building maintenance, new municipal facility construction and related land disturbances, design and construction of street and storm drain systems, discharges from non-emergency fire fighting-related training activities, and stormwater system maintenance.*

The City of Lake Oswego requires training for select employees that participate in spill response activities.

5.5 BMP PE5 – Promote Staff Education and Participation with Local Organizations

NPDES permit requirements are listed below, as pertaining to BMP PE5. Applicable provisions are outlined under Schedule A.4.d of the City's MS4 NPDES Permit.

NPDES Permit Requirement – *(vii) Include training for municipal employees involved in MS4-related activities, as appropriate. The training should include stormwater pollution prevention and reduction from municipal operations, including, but not limited to, parks and open space maintenance, fleet and building maintenance, new municipal facility construction and related land disturbances, design and construction of street and storm drain systems, discharges from non-emergency fire fighting-related training activities, and stormwater system maintenance.*

A variety of training is provided to City staff associated with stormwater management including attending seminars, conferences and task specific training. Training and advisory committee opportunities are also made available to City staff through state, and local agencies and groups involved with a broad range of water quality issues including stormwater. Such training is conducted annually or every other year, depending on the number of employees being trained. Training opportunities are implemented to the MEP. The City will also conduct regular staff meetings two to four times per year for staff with BMP implementation responsibilities. Meetings will be used to track progress on BMP implementation and to present training type materials related to stormwater quality and the MS4 NPDES permit requirements.

The City of Lake Oswego Engineering, Planning, Building, Parks, and Public Works-Operations staff regularly attend conferences, meetings, and seminars hosted by AWRA, ACWA, APWA, Regional Erosion Control Awards Committee, and the Tualatin Basin Policy Advisory Committee. Attendance of conferences, meetings, and seminars, etc is implemented to the MEP. Additionally, the City of Lake Oswego continues to meet and coordinate with other Clackamas County co-permittees regarding regional water quality efforts. Areas for coordination include MS4 issues, education, public outreach and monitoring. These opportunities for coordination help promote additional staff education.

BMP Fact Sheet:

Element #4 – Public Education and Outreach (PE)

<p>Introduction:</p>	<p>The purpose of this BMP category is to improve water quality through public education, outreach, coordination, and training. BMPs under this category attempt to inform the public and influence behaviors in order to reduce pollutant discharge into the MS4.</p>
<p>Measurable Goals and Tracking Measures:</p>	<p>BMP PE1 – Provide Public Education and Outreach Materials Regarding Stormwater Management</p> <ul style="list-style-type: none"> • Measurable Goal: Provide educational materials two times per year related to impacts of fertilizers, herbicides, and pesticides on receiving water quality and on the use of alternative, environmentally friendly products the public may consider as an alternative. <ul style="list-style-type: none"> ○ Tracking measure: Summarize the distribution and content of outreach material related to landscape management on an annual basis. • Measurable Goal: Provide educational materials related to watershed protection, proper disposal practices, and facilitation of public reporting of illicit discharges annually. <ul style="list-style-type: none"> ○ Tracking measure: Summarize the distribution and content of outreach material related to proper disposal practices for oil, hazardous wastes, paints, and other items that may cause harm to surface waters on an annual basis. ○ Tracking measure: Specify how the spill control/ watershed protection number was publicized annually. • Measurable Goal: Conduct catch basin marking through the use of volunteers during the permit term. <ul style="list-style-type: none"> ○ Tracking measure: Number and percent of total catch basins marked annually. • Measurable Goal: Coordinate with other local, Phase I permittees in providing/ compiling information regarding a public education effectiveness evaluation. During permit year one, interested Phase 1 jurisdictions will meet to develop an initial coordinated strategy. Depending on the developed strategy, implementation of the strategy will occur during subsequent years of the permit term. Results of the effectiveness evaluation will be documented during the final year of the permit term. <ul style="list-style-type: none"> ○ Tracking Measure: Report on status of effectiveness evaluation. <p>BMP PE2 – Provide Educational Training Opportunities for Construction Site Operators</p> <p>There are no measurable goals identified for this BMP.</p> <p>BMP PE3 – Conduct Staff Training for Pest Management</p> <ul style="list-style-type: none"> • Measurable Goal: During the permit term, require training and certification in accordance with Oregon Department of Agriculture regulations. Require certified staff to maintain continuing education credits.

BMP Fact Sheet:

Element #4 – Public Education and Outreach (PE)

	<ul style="list-style-type: none"> ○ Tracking Measure: Number of staff attending continuing education classes to maintain ODA applicators license. ● Measurable Goal: In accordance with the update of the City’s Integrated Pest Management Practices (see BMP PEST2), annually train staff on new maintenance activities, once the revised City’s Integrated Pest Management Practices have been adopted. <p>BMP PE4 – Conduct Staff Training in Spill Response</p> <ul style="list-style-type: none"> ● Measurable Goal: Provide Spill Response Training to appropriate City Staff annually. <ul style="list-style-type: none"> ○ Tracking Measure: Number of City Staff with training. ○ Tracking Measure: Number of Staff attending training. <p>BMP PE5 – Promote Staff Education and Participation</p> <ul style="list-style-type: none"> ● Measurable Goal: Conduct 2 to 4 meetings annually for employees associated with stormwater management in the City. <ul style="list-style-type: none"> ○ Tracking Measure: Track the number of employees attending meetings regarding stormwater management annually. ● Measurable Goal: Coordinate annually with other Clackamas County co-permittees regarding regional water quality efforts. <ul style="list-style-type: none"> ○ Tracking Measures: Track the number of joint projects related to stormwater management that the City is currently involved. ● Measurable Goal: Throughout the permit term, participate, where practicable, in conferences and training opportunities available through state, and local agencies and groups associated with water quality.
<p>Additional Commitments (to be referenced in the annual reports as applicable)</p>	<p>BMP PE1 – Continue participation with the Regional Coalition of Clean Rivers and Streams.</p> <p>BMP PE1 – Document other public education and outreach activities not specified as a measurable goal.</p> <p>BMP PE2 – Continue to provide access to the Erosion Prevention and Sediment Control Planning and Design Manual to engineers, contractors, and developers and distribute other referenced (per the BMP) materials related to erosion and sediment control.</p> <p>BMP PE5 – Continue to attend and participate in conferences, meetings, and seminars as related to stormwater and surface water quality.</p>
<p>Adaptive Management Strategy</p>	<p>Tasks may be adjusted and resources allocated differently but will remain consistent with the City’s MEP, in order for the City to adaptively manage their public education and outreach activities. Such modifications would be specified in the NPDES annual reports.</p>

BMP Fact Sheet: Element #4 – Public Education and Outreach (PE)

Related Documents	None identified.
Relationship to TMDLs	<p>Phosphorus. Public education as related to application and management of fertilizers and other phosphorus containing materials is necessary to reduce phosphorus loads in water bodies.</p> <p>Settleable Volatile Solids. Erosion and sediment control BMPs reduce the discharge of organic matter and sediment (total and suspended), which results in reduced sediment oxygen demand in receiving waters.</p>

6.0 ELEMENT #5 – PUBLIC INVOLVEMENT

Per Schedule A.4.e of the City's MS4 NPDES permit, the City of Lake Oswego requires the following:

NPDES Permit Requirement - (e) *Co-permittees must adopt a public participation approach that provides opportunities for the public to effectively participate in the development, implementation and modification of the co-permittee's stormwater management program. The process must include provisions for receiving and considering public comments on the SWMP and the TMDL pollutant load reduction benchmark development. This public involvement does not apply to adding BMPs, and revisions or updates to existing BMPs that do not change the substance of the BMPs.*

The City provides opportunity for public participation in the development, implementation, and modification of the policies, practices, procedures, and codes that comprise the City's Stormwater Management Plan (SWMP) and pollutant load reduction benchmark development.

SWMP revisions and pollutant load reduction benchmarks are required for submittal to DEQ at the permit renewal submittal (180-days prior to permit expiration). Prior to submittal of these items, the City will provide the public with the opportunity to comment on the revisions to the SWMP and proposed pollutant load reduction benchmarks for a minimum of 30 days. Comments on the documents will be collected and considered, and response to comments will be publically provided.

Annually, the City reports to DEQ on the status of implementation of their current SWMP. Such report is called the City's MS4 NPDES Annual Report. To aid in public participation and involvement, the City will post their annual report on the web for public access and review.

No measurable goals or tracking measures are outlined for this permit requirement.

7.0 ELEMENT #6 – POST-CONSTRUCTION SITE RUNOFF CONTROL

The City conducts plan review activities for new and redevelopment applications within its jurisdiction. Existing stormwater development standards focus on stormwater quality for new development based on phosphorus removal efficiencies and stormwater quantity control to protect downstream flooding.

By January 1, 2014, the City of Lake Oswego will review their existing stormwater treatment design standards and applicable code provisions for consistency with the City's MS4 NPDES permit requirements related to maintaining predevelopment hydrologic function, implementing low-impact development and green infrastructure (GI) design approaches, and promoting the minimization of impervious surfaces and reducing stormwater runoff where applicable.

7.1 BMP DEV1 – Development Review

NPDES permit requirements are listed below, as pertaining to BMP DEV1. Applicable provisions are outlined under Schedule A.4.f of the City's MS4 NPDES Permit.

NPDES Permit Requirement – *(i) By the January 1, 2014, the post-construction stormwater pollutant and runoff control program applicable to new development and redevelopment projects that create or replace 3,000 ft² of impervious surface must meet the following conditions :1) Incorporate site-specific management practices that target natural surface or predevelopment hydrologic functions where practicable; 2) Minimize site specific post-development stormwater runoff volume and rates of discharges to the municipal separate storm sewer system (MS4)..; 3) Prioritize and implement Low-Impact Development (LID), Green Infrastructure (GI) or equivalent design and construction approaches; and, 4) Capture and treat 80% of the annual average runoff volume, based on a documented local or regional rainfall frequency and intensity.*

NPDES Permit Requirement – *(ii) Co-permittees must eliminate code and development standard barriers that inhibit design and implementation techniques intended to minimize impervious surfaces and reduce stormwater runoff (e.g., Low Impact Development, Green Infrastructure), and have been identified by and are within the jurisdiction of the permittee....Co-permittees must review code and development standards, and modify barriers, such as by policy, code, rules, ordinance or similar mechanism, as required within three years of identification.*

NPDES Permit Requirement – *(iii) To reduce pollutants and mitigate the volume, duration, time of concentration and rate of stormwater runoff, the co-permittees must develop or reference an enforceable post-construction stormwater quality management manual or equivalent document by January 1, 2014 that, at a minimum, includes the following: 1) A minimum threshold for triggering the requirement for post-construction stormwater management control and the rationale for the threshold; 2) A defined design storm that allows for or identification of an acceptable continuous simulation method to address the capture and treatment of 80% of the annual average runoff volume; 3) Applicable LID, GI or similar stormwater runoff reduction approaches,*

including the practical use of these approaches; 4) Conditions where the implementation of LID, GI or equivalent approaches may be impracticable; and, 5) Best Management Practices.

NPDES Permit Requirement – (iv) *Co-permittees must review, approve and verify proper implementation of post-construction site plans for new development and redevelopment projects applicable to this section.*

NPDES Permit Requirement – (v) *Where a project site is characterized by factors limiting on-site stormwater capture and treatment or flow reduction... the Post-Construction Stormwater Management program must require equivalent measures, such as off-site stormwater quality management. Off-site stormwater quality management may include off-site mitigation, a stormwater quality structural facility mitigation bank or a payment-in-lieu program.*

The City of Lake Oswego Planning, Public Works, and Building divisions share review responsibilities for new development applications. Specifically the Planning and Engineering Divisions review development proposals for consistency with any applicable regulatory *Comprehensive Plan policies*, and for consistency with applicable community development code requirements (i.e., zoning and development standards), including compliance with natural resource protection standards for wetlands, stream corridors, floodplains, etc., and with other City code provisions related to development. The Engineering Division specifically evaluates development proposals and conducts site plan reviews with regards to proposed stormwater conveyance, treatment, and disposal. Such development standards specific for stormwater conveyance, treatment, and disposal are specified in LOC Chapter 50.

Through the development review process, the City currently requires surface water quality control (treatment) for new development where the net increase in impervious surface is greater than or equal to 6,060 square feet. This threshold was established when the City began implementing surface water quality standards and controls in 1990, in response to the Tualatin River TMDL for phosphorus. The surface water quality standards were required for all new development activities, with the exception of one or two family dwellings, and surface water quality treatment facilities were required to remove 65% of the phosphorus from 100 percent of newly constructed impervious surfaces including pavement, buildings, public and private roadways. In accordance with Oregon Administrative Rule (OAR) Section 340-41-455, Subsection 3(d)(B)), construction of one or two family dwellings on existing lots of record are exempt from the requirement to provide facilities to satisfy the 65% phosphorus removal standard.

The City has a *Surface Water Technical Guidance Handbook* (2003) that provides design guidance and criteria for stormwater quality facilities. Typical approved stormwater treatment facilities include bioswales, extended dry detention ponds, retention ponds, vegetated filter strips, pollutant control manholes and proprietary stormwater treatment devices. Updates to the *Surface Water Technical Guidance Handbook* are proposed under BMP DEV2.

7.2 BMP DEV2 – Review and Update Applicable Code and Development Standards Related to Stormwater Control

NPDES permit requirements are listed below, as pertaining to BMP DEV2. Applicable provisions are outlined under Schedule A.4.f of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(i) By January 1, 2014, the post-construction stormwater pollutant and runoff control program applicable to new development and redevelopment projects that create or replace 3,000ft² of impervious surface must meet the following conditions :1) Incorporate site-specific management practices that target natural surface or predevelopment hydrologic functions where practicable; 2) Minimize site specific post-development stormwater runoff volume and rates of discharges to the municipal separate storm sewer system (MS4)..; 3) Prioritize and implement Low-Impact Development (LID), Green Infrastructure (GI) or equivalent design and construction approaches; and, 4) Capture and treat 80% of the annual average runoff volume, based on a documented local or regional rainfall frequency and intensity.*

NPDES Permit Requirement – *(ii) Co-permittees must eliminate code and development standard barriers that inhibit design and implementation techniques intended to minimize impervious surfaces and reduce stormwater runoff (e.g., LID, GI), and have been identified by and are within the jurisdiction of the permittee....Co-permittees must review code and development standards, and modify barriers, such as by policy, code, rules, ordinance or similar mechanism, as required within three years of identification.*

NPDES Permit Requirement – *(iii) To reduce pollutants and mitigate the volume, duration, time of concentration and rate of stormwater runoff, the co-permittees must develop or reference an enforceable post-construction stormwater quality management manual or equivalent document by January 1, 2014 that, at a minimum, includes the following: 1) A minimum threshold for triggering the requirement for post-construction stormwater management control and the rationale for the threshold; 2) A defined design storm that allows for or identification of an acceptable continuous simulation method to address the capture and treatment of 80% of the annual average runoff volume; 3) Applicable LID, GI or similar stormwater runoff reduction approaches, including the practical use of these approaches; 4) Conditions where the implementation of LID, GI or equivalent approaches may be impracticable; and, 5) Best Management Practices.*

NPDES Permit Requirement – *(iv) Co-permittees must review, approve and verify proper implementation of post-construction site plans for new development and redevelopment projects applicable to this section.*

NPDES Permit Requirement – *(v) Where a project site is characterized by factors limiting on-site stormwater capture and treatment or flow reduction... the Post-Construction Stormwater Management program must require equivalent measures, such as off-site stormwater quality management. Off-site stormwater quality management may include off-site mitigation, a stormwater quality structural facility mitigation bank or a payment-in-lieu program.*

In conjunction with the provisions and timeframe outlined in the City's MS4 NPDES permit, the City of Lake Oswego will review their existing stormwater treatment design standards and applicable code provisions by January 1, 2014 to ensure that barriers that could inhibit low impact development and green infrastructure are minimized and eliminated where practicable. As part of the review, the City will review the *Surface Water Technical Guidance Handbook* and regionally applicable examples of stormwater management manuals. It is anticipated that this review will ensure that the anticipated revisions to the Handbook are promoting the design and implementation of practices to minimize impervious surfaces and reduce stormwater runoff, optimizing onsite retention practices, and reducing post-construction stormwater runoff volumes and rates.

As applicable, the City will update the *Surface Water Technical Guidance Handbook* impervious area threshold for stormwater pollutant and runoff control and the design storm that would result in capture and treatment of 80% of the average annual runoff volume.

In conjunction with proposed revisions to the City's Community Development Code, provisions related to factors and activities that would limit on-site stormwater capture and treatment including approved equivalent measures for off-site stormwater quality management will be included, to the MEP.

BMP Fact Sheet:

Element #6 – Post Construction Site Runoff Control (DEV)

Introduction:	The purpose of this BMP category is to improve water quality by implementing appropriate post-construction design requirements.
Measurable Goals and Tracking Measures:	<p>BMP DEV1 – Development Review</p> <ul style="list-style-type: none"> • Measureable Goal: Continue to review all new development applications for compliance with existing for stormwater quality standards. <ul style="list-style-type: none"> ○ Tracking Measure: Track the number of new development applications reviewed for stormwater quality compliance. <p>BMP DEV2 – Review and Update Applicable Code and Development Standards Related to Stormwater Control</p> <ul style="list-style-type: none"> • Measureable Goal: Beginning during permit year 1, review current City of Lake Oswego development code provisions for consistency with MS4 NPDES permit language. • Measureable Goal: Beginning during permit year 1 review the City's <i>Surface Water Technical Handbook</i> and other local jurisdiction's stormwater design manuals and revise or adopt a manual for the City that is consistent with MS4 NPDES permit language.
Additional Commitments (to be referenced in the annual reports as applicable)	BMP DEV2 – Update the City's existing post-construction design standards and code language by January1, 2014.
Adaptive Management Strategy	Implementation of existing stormwater development standards and proposed updates to such standards are consistent with what the City has deemed MEP. Based on the results of annual SWMP implementation, the efforts may be adjusted and resources allocated differently but still consistent with the City's MEP, in order for the City to adaptively manage their program. Such modifications would be specified in the NPDES annual reports.
Related Documents	<p>The City of Lake Oswego Comprehensive Plan (1984, as amended) (undergoing periodic review during the permit term). The City of Lake Oswego <i>Public Facilities Plan</i> (1990, updated 1997) <i>Lake Oswego Clean Streams Plan</i> (2009) <i>Surface Water Technical Guidance Handbook</i> (2003) <i>City of Lake Oswego Community Development Code</i></p>
Relationship to TMDLs	<p>Phosphorus. The City's existing stormwater treatment design standards are developed to remove phosphorus. Bacteria. Through implementation of proposed treatment standards promoting infiltration techniques, bacteria will be reduced.</p>

BMP Fact Sheet:

**Element #6 – Post Construction Site Runoff Control
(DEV)**

Settleable Volatile Solids. The City's existing stormwater treatment design standards would address settleable volatile solids.

8.0 ELEMENT #7 – POLLUTION PREVENTION FOR MUNICIPAL OPERATIONS

The City of Lake Oswego conducts a variety of activities focused on the prevention of typical stormwater pollutants (sediment, hydrocarbons, trash and debris, nutrients, metals) from entering the MS4 system. Such activities include the maintenance and repair of City streets; the maintenance of public parks and recreational areas with the intent of minimizing fertilizer and pesticide use; the maintenance of municipal facilities; control of potential cross-connections from the sanitary sewer system; and master planning for stormwater quality improvement.

It should be noted with respect to NPDES permit requirement A.4.g.v. (*implement a program to control the release of materials related to fire-fighting training activities*) that fire fighting training activities do not occur within Lake Oswego. Therefore, a BMP was not developed to address this requirement.

8.1 BMP OM1 – Street Sweeping of Curbed Arterial and Residential Streets

NPDES permit requirements are listed below, as pertaining to BMP OM1. Applicable provisions are outlined under Schedule A.4.g of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(i) Operate and maintain public streets, roads and highways for which the permittee has authority in a manner designed to minimize the discharge of stormwater pollutants to the MS4, including pollutants discharged as a result of deicing activities and yard debris reduction and disposal programs;*

The City of Lake Oswego conducts street sweeping activities throughout the City. Street sweeping is conducted on all major and minor curbed arterial streets and all curbed residential streets. Curbed arterial streets are swept between 13 and 22 times per year, and all curbed residential streets in the City are swept between 2 and 6 times per year. Both sweeping frequencies will be based on iterative management findings and MEP.

A vacuum sweeper is used to minimize wash water from entering the stormwater conveyance system.

8.2 BMP OM2 – Deicing and Leaf Pick-up Activities

NPDES permit requirements are listed below, as pertaining to BMP OM2. Applicable provisions are outlined under Schedule A.4.g of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(i) Operate and maintain public streets, roads and highways for which the permittee has authority in a manner designed to minimize the discharge of stormwater pollutants to the MS4, including pollutants discharged as a result of deicing activities and yard debris reduction and disposal programs;*

The City of Lake Oswego applies washed gravel to roadways when ice is present. Street sweepers sweep up the applied gravel after the ice has melted and as promptly as resources and weather allows.

The City's contracted waste hauler, Allied Waste, provides weekly yard debris collection for grass clippings, leaves, etc year round. The City's Operations staff also collects fallen leaves seasonally in City streets. The City Operations Program addresses leaf debris in City streets and is primarily implemented to prevent flooding issues from clogged inlets.

8.3 BMP OM3 – Road Maintenance and Repair Activities

NPDES permit requirements are listed below, as pertaining to BMP OM3. Applicable provisions are outlined under Schedule A.4.g of the City's MS4 NPDES Permit.

NPDES Permit Requirement – *(i) Operate and maintain public streets, roads and highways for which the permittee has authority in a manner designed to minimize the discharge of stormwater pollutants to the MS4, including pollutants discharged as a result of deicing activities and yard debris reduction and disposal programs;*

The City of Lake Oswego conducts road maintenance and repair activities on an ongoing basis to prevent erosion and future pollution from occurring. Repair work is generally scheduled during the dry season when possible, to minimize polluted discharges from entering the stormwater conveyance system, the MEP.

City-conducted road maintenance and repair activities that would trigger erosion control requirements (an erosion and sediment control plan and/or permit) require that the project is monitored for erosion control compliance by City Staff, to the MEP.

8.4 BMP PEST1 – Reduce Pollutants in Discharges Associated with the Application of Pesticides, Herbicides, and Fertilizers

NPDES permit requirements are listed below, as pertaining to BMP PEST1. Applicable provisions are outlined under Schedule A.4.g of the City's MS4 NPDES Permit.

NPDES Permit Requirement – *(ii) Implement a management program to control the use and application of pesticides, herbicides and fertilizers on municipally-owned properties;*

The City of Lake Oswego has adopted standard operating procedures (SOPs) for pest and landscape management activities, which utilize components of the City's Integrated Pest Management Practices. The City's Integrated Pest Management Practices define appropriate application procedures and protocols along roadways, within City parks, and around water quality facilities for staff to adhere to during maintenance activities. Per the SOPs, the following activities are typical:

- Application of chemicals is reduced and/ or eliminated where possible;
- Regular removal of invasive plant species is conducted, to the MEP;

- Native plants are used for revegetation projects; and
- Only spot spraying is conducted for blackberry removal.

In addition, any work that is conducted within public right-of-ways requires certified, licensed applicators.

Specific education measures and staff training are discussed under Section 5.0 – Element #4 - Public Education and Outreach.

8.5 BMP PEST2 – Update the City of Lake Oswego Integrated Pest Management Practices

NPDES permit requirements are listed below, as pertaining to BMP PEST2. Applicable provisions are outlined under Schedule A.4.g of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(ii) Implement a management program to control the use and application of pesticides, herbicides and fertilizers on municipally-owned properties;*

The City of Lake Oswego has been using its Integrated Pest Management Practices for close to thirty years. In spite of this, the City has set a measureable goal of revising the current Integrated Pest Management Practices with a more current version that reflects the current state of practice related to the City’s Integrated Pest Management, and review current practices for areas of improvement or modification for efficiency. The City currently incorporates a variety of Integrated Pest Management Practices, for example:

- Operations staff has long concentrated on buying disease resistant plants and plants that attract beneficial insects so they stay healthy without insecticides.
- Turf maintenance began with experimenting with low phosphorus fertilizer twenty years ago by working with manufacturers to mix a special Lake Oswego blend.
- Water management was improved by installing a computerized irrigation system twelve years ago. For many years wetting agents have been used as standard practice at the golf course and park turf areas to increase water absorption.
- Every year all the shrub beds are mulched with a compost/dark bark mix to help organically feed the soil, smother weeds and retain soil moisture. Medians are filled with plants, which reduces weed growth since healthy plants shade out and out-compete weeds. This technique also works for a lawn since healthy vigorous turf can out-compete weeds and thus no chemicals need to be used.
- The Operations staff are constantly experimenting with new disease-resistant plant varieties and drought tolerant plants in an effort to showcase how sustainable and beautiful water-wise gardening can be.

Revisions and updates to the City’s Integrated Pest Management Practices will be incorporated by the end of the permit term.

8.5 BMP OM4 – Implement a Program to Reduce the Impact of Stormwater Runoff from Municipal Facilities

NPDES permit requirements are listed below, as pertaining to BMP OM4. Applicable provisions are outlined under Schedule A.4.g of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(iii) Inventory, assess, and implement a strategy to reduce the impact of stormwater runoff from municipal facilities that treat, store or transport municipal waste, such as yard waste or other municipal waste not already covered under a 1200 series NPDES permit;*

The City of Lake Oswego currently operates various maintenance facilities that have the potential to treat, store, or transport municipal waste. Such facilities include the Public Works Operations Building/Yard, Lake Oswego Municipal Golf Course, and Parks Maintenance Buildings.

By January 1, 2013, the City of Lake Oswego will inventory these facilities and assess strategies to minimize pollutant discharge from these facilities.

8.6 BMP ILL3 – Control Infiltration and Cross Connections to the Stormwater Conveyance System

NPDES permit requirements are listed below, as pertaining to BMP ILL3. Applicable provisions are outlined under Schedule A.4.g of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(iv) Implement controls to limit infiltration of seepage from the municipal sanitary sewer system to the MS4 where necessary.*

The City of Lake Oswego implements an inflow and infiltration (I&I) abatement program for the sanitary sewer system. Sanitary lines are tested via smoke-testing, T.V. techniques, and flow metering for any cracking or breakage that would possibly result in infiltration from the sanitary to the storm system.

The City’s Engineering Division reviews new and re-development plans for possible cross-connections. The City’s illicit discharge program also works to control and prevent any cross-connections during their outfall inspections and dry-weather field screening activities.

8.7 BMP DEV3 – Master Planning for Stormwater Quality Improvement

NPDES permit requirements are listed below, as pertaining to BMP DEV3. Applicable provisions are outlined under Schedule A.4.g of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(vi) Assess co-permittee flood control projects to identify potential impacts on the water quality of receiving water bodies and determine the feasibility of retrofitting structural flood control devices for additional stormwater*

pollutant removal. The results of this assessment must be incorporated and considered along with the results of the Stormwater Retrofit Assessment required by this permit;

The City of Lake Oswego operates under a number of planning and development-related documents with goals to reduce and/or eliminate pollutant discharges to surface water bodies. The City's *Comprehensive Plan* was acknowledged by the Land Conservation and Development Commission in 1984 and is currently being reviewed and updated (as part of Periodic Review). It is anticipated that the review will take two to three years to complete. The review ensures the plan addresses current state land use planning regulations. Specific sections of the *Comprehensive Plan* address water quality and the state land use goals (Goal 5, Goal 6 and Goal 11). The City's *Public Facilities Plan* was originally adopted in 1990 as part of the *Comprehensive Plan* update and updated in 1997, and it provided an inventory and conditions analysis for the major elements of the City's infrastructure including stormwater management facilities.

Specific to stormwater master planning, the City finalized and adopted the *Lake Oswego Clean Streams Plan*, in November 2009. The *Clean Streams Plan* serves as an update to the previous surface water management master plan (dated 1992). The *Lake Oswego Clean Streams Plan* serves as the basis for the stormwater management and facility infrastructure portion of the *Public Facilities Plan* described above. The *Lake Oswego Clean Streams Plan* contains a number of recommended capital improvement projects (CIPs) for flow control and water quality that the City will reference for future utility and infrastructure improvement, as an update to the City's original 10-year CIP Plan. Such CIPs include low impact development technologies where practicable, as many areas of the City of Lake Oswego contain soils that don't support effective infiltration. Prioritization of CIPs is generally based on overall planning goals, cost, public safety, and environmental impact. As funding is available, the City implements the CIPs and continues to update the CIP inventory. Future updates to the City's CIP are expected to include provisions related to hydromodification and retrofit opportunities for water quality, per the City's new MS4 NPDES permit.

LOC 38.24.505 and .510 creates the Surface Water Management Utility, which plans, designs, constructs, maintains, administers, and operates public surface water facilities including those projects identified within the City's prioritized CIP list. Utility user charges are also established by LOC 38.06.030, which fund portions of CIPs.

Generally, there is limited opportunity for retrofit of existing flood control facilities because there are very limited facilities that solely address flood control. Most public drainage facilities are constructed for both flood control and water quality. The City of Lake Oswego operates one major flood control facility and works with the Lake Oswego Corporation (Lake Corp.), which operates the gates, weirs, and overflow facilities related to operation of Oswego Lake. Water quality is always taken into account if the City is repairing, retrofitting or constructing new infrastructure, through compliance with their development standards and erosion and sediment control practices.

BMP Fact Sheet:

Element #7 – Pollution Prevention for Municipal Operations (OM, PEST, ILL)

<p>Introduction:</p>	<p>The purpose of this BMP category is to improve water quality by implementing appropriate operations and maintenance and other pollution prevention practices.</p>
<p>Measurable Goals and Tracking Measures:</p>	<p>BMP OM1 – Street Sweeping of Curbed Arterial and Residential Streets</p> <ul style="list-style-type: none"> • Measurable Goal: Annually sweep curbed arterial streets between 13 and 22 times annually. <ul style="list-style-type: none"> ○ Tracking Measure: List all curbed arterial streets and dates swept. • Measurable Goal: Annually sweep all curbed residential streets between 2 and 6 times annually. <ul style="list-style-type: none"> ○ Tracking Measure: List all curbed residential streets and dates swept. <p>BMP OM2 – De-Icing and Leaf Pick-up Activities</p> <ul style="list-style-type: none"> • Measurable Goal: Pick up all deicing materials as promptly as weather and resources allow. • Measurable Goal: Pick up leaf debris from City Streets a minimum of once per season to prevent inlet clogging and localized flooding. <ul style="list-style-type: none"> ○ Tracking Measure: Report volume of leaves collected from City Streets in annual report. • Measurable Goal: Promote yard waste collection services provided by City Waste Contractor once per season during permit term. <ul style="list-style-type: none"> ○ Tracking Measure: Description of leaf debris information provided to public for leaf pick up and recycling. <p>BMP OM3 – Road Maintenance and Repair Activities</p> <p>There are no measurable goals identified for this BMP.</p> <p>BMP PEST1 – Reduce Pollutants in Discharges Associated with the Application of Pesticides, Herbicides and Fertilizers.</p> <ul style="list-style-type: none"> • Measurable Goal: Inventory pesticides, herbicides, and fertilizers applied to City owned property over the permit term. <ul style="list-style-type: none"> ○ Tracking Measure: Annually report on the quantity of pesticides, fertilizers, and herbicides applied to City property. ○ Tracking Measure: Annually report on the efforts and alternatives (either annually or over the permit term) used to reduce the quantity of pesticide, herbicide, and fertilizer used by the City on City property. <p>BMP PEST2 – Update the City of Lake Oswego Integrated Pest Management Practices.</p> <ul style="list-style-type: none"> • Measurable Goal: Implement and update the City of Lake Oswego City’s Integrated Pest Management Practices over the

BMP Fact Sheet: Element #7 – Pollution Prevention for Municipal Operations (OM, PEST, ILL)

	<p>permit term.</p> <p>BMP OM4 – Implement a Program to Reduce the Impact of Stormwater Runoff from Municipal Facilities</p> <ul style="list-style-type: none"> • Measureable Goal: Inventory facilities subject to this requirement during the permit term. As municipal facilities are identified, the City will establish strategies to minimize pollutant discharges from these facilities. By the end of the permit term, such strategies will be implemented and a mechanism for tracking the implementation of such activities will be in place. <ul style="list-style-type: none"> ○ Tracking Measure: Track the new water quality practices applied at municipal facilities subject to this requirement. <p>BMP ILL3 – Control Infiltration and Cross Connections to the Stormwater Conveyance System</p> <ul style="list-style-type: none"> • Measurable Goal: Ensure that all identified cross connections are abated upon discovery. <ul style="list-style-type: none"> ○ Tracking Measure: Number of cross connections discovered and abated annually.
<p>Additional Commitments (to be referenced in the annual reports as applicable)</p>	<p>BMP PEST2 – Update the City’s Integrated Pest Management Practices over the permit term.</p> <p>BMP OM4 – By January 1, 2013, identify strategies to minimize pollutant discharge from municipal facilities.</p>
<p>Adaptive Management Strategy</p>	<p>Pollution prevention activities as identified in the SWMP are consistent with what the City has deemed MEP. Based on the results of annual SWMP implementation, the frequencies and efforts may be adjusted and resources allocated differently but still consistent with the City’s MEP, in order for the City to adaptively manage their program. Such modifications would be specified in the NPDES annual reports.</p>
<p>Related Documents</p>	<p>The City of Lake Oswego Comprehensive Plan (1984, as amended). The City of Lake Oswego <i>Public Facilities Plan</i> (1990, updated 1997) <i>Lake Oswego Clean Streams Plan</i> (2009) <i>Surface Water Technical Guidance Handbook</i> (2003) <i>City of Lake Oswego Community Development Code</i> Standard operating procedures (SOPs), dated August 25, 2005, issued by Park Maintenance: 1) Vegetation Removal, Mowing, and Alteration, 2) Animal Waste Control, and 3) Pesticide and Fertilizer Application.</p>

BMP Fact Sheet:
Element #7 – Pollution Prevention for Municipal Operations
(OM, PEST, ILL)

Relationship to TMDLs

Phosphorus. The City's stormwater treatment design standards, utilized in the design and construction of CIPs are intended to remove phosphorus.

Bacteria. Through appropriate pollution prevention activities and appropriate pest management techniques, sources of bacterial contamination will be identified and corrected.

Settleable Volatile Solids. Roadway maintenance activities will reduce the discharge of settleable volatile solids that accumulate in the system.

9.0 ELEMENT #8 – STRUCTURAL STORMWATER FACILITIES OPERATIONS AND MAINTENANCE

The City of Lake Oswego conducts a variety of activities focused on the prevention of typical stormwater pollutants (sediment, hydrocarbons, trash, debris, nutrients and metals) from entering the MS4 system. Such activities include the installation, tracking, and maintenance of stormwater conveyance system components and structural stormwater facilities.

9.1 BMP OM5 – Inspection and Maintenance of Publicly Owned Conveyance System Components

NPDES permit requirements are listed below, as pertaining to BMP OM5. Applicable provisions are outlined under Schedule A.4.g of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *(i) Co-permittees must implement a program by January 1, 2013 to verify that stormwater structural facilities and controls are inventoried, mapped, inspected, operated and maintained for effective pollutant removal, infiltration and/or flow control. At a minimum, the program must include the following: 1) Legal authority to inspect and require effective operation and maintenance; 2) A program to inventory and map public and private stormwater treatment facilities as provided under Schedule A.4.h.ii.; and, 3) Public and private stormwater facility inspection and maintenance requirements for stormwater facilities that have been inventoried and mapped as provided under Schedule A.4.h.ii.*

NPDES Permit Requirement – *(ii) As part of the Stormwater Structural Facilities and Controls Inspection and Maintenance program, co-permittees must develop and implement a plan or approach by January 1, 2013 that guides the long-term maintenance and management of all publicly-owned and identified privately-owned stormwater structural facilities and controls. At a minimum, the plan or approach must describe the following:*

- 1) Publicly-owned or operated stormwater quality facilities inventory and mapping process, inspection and maintenance schedule, inspection, operation and maintenance criteria and priorities, description of inspector type and staff position or title, and, inspection and maintenance tracking mechanisms; and*
- 2) Privately-owned or operated stormwater quality facilities procedures for and types of stormwater facilities that will be inventoried and mapped, inspection criteria, rationale, priorities, inspection frequency and procedures, required training or qualifications to inspect private stormwater facilities, reporting requirements, and, inspection and maintenance tracking mechanism.*

The City of Lake Oswego will inspect publicly owned conveyance system components during the permit term. Components of the public conveyance system include culverts, conveyance ditches, inlet structures, and catch basins without sumps. Problem areas are identified during the inspections, and maintenance and/or repair/replacement activities are addressed to the MEP.

Inspections of public conveyance system components (specifically drainage pipe) also occur in conjunction with citizen complaints and inquiries, to the MEP. During inspections, problem areas are identified and maintenance and/or repair activities are scheduled and promptly conducted, to the MEP.

A database tracking system is updated during each maintenance reporting period to allow the City to track and inventory their conveyance system.

9.2 BMP OM6 – Inspection and Maintenance of Publicly Owned Catch Basins with Sumps

NPDES permit requirements are listed below, as pertaining to BMP OM6. Applicable provisions are outlined under Schedule A.4.g of the City's MS4 NPDES Permit.

NPDES Permit Requirement – *(i) Co-permittees must implement a program by January 1, 2013 to verify that stormwater structural facilities and controls are inventoried, mapped, inspected, operated and maintained for effective pollutant removal, infiltration and/or flow control. At a minimum, the program must include the following: 1) Legal authority to inspect and require effective operation and maintenance; 2) A program to inventory and map public and private stormwater treatment facilities as provided under Schedule A.4.h.ii.; and, 3) Public and private stormwater facility inspection and maintenance requirements for stormwater facilities that have been inventoried and mapped as provided under Schedule A.4.h.ii.*

NPDES Permit Requirement – *(ii) As part of the Stormwater Structural Facilities and Controls Inspection and Maintenance program, co-permittees must develop and implement a plan or approach by January 1, 2013 that guides the long-term maintenance and management of all publicly-owned and identified privately-owned stormwater structural facilities and controls. At a minimum, the plan or approach must describe the following:*

- 1) Publicly-owned or operated stormwater quality facilities inventory and mapping process, inspection and maintenance schedule, inspection, operation and maintenance criteria and priorities, description of inspector type and staff position or title, and, inspection and maintenance tracking mechanisms; and*
- 2) Privately-owned or operated stormwater quality facilities procedures for and types of stormwater facilities that will be inventoried and mapped, inspection criteria, rationale, priorities, inspection frequency and procedures, required training or qualifications to inspect private stormwater facilities, reporting requirements, and, inspection and maintenance tracking mechanism.*

There are approximately 5500 catch basin inlets in the City of Lake Oswego. Of that 5500, the City of Lake Oswego operates approximately 1700 publicly owned, sumped catch basins. Sumped catch basins are classified by the City of Lake Oswego as those catch basins with a 12” deep or greater sump. The City inspects all of their publicly owned, sumped catch basins annually. Problem areas are identified during the annual inspection, and maintenance, repair, or replacement activities are scheduled thereafter.

Ninety percent of all sumped catch basins are cleaned at least once annually. Maintenance activities primarily occur during the dry weather season. In general, cleaning of publically owned sumped catch basins involves removing standing water and debris from the catch basin and sump. Debris levels in catch basins are qualitatively noted on data collection forms along with other observations and background information (site location, date cleaned, etc).

As with the stormwater conveyance system maintenance (BMP: OM5), inspections of public sumped catch basins also occur in conjunction with citizen complaints and inquiries, to the MEP. As a result of public complaint or inquiry, problem areas are identified and maintenance and/or repair activities are scheduled as necessary.

A database tracking system is updated during each maintenance cycle to allow the City to track maintenance efforts and inventory existing sumped catch basins.

9.3 BMP OM7 – Tracking, Inspection, and Maintenance of Water Quality Treatment Facilities

NPDES permit requirements are listed below, as pertaining to BMP OM7. Applicable provisions are outlined under Schedule A.4.d and A.4.g of the City’s MS4 NPDES Permit.

NPDES Permit Requirement – *Schedule A.4.d.iv As appropriate, provide public education on the proper operation and maintenance of privately-owned or operated stormwater quality management facilities.*

NPDES Permit Requirement – *Schedule A.4.g.i Co-permittees must implement a program by January 1, 2013 to verify that stormwater structural facilities and controls are inventoried, mapped, inspected, operated and maintained for effective pollutant removal, infiltration and/or flow control. At a minimum, the program must include the following: 1) Legal authority to inspect and require effective operation and maintenance; 2) A program to inventory and map public and private stormwater treatment facilities as provided under Schedule A.4.h.ii.; and, 3) Public and private stormwater facility inspection and maintenance requirements for stormwater facilities that have been inventoried and mapped as provided under Schedule A.4.h.ii.*

NPDES Permit Requirement – *Schedule A.4.g.ii As part of the Stormwater Structural Facilities and Controls Inspection and Maintenance program, co-permittees must develop and implement a plan or approach by January 1, 2013 that guides the long-term maintenance and management of all publicly-owned and identified privately-owned stormwater structural facilities and controls. At a minimum, the plan or approach must describe the following:*

- 1) *Publicly-owned or operated stormwater quality facilities inventory and mapping process, inspection and maintenance schedule, inspection, operation and maintenance criteria and priorities, description of inspector type and staff position or title, and, inspection and maintenance tracking mechanisms; and*

Privately-owned or operated stormwater quality facilities procedures for and types of stormwater facilities that will be inventoried and mapped, inspection criteria, rationale, priorities, inspection frequency and procedures, required training or qualifications to inspect private stormwater facilities, reporting requirements, and, inspection and maintenance tracking mechanism.

The City of Lake Oswego owns and operates public, structural water quality facilities. Such structural facilities currently include detention and sedimentation ponds, swales, pollution control manholes, and filter vaults that provide for pollutant removal by controlling flow, promoting infiltration, providing for sedimentation, and filtering pollutants from stormwater.

Public stormwater facility maintenance records are currently tracked at the Public Works Operations Division. Public structural water quality facilities are inspected throughout the permit term and routine maintenance is conducted to the MEP. Typical routine maintenance activities include mowing, trimming, inlet/outlet maintenance, and removal of debris. Watering vegetation in water quality treatment facilities is conducted until new vegetation is established. Based on the results of the inspections, non-routine maintenance activities may be warranted. Non-routine maintenance activities include planting vegetation, reshaping/reconstructing, and silt and sediment removal. Proprietary system maintenance typically falls under non-routine maintenance activities. By January 1, 2013, the City will formalize their current inspection and maintenance schedules, inspection and maintenance criteria, and inspection and maintenance tracking mechanisms.

The City of Lake Oswego is also beginning to implement a program to track private, structural water quality facility maintenance. Private facilities typically are owned and operated by homeowner associations or similar private entities in Lake Oswego. As a result, some do not realize that they are legally responsible for the operation and maintenance of these privately owned facilities. The City has compiled an inventory of all known (existing) private structural water quality facilities and updates to the inventory occur annually. New facilities are tracked in conjunction with receipt of the facility's operations and maintenance agreement (required for submittal during development plan review). During the permit term, the City follows up with property owners to ensure that a copy of the maintenance agreement is on file with the City and conducts spot inspections of private water quality facilities.

In accordance with the schedule outlined for public water quality facilities, the City is formalizing inspection and maintenance schedules, inspection and maintenance criteria, and inspection and maintenance tracking mechanisms for structural control facilities by January 1, 2013. Such information will also be made available to private facility owners to assist them in conducting independent inspections and maintenance of private structural control facilities. Additionally, by January 1, 2013, the City will research permanent funding mechanisms to cover items such as private structural BMP owner education and outreach, operation and maintenance (O&M) plan review, and implementation of the private facilities O&M plans.

BMP Fact Sheet:

Element #8 – Structural Stormwater Facilities Operations and Maintenance (OM)

<p>Introduction:</p>	<p>The purpose of this BMP category is to improve water quality by implementing appropriate operations and maintenance practices for structural stormwater facilities.</p>
<p>Measurable Goals and Tracking Measures:</p>	<p>BMP OM5 - Inspection and Maintenance of Publicly Owned Conveyance System Components</p> <ul style="list-style-type: none"> • Measurable Goal: Inspect the publicly owned stormwater conveyance system components (pipes, culverts, ditches, and inlets) during the permit term. <ul style="list-style-type: none"> ○ Tracking Measure: Number of conveyance system components inspected and/or repaired annually. ○ Tracking Measure: Number of inspections and repair activities conducted annually. • Measurable Goal: Based on the results of the inspections and citizen complaints, maintain the conveyance system components in need of service during the permit term. <ul style="list-style-type: none"> ○ Tracking Measure: Describe all maintenance activities potentially impacting water quality that are conducted annually. <p>BMP OM6 - Inspection and Maintenance of Publicly Owned Catch basins with Sumps</p> <ul style="list-style-type: none"> • Measurable Goal: Inspect all of the publicly owned, sumped catch basins in the City annually. <ul style="list-style-type: none"> ○ Tracking Measure: Number and percent of total catch basins inspected annually. • Measurable Goal: Maintain a minimum of 90% of City owned sumped catch basins annually, based on regular maintenance schedules and results of inspections. <ul style="list-style-type: none"> ○ Tracking Measure: Number and percent of total catch basins maintained annually. <p>BMP OM7 – Tracking, Inspection and Maintenance of Water Quality Treatment Facilities</p> <ul style="list-style-type: none"> • Measureable Goal: Develop a program to track and report on public and private water quality facility operations and maintenance activities by January 1, 2013. <ul style="list-style-type: none"> ○ Tracking Measure: Track status of developing the program and any updates made to the program once complete. • Measurable Goal: Annually inspect all of the publicly owned water quality treatment facilities. <ul style="list-style-type: none"> ○ Tracking Measure: Number and percent of total public water quality treatment facilities inspected annually. • Measurable Goal: Annually conduct routine maintenance activities to ensure functionality of public water quality treatment facilities. <ul style="list-style-type: none"> ○ Tracking Measure: Number of public water quality treatment facilities maintained annually and description of

BMP Fact Sheet: Element #8 – Structural Stormwater Facilities Operations and Maintenance (OM)

	<p>maintenance activity.</p> <ul style="list-style-type: none"> • Measurable Goal: Continually maintain an inventory of private water quality facilities in conjunction with receipt of private facility operations and maintenance agreements throughout the permit term. • Measurable Goal: Annually inspect 10% of private water quality facilities for which an O&M agreement is on file with the City. <ul style="list-style-type: none"> ○ Tracking Measure: Number and percent of total private water quality treatment facilities inspected annually. Document the date of inspection.
Additional Commitments (to be referenced in the annual reports as applicable)	BMP OM7 – Incorporate public and private stormwater quality facilities into the City’s GIS inventory; develop a formalized inspection and maintenance schedule, inspection and maintenance criteria, and inspection and maintenance tracking mechanisms for structural control facilities by January 1, 2013.
Adaptive Management Strategy	Inspection and maintenance frequencies and efforts for structural water quality facilities, as identified in the SWMP are consistent with what the City has deemed MEP. Based on the results of annual SWMP implementation, the frequencies and efforts may be adjusted and resources allocated differently but will remain consistent with the City’s MEP, in order for the City to adaptively manage their program. Such modifications would be specified in the NPDES annual reports.
Related Documents	<i>Surface Water Technical Guidance Handbook (2003)</i> <i>City of Lake Oswego Community Development Code</i>
Relationship to TMDLs	<p>Phosphorus. The City’s stormwater treatment design standards result in structural water quality facilities that are developed to remove phosphorus. Through maintenance and inspection, these facilities maintain their effectiveness.</p> <p>Bacteria. Through appropriate maintenance and inspection of the structural water quality facilities, sources of bacterial contamination will be identified and corrected.</p> <p>Settleable Volatile Solids. Adequate maintenance of the structural water quality facilities will reduce the discharge of settleable volatile solids that accumulate in the system.</p>

Glossary

ACWA	Association of Clean Water Agencies (Oregon and National Chapter)
APWA	American Public Works Association
AWRA	American Water Resources Association
BMP	A BMP is a technique, process, activity, or structure used to reduce the pollutant content of a storm water discharge. BMPs include simple nonstructural methods, such as good housekeeping and preventive maintenance. BMPs may also include structural modifications, such as the installation of bioretention measures. BMPs are most effective when used in combination with each other, and customized to meet the specific needs (drainage, materials, activities, etc.) of a given operation.
Catch Basin	Usually a grated inlet that serves as a inlet for surface water to a storm sewer, having at its base a sediment sump designed to retain dirt and other organic and inorganic debris below the point of overflow.
DEQ	Department of Environmental Quality (Oregon)
EPA	Environmental Protection Agency
EPSCP	Erosion Prevention and Sediment Control Plan
IDDE	Illicit Discharge Detection and Elimination
LOC	Lake Oswego Code
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NPDES	A national program under Section 402 of the Clean Water Act for regulation of discharges of pollutants from point sources to waters of the United States.
OAR	Oregon Administrative Rule
SOP	Standard Operating Procedure
TMDL	Total Maximum Daily Load, is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards

