Department of Community Services

Transportation Division

December 18, 2015

Mark Riedel
Oregon Department of Environmental Quality
811 SW 6th Ave
Portland, OR 97204

SUBJECT: NPDES MS4 Permit Annual Report 2015

Dear Mr Riedel:

I am pleased to submit the enclosed National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (NPDES MS4) Phase I Permit – Permit Renewal Application Submittal. This report fulfills reporting requirements for the NPDES MS4 Phase I Permit #103004.

We look forward to discussing our efforts in the next permit cycle and any new requirements and focus areas DEQ proposes. Electronic downloads can be found at multco.us/water-quality-program/reports-and-plans. If you have any questions concerning this report, please contact Roy Iwai, Water Resources Specialist at (503) 988-0195, or by email at roy.iwai@multco.us.

Sincerely,

Ian B. Cannon, P.E.
Transportation Division Director

2015 NPDES Permit Renewal Application

National Pollutant Detection and Elimination System Municipal Separate Storm Sewer System Phase I Permit

Multnomah County
Water Quality Program
Transportation Division
Department of Community Services

December 2015

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Contents

Introduction

Permit Background

In the early 1990s, the Federal Clean Water Act required municipalities with populations greater than 100,000 to apply for and obtain a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit for their stormwater discharges. In Oregon, this program was delegated to the Oregon Department of Environmental Quality (DEQ). As a result, DEQ directed six Oregon jurisdictions and associated co-permittees to apply for and obtain a municipal NPDES stormwater permit. The City of Portland and the City of Gresham are two of the six jurisdictions required to obtain an NPDES permit in 1995, and Multnomah County was a co-permittee on each of these City's permits. In 2009, Multnomah County requested that DEQ create a new single individual permit rather than maintain coverage under both Portland and Gresham permits. DEQ granted the request with the renewed permit in 2010.

Multnomah County developed a Stormwater Management Plan (SWMP) for the original NPDES permit in 1995. This SWMP has been updated with permit renewals in 2004 and 2010.

Permit Renewal Application Requirements

The NPDES permit renewal submittal must contain the following information and analysis. This submittal is organized in the sections numbered below.

1. Description of the County's Permit area

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

2. Total Maximum Daily Load Benchmarks and Pollutant Load Estimate Update

   B.6.c. Updated estimate of total annual pollutant loads for applicable TMDL pollutants or applicable surrogate pollutants and the following parameters: BOD5, COD, nitrate, total phosphorus, dissolved phosphorus, cadmium, copper, lead, and zinc. The estimates must be accompanied by a description of the procedures for estimating pollutant loads and concentrations, including any modeling, data analysis and calculation methods.

   B.6.h. If applicable, the established TMDL pollutant reduction benchmarks, as required in Schedule D.3.d. of the permit.

3. Proposed program modifications

   *B.6.a. Stormwater Management Plan changes – addition or removal of BMPs and associated measurable goal*s.

4. Fiscal evaluation

   B.6.f. A fiscal evaluation summarizing program expenditures for the current and projected program allocation for next permit cycle.

5. Maximum Extent Practicable (MEP) evaluation

   B.6.b. Information and analysis necessary to support the Department's independent assessment that the permittee's stormwater management program addressed in the requirements of the permit. The permitee must describe how the proposed management practices, control techniques, and other provisions implemented as part of the stormwater program were evaluated using a permittee-defined and standardized set of objective criteria relative to the following MEP general evaluation factors:
   a. *Effectiveness – program elements effectively address stormwater pollutants.*
   b. *Local applicability – technically feasible considering local soils, geography, etc.*
   c. *Program resources – program elements are being implemented considering availability of resources and the permittees stormwater management program priorities.*

6. A proposed monitoring program

   B.6.d. Proposed monitoring objectives matrix and proposed monitoring plan including information required in Schedule B.2.d. for each proposed monitoring objective/task.

7. Stormwater System and Facilities Mapping

   B.6.h.Updated maps of the MS4, including the service boundary of the MS4, projected changes in land use and population densities, projected future growth, location of permittee-owned operations, facilities, or properties with storm sewer systems, and the location of facilities issued an industrial NPDES permit that discharge to the MS4.

1. Description of the County's Permit Area

Multnomah County is a unique jurisdiction with NPDES permit areas composed of several discrete urban pockets of unincorporated County in the urban areas of Portland, Gresham and Fairview, and approximately twenty-eight miles of road and bridge right-of-ways within the Cities of Portland, Troutdale, Wood Village, and Fairview. The terms "Portland Area" and "Gresham Area" are used in this plan to describe the NPDES permit area, as to provide continuity from the previous two-permit status.

Within the Portland Area, Multnomah County is only responsible for the Willamette River bridges and a few small unincorporated pocket areas within the Portland Urban Services boundary (Figure 1). Within the Gresham Area, Multnomah County is responsible for approximately twenty-eight miles of arterial roadways in the Cities of Fairview, Troutdale, and Wood Village, and the unincorporated residential area known as "Interlachen" that is located between Fairview Lake and Blue Lake (Figure 2). More specific details regarding the County's jurisdiction are provided below.

Portland Area Responsibility

Formerly MS4 Permit No. 101314

(Co-permittees: City of Portland, Port of Portland and Multnomah County)

Multnomah County's activities and associated BMP implementation within the Portland Area has significantly diminished over the years. In 1984, the County transferred road and drainage facility maintenance to the City for roads in the unincorporated pocket areas within the Portland Urban Services Boundary through an Intergovernmental Agreement known as the Westside Pocket Area Maintenance Agreement (WPAMA). Of note is the requirement that road and drainage facility maintenance provided by the City is to be provided in a manner consistent with applicable operations and maintenance best management practices as set forth in the City of Portland's Stormwater Management Plan under their MS4 NPDES Permit. (WPAMA, Art. 3, Sec. I, (A)). Clean Water Services also provides maintenance services such as catch basin cleaning, street sweeping, large culvert cleaning, and in the Tualatin River basin area (Fanno Creek).

As a result of the Metro Urban Growth Management Functional Plan, the City of Portland and Multnomah County entered into an Urban Planning Area Agreement (UPAA) dated March 5, 1998. The UPAA provided for the coordination and orderly conversion of unincorporated urbanizable land in the County to urban uses, and authorized the City to prepare applicable comprehensive plan and implementing ordinances for the County's urban areas. The County adopted the City's applicable land use regulations, comprehensive plan and zoning through County Ordinance 967, which went into effect January 1, 2002. Under the UPAA, the County agreed to transfer to the City responsibility for implementing and administering comprehensive

plan and zoning regulations for all County unincorporated areas within the City's Urban Services Boundary.

An important aspect of the UPAA is the expressed responsibility of the City to address, through their comprehensive plan and zoning regulations, erosion control, floodplain review, grading, and stormwater disposal (UPAA III(C)(2)(a)). Further, land use planning review shall be provided by the City in a manner consistent with applicable best management practices as set forth in the City of Portland NPDES MS4 Permit. The level of review shall be provided at the same level provided by the City to other areas within the City limits. (UPAA III(C)(2)(o)).

The County's remaining primary stormwater management activity in the Portland Area is associated with five of the Willamette River bridges. Secondarily, the County retains jurisdiction to review development connection or impacts to the right-of-way on the roads that the City maintains and operates. The County owns and manages four facilities in the Portland Area.

Gresham Area Responsibility

Formerly MS4 Permit No. 108013

(Co-permittees: City of Gresham, City of Fairview and Multnomah County)

Multnomah County's activities and associated BMP implementation within the Gresham Area has also significantly diminished over the years. In 1995, the County transferred many of its roads to the City of Gresham, including a majority of the drainage system and outfalls. Effective January 1, 2006, the remaining County roads within the City of Gresham were transferred to the City pursuant to Senate Bill 1096.

The County continues to own, operate and maintain approximately 11 miles of arterial roads within the City of Fairview, 13 miles of roadway within Troutdale, and 4 miles of roadway in Wood Village. Portions of these roadways are served by underground injection control devices or "drywells" to manage stormwater, or other means of infiltration into the right-of-way, and therefore are excluded from the NPDES MS4 area. Approximately 16 miles of roadway discharge to the MS4.

The County remains responsible for zoning and planning in the unincorporated residential area known as "Interlachen." The County also owns and manages five facilities in the Gresham Area.

No permit area expansions are anticipated to occur during the following permit term.

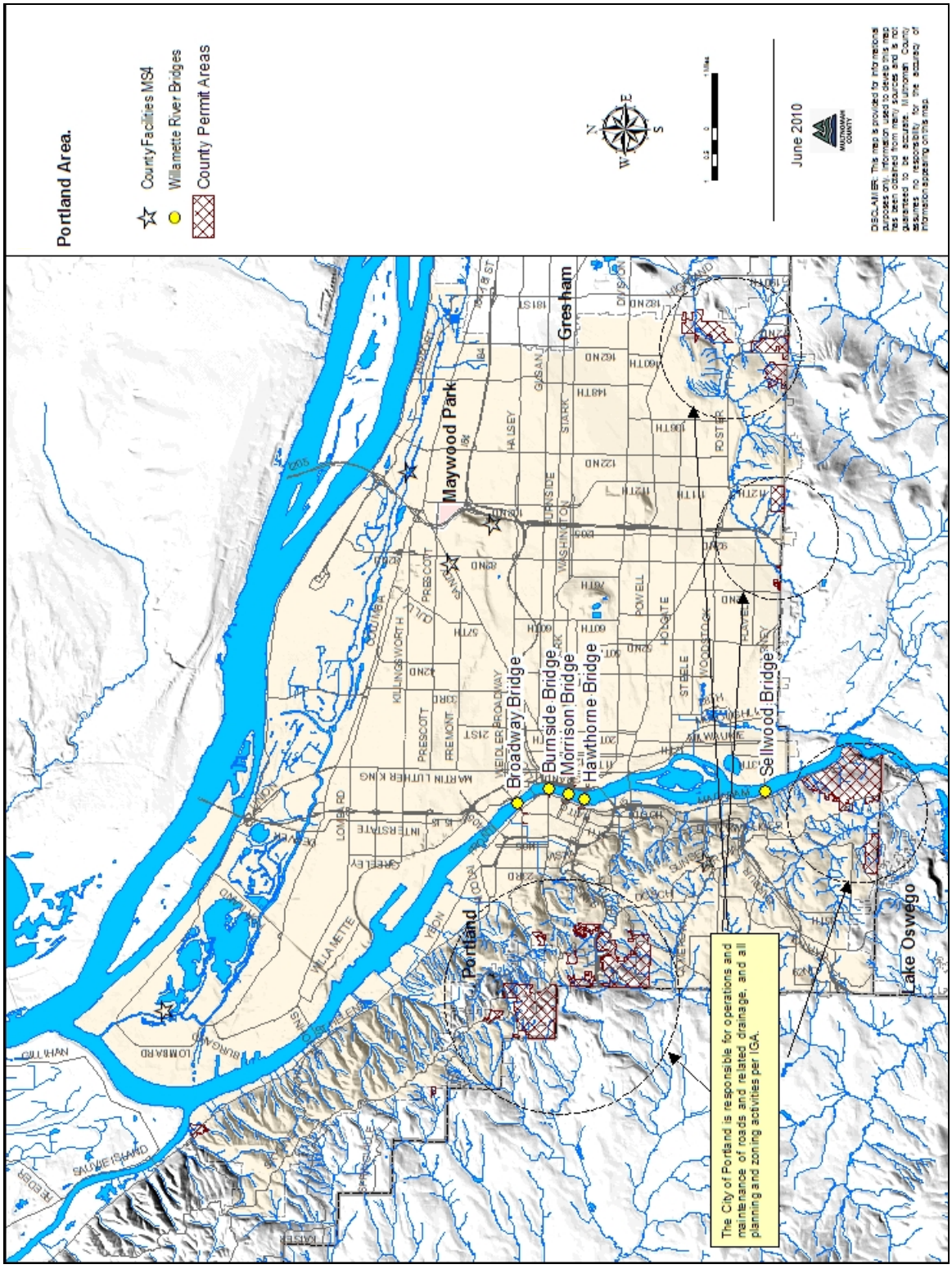

Figure 1. Portland area of Multnomah County NPDES permit area.

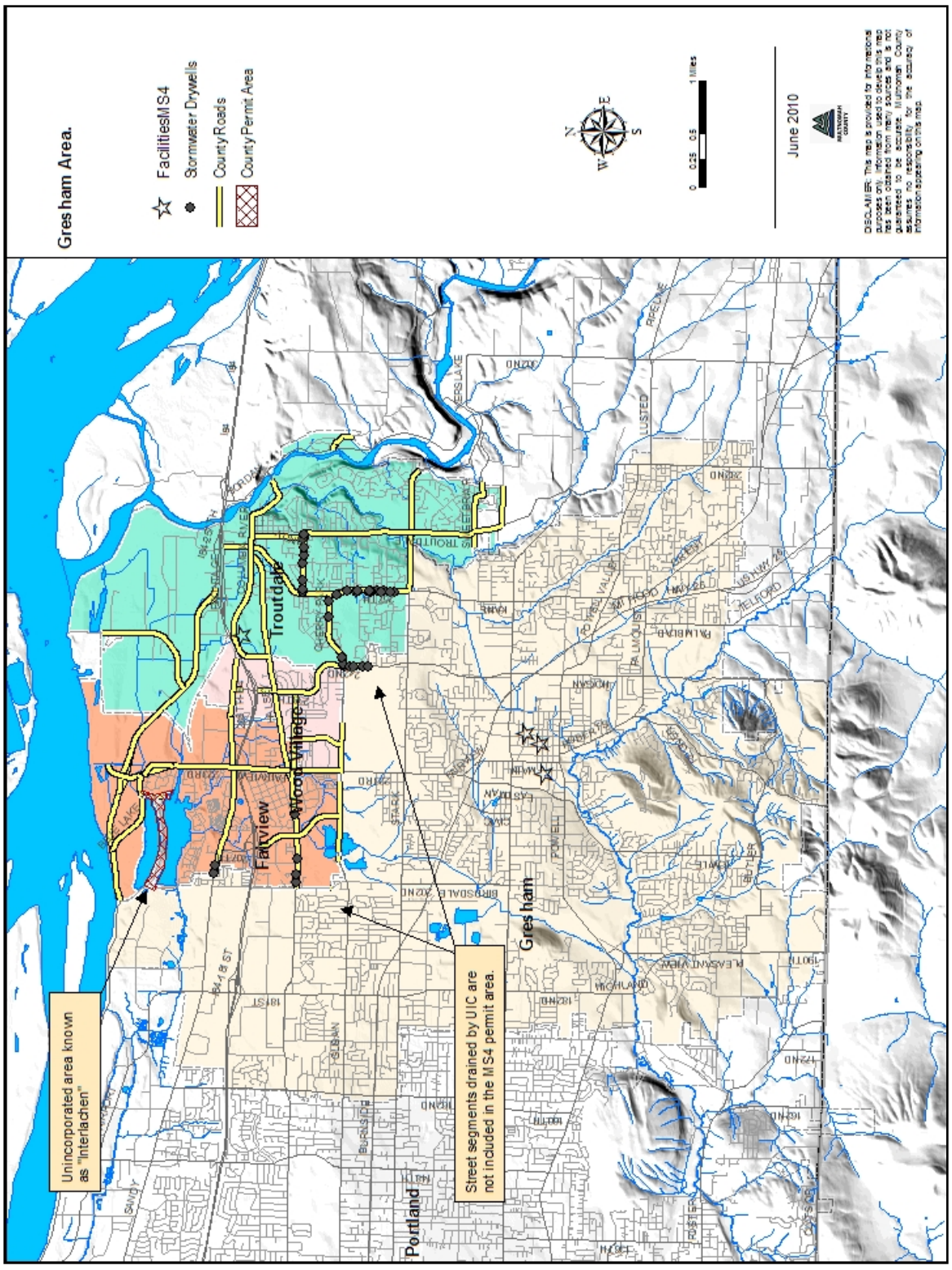

Figure 2. Gresham area of the Multnomah County NPDES permit area.

2. TMDL Benchmarks and Pollutant Load Estimate Update

The County discussed pollutant status of the various pocket permit areas in the County's NPDES jurisdiction in the 2014 TMDL and 303(d) List Pollutant Reduction Analyses report. The mix of jurisdictional pockets and roadways within other cities does not lend to a straightforward or practicable application of the pollutant load model developed by the Association of Clean Water Agencies in 2008 to estimate pollutant loads from various land uses. This model is intended for use on broad areas of a city, not for discrete elements within a land use, such as a singular segment of roadway.

The Fairview Creek and Beaver Creek are two TMDL watersheds where the County manages significant roadway segments within the urban fabric. Beaver Creek roadways consist of three segments, two of which may contribute to hydromodification impacts[1]. These roadways make up 35 acres (0.05 mi^2) of right of way within 4,300 acres (6.7 mi^2) of the City of Troutdale. Beaver Creek watershed has a total area of 8,640 acres (13.5 mi^2). TMDL pollutant load modeling for bacteria from these road segments in Beaver Creek watershed was not conducted due to the limitations above. It is significant to note that the in stream bacteria data nearly meets water quality standards and is strongly influenced by the agricultural areas of the watershed.

Fairview Creek drains approximately 7,000 ac (11 mi^2) of which approximately half (4,523 ac) is within the City of Fairview. County roadway segments discharge 109 acres of right of way to Fairview Creek, and 49 acres from the Interlachen residential neighborhood. The City of Fairview modeled pollutant loads using the Association of Clean Water Agencies model in their 2014 Annual Report and provides TMDL benchmarks as part of their 2015 Permit Renewal Submission. The benchmarks do not include future County projects.

Multnomah County installs stormwater treatment in conjunction with capital projects. As the County does not have dedicated stormwater utility funding, proactively installing stormwater treatment is not practicable within our road budget. Thus, an opportunitistic approach is the County strategy in this regard. Current projects and pending projects are identified in the County's Capital Improvement Plan and Program (CIPP) for 2014-2018[2]. Not all projects in the CIPP are funded at this time. Future projects will be identified in the 2019-2023 CIPP.

Pending projects in Fairview and Beaver Creek watershed for the 2014-2018 CIPP include:

- Sandy Blvd (Gresham city limits to 230th) improvements (project #715)
- Glisan St (202nd – Fairview Parkway) improvements (project #110)
- SE 223rd Ave (Halsey St – Sandy Blvd) improvements (project #135)
- Stark St (257th Ave – Troutdale Rd) improvements (project #57)
- Troutdale Rd (Stark St– Cherry Park Ave) improvements (projects #150 and 165)

[1] Multnomah County. 2014 Multnomah County NPDES MS4 Phase I Permit - Hydromodification Assessment.
[2] multco.us/transportation-planning/webform/transportation-capital-improvement-plan-and-program

3. Proposed Program Modifications

The County's program evaluation involves an adaptive management approach in two phases. The adaptive management approach, submitted to DEQ in November 2011, describes the annual and 5 year review process:

1) Annual adaptive management process applies to individual BMPs:
   - *Was the measurable goal attained?*
   - *Can we refine the BMP to gain efficiency or effectiveness?*
   - *Do we have resources to improve a particular BMP?*

2) 5-year (or permit cycle) adaptive management process asks:
   - *Do we have new technology or information to improve the suite of BMPs?*
   - *Have we set appropriate measurable goals for existing BMPs?*
   - *Do we have resources to change BMPs or create new capacity?*

In addition, the Hydro-modification Assessment, TMDL Pollutant Load Reduction Evaluation, and environmental literature and data could be used to evaluate the effectiveness of the Stormwater Management Plan.

Summary of Annual BMP Reviews

The County's Stormwater Management Plan is made up of thirty-two BMPs grouped into seven categories:

- Public Involvement and Education (PI)
- Operations and Maintenance (OM)
- Illicit Discharges Control (ILL)
- New Development Standards (ND)
- Structural Controls (STR)
- Natural Systems (NS)
- Program Management (PM)

These activities can be summarized generally as ongoing tasks and periodic tasks, with each type of task having a different type of measurable goal. For ongoing tasks, such as attending public meetings, the goals are simply tracking measures. For periodic tasks, such as annual stormwater facility inspection, the measurable goal is to complete the task within a specific timeframe.

Measureable goals were achieved for all BMPs since 2010, except for a single instance in 2014 (lagging inspection of a construction permit by a city jurisdiction which was subsequently corrected). Given the small NPDES permit area with land use authority limited to a single 200 home neighborhood, and roadways limited to 28 miles within other city jurisdictions, many of the BMPs have no activity during the permit year. This lack of activity, however, does not suggest BMP modification.

The focus of the County's NDPES program is on roadway stormwater maintenance, and program refinement was focused in this area. In 2011, the County developed a novel catch basin and sweeping effectiveness program, where measures of catch basin fullness are used to inform cleaning frequency. We successfully developed tools and methods to collect and analyze data and the results have improved the efficiency and effectiveness of cleaning.

5-Year BMP Review

EPA regulations require that initial MS4 permits (i.e. first permit term) set the foundation of the permittee's SWMP. For Phase II MS4 the focus is on the six minimum control measures in 40 C.F.R. 122.34(b), while the Phase I MS4 permittees are informed by the regulations at 40 C.F.R. 122.26(d). New BMP and program guidance is found on the EPA's NPDES website.

The current SWMP is consistent with the program requirements of 40 C.F.R.122.26(d), as were all previous versions of the SWMP. The County has also conducted Maximum Extent Practicable (MEP) evaluations in previous iterations of the SWMP. New review of the EPA BMP guidance for program areas revealed no new BMP areas, and the County's BMPs align with EPA's BMP organization for the NPDES Phase II six minimum measures.

The County's NPDES jurisdiction remains small, and without the ability to seek dedicated stormwater utility funding, no new source of funding is anticipated. We have incorporated new technology, including GIS mapping, and operations management systems (e.g., Cartegraph) are currently employed to facilitate timely work and asset and data management. No other technology is currently being sought at this time. Given program focus and objectives are met, and that budget increases are limited, it is anticipated during the next permit cycle that the program will maintain the successful program that has been developed over several previous permit cycles.

Use of Monitoring Data, Pollutant Load Estimates, and Hydromodification Assessment

The ultimate goal of the County's stormwater management program is to reduce pollutant discharges to the maximum extent practical and protect water quality. Quantifying pollutant reduction is extremely difficult with existing resources, and despite the tools available to analyze pollutant and watershed data, we can only make broad associations with this information and our stormwater BMPs. Monitoring data and pollutant modeling are useful primarily to establish baseline information, as hydromodification captures long term impacts. These data are informative at the program level, at the broad watershed scale, but new ways to understand local and short term changes are needed.

Monitoring data from streams in the NPDES permit reflects the integration of many different sources of pollutants from agricultural areas and urban land uses. These urban sources are also from multiple jurisdictions, including Fairview, Wood Village, and Gresham. Pollutant concentrations largely meet water quality standards, except for E.coli bacteria, which are periodically exceeded in Fairveiw and Beaver Creek. The City of Gresham's pollutant trend analysis shows improving water quality trends, which is evidence that generally a combination of urban and rural programs are working.

The County does not collect stormwater data from outfalls. We agree with DEQ's position that stormwater has been well characterized in previous efforts at the local and regional levels, and that further data collection does not add significantly to the characterization. Pollutant data is useful in establishing quantitative pollutant load model inputs, as has been used by Oregon NPDES Phase I communities for many years. While this type of modeling is useful at the watershed scale, this tool is not suited for roadway segments within the County's permit jurisdiction because the assumptions used to create the model are too coarse. A more straight forward way to understand pollutants in stormwater is simply to identify areas of roadway with and without stormwater treatment, because the numbers of roadway segments are so few.

The County's unusual NPDES permit area limits the utility of the hydromodification assessment to inform the stormwater program in a similar way as with water quality data. Multiple sources of stormwater within a watershed confound the ability to separate the County's pollutant input from other local sources.

Proposed Modifications to BMPs

New permit requirements are typically introduced during permit review and negotiations with DEQ to move the program in new directions. These new requirements may be associated with existing SWMP BMPs or may require new analyses to be added in the permit. Because we have not yet entered into formal permit review and negotiations with DEQ, and do not expect these discussions to occur before 2017 (personal communications, 2015), no changes are proposed to the SWMP at this time. Changes to the stormwater program and the SWMP will occur during

and after permit negotiations, and a final draft will be posted for public comment before the SWMP is finalized.

4. Fiscal Evaluation

Program activity within the County's NPDES permit area is divided between areas that were previously managed under the Portland area and Gresham area NDPES permits. The Water Quality program, consisting of one staff, manages the County stormwater program, and portions of two Asset Management staff provide mapping and database services across the entire permit area. Services specific to the two areas are described below.

Gresham area stormwater related services:

- Road Maintenance expenditures and anticipated budget allocations within Fairview and Interlachen incorporate items including drainage maintenance, right-of-way, surface management, vegetation management, general administration, emergency road hazard response and training.
- Road Engineering expenditures and anticipated budget allocations within Fairview and Interlachen incorporate drainage studies and reviews, environmental compliance review, as-built plan drafting and inventory, GIS database entry, and training.
- Land Use and Transportation Planning expenditures and anticipated budget for design review of capital improvements and right-of-way impacts to the County roads in Fairview, Troutdale, and Wood Village, and for design review and permits for development within the Interlachen Area.

Portland area stormwater related services:

- Bridge Maintenance expenditures and anticipated budget allocations within the Portland Permit area incorporate items including, drainage maintenance, right-of-way, surface management, vegetation management, general administration, emergency road hazard response and training.
- Bridge Engineering expenditures and anticipated budget allocations within the Portland Permit area incorporate drainage studies and reviews, environmental compliance review, as-built plan drafting and inventory, GIS database entry, and training.
- Multnomah County Road Maintenance, contracts the City of Portland and Clean Water Services to maintain and operate County owned roads to their respective standards in the urban unincorporated pocket areas through Intergovernmental Agreements.
- Road Engineering continues to retain authority to review access and impacts to the right-of-way, including stormwater discharge when such discharges cannot be retained on site.

- Transportation planning within the Portland Permit area includes development review in the unincorporated pockets where such development has the potential to access or impact the county right-of-way.

Funding for stormwater program expenditures are derived from two sources. The Land Use Planning Divison receives funding from the General Fund. The Transportation Division (Road and Bridge Services and Transportation Planning) receives funding from the State Highway Trust Fund, which includes the State gasoline tax, weight/mile tax on trucks, and vehicle registration fees. Highway Trust Funds are constitutionally dedicated to road related issues. The County has no revenue from dedicated stormwater fees. This is a result of the County roads and unincorporated pockets being nested within other city jurisdiction's service areas.

Table 1. Actual spending on stormwater related activities 2011 – 2015.

Program Area	*FY 2011 actual*	*FY 2012 actual*	*FY 2013 actual*	*FY 2014 actual*	*FY 2015 actual*	*FY 2016 budget*
Water Quality Program[1]	$133,829	$142,000	$205,600	$219,830	$225,450	$169,742
Asset Management[2]	$14,733	$15,300	$13,300	$7,200	$7,200	$7,560
Gresham area						
Road Maintenance[3]	$226,269	$245,900	$179,900	$554,116[6]	$375,527	$375,000
Road Engineering[3]	$150,782	$143,000	$162,700	$210,655	$265,987	$297,987
Land Use & Transportation Planning	$138	$590	$4,400	$4,220	$1,800	$2,000
Portland Area						
Bridge Maintenance/Operations	$18,337	$13,600	$26,200	$14,943	$15,321	$16,249
Bridge Engineering[4]	$15,062,120	$73,397,000	$68,615,900	$94,033,759	$66,915,073	$72,261,574
Road Maintenance IGA	$44,378	$20,900	$88,500	$88,500	$42,582	$100,000
Road Engineering[5]	$10,061	$10,700	$10,000	$10,845	$11,025	$7,875
Transportation Planning	$1,229	$2,030	$0	$1,580	$100	$2,000

[1]*Figure includes entire Water Quality program which includes one staff, monitoring budget for UIC, TMDL and NPDES programs, and additional watershed programs. Differences between years are largely due to the hire of limited duration staff.*

[2]*Estimate is based on a portion of time from two Asset Management staff.*

[3]*Budget estimate is based on actual spending from the previous year for time spent on water quality work, plus a budget for training.*

[4] *The amount shown represents the entire Bridge Engineering program. The entire program is included because Bridge Services do not budget or collect charges for water quality tasks. Water quality best practices are integral in all aspects of design and construction and hence we are not able to be segregated from the other work. Increase in budget reflects Sellwood Bridge funding.*

[5]*Estimate of the amount of time spent on water quality issues in Portland area right-of-way.*

[6]*This value reflects changes in budget coding where zone designations within a work district were eliminated, thus the value includes work outside the NPDES area.*

5. Maximum Extent Practicable Evaluation

As described above, Multnomah County's stormwater program continues to meet the MEP standard from its original 1995 permit and continuously evaluates and improves its program. The County uses an adaptive management framework to evaluate management practices and measurable goal attainment. The County also considers three MEP evaluation factors listed in the current permit: effectiveness, local applicability, and program resources. As required by the permit, Phase I jurisdictions coordinated an approach to define and standardize objective criteria related to these MEP factors. These criteria are provided below:

Program Effectiveness

- The County program includes a range of BMPs that encompass pollution prevention, source control, and treatment approaches.
- The County program consists of BMPs that are technically feasible, effective, and implementable.
- The County program includes BMPs that help achieve TMDL pollutant load reductions, and make progress towards TMDL wasteload allocations.

Local Applicability

- The County program is consistent with local ordinance and current legal authority.
- Stormwater design standards implemented as part of the program reflect local conditions specific to soils, rainfall, infiltration rates, and stream conditions.

Program Resources

- The County program considers implementation costs and practicality within the overall context of the County's priorities and resources.
- The program is reflected in the current budget allocations.

6. Proposed Monitoring Program Plan

Since 2011, the County has maintained an IGA with the City of Gresham for NPDES monitoring. Data is collected from local watersheds where the County and Gresham share jurisdiction. For details on the proposed monitoring plan, refer to the City of Gresham NPDES Permit Renewal Application Package.

The proposed monitoring matrix and monitoring proposal describes how current monitoring objectives are met, and what monitoring actions are needed to supplement existing data and literature. During permit negotiations, it is likely that new monitoring objectives may arise, and existing objectives may be deleted. Based on these pending discussions, the County will update the monitoring matrix and monitoring proposal to meet the requirements of the new permit.

Table 2. Monitoring matrix

Monitoring Objective	*Instream water quality monitoring*	*Instream biological monitoring*	*Storm water monitoring*	*Literature Review*	*Data Evaluation*
1. Evaluate the source(s) of the 2004/2006 303(d) listed pollutants applicable to the permit area				Clackamas County pesticide study	
2. Evaluate the effectiveness of BMPs to assist in the determination of BMP implementation priorities				Regional BMP literature	
3. Characterize MS4 runoff discharges based on land use type, seasonality, geography, or watershed characteristic				ACWA stormwater characterizati on analysis	
4. Evaluate long-term trends in receiving waters associated with MS4 stormwater discharges	Beaver Creek conventional, nutrients, bacteria, and metals (quarterly) - Monitoring is coordinated with Gresham through an IGA.	Beaver Creek macroinvertebr ates (annual) - Monitoring is coordinated with Gresham through an IGA.			Long term trend analysis
5. Assess the chemical, biological, and physical effects of MS4 discharges on receiving waters					Instream data comparison with water quality standards
6. Assess progress towards meeting TMDL pollutant load reduction benchmarks				Instream data summary	PLOAD model using ACWA or other regional stormwater data

Table 3. Multnomah County monitoring proposal.

Monitoring Type	*Coordination*	*Location*	*Frequency*	*Pollutant Category (Parameter)*
Instream monitoring	yes	2 sites	4/year	Field (Temperature, Dissolved Oxygen, Conductivity, pH, Turbidity Conventional (BOD, TSS, Hardness, Chlorophyll a) Nutrients (Nitrate-N, Ammonia-N, Total P, Ortho-P) Metals (Total and Dissolved Cu, Pb, Zn; total Hg) Bacteria (E.coli)
Macroinvertebrate monitoring	yes	2 sites	1/year	Macroinvertebrate

7. Stormwater System and Facilities Mapping

The County maintains stormwater system and facilities maps in GIS format. The GIS map data is visualized on desktop and mobile devices using a web map platform. This map is made in collaboration with the Cities of Gresham, Fairview, Wood Village and Troutdale. The following web map link contains data required in the Permit Renewal Application Package. A screen shot of the web map is included in Figure 3.

To view the NPDES Renewal maps, please go the following website:

http://tiny.cc/emcstormwater

Layers referenced in the NPDES renewal can be found in the following groups in the map's layer list:

Stormwater Systems:

- Stormwater points. Features such as:
  - **Catch Basins**
  - **Outfalls**
  - **Structural Controls**

Reference Layers:

- Boundaries.
  - **MS4 Boundary**
  - **Urban Growth Boundary**
  - **City Boundaries**
- Streams and Watersheds.
  - **Streams**
  - **Watershed Boundaries** (HUC 6)
- NPDES Renewal 2015.
  - **Gresham 1200z Permits**
  - **Gresham Owned Land**
  - **Gresham Designated Sump Areas**
  - **Mult. Co. Storm treatment facilities**
  - **Mult. Co. Owned Land**
- County-Wide
  - **Population Change 2010-2040** (TAZ)
  - **Population Density** (TAZ)
  - **Land Use** (City of Gresham and RLIS sources)
  - **Municipal Waste Facilities**

To navigate the map features, see the key below:

To see available layers and sub-layers, and to turn them on or off.
The Layer List panel displays the list of layers to choose from. The triangles on the left side of the layer list show either a legend swatch or sub-layers. The triangles on the right side of the panel include options such as open the attribute table, adjust the transparency of the layer, and zoom to the extent of the layer.

To view the Legend.
Displays the legend.

To switch between the basemap and aerial imagery.
Switch between the basemap and air photos, or choose a different basemap.

To measure.
Measure distance or area. Choose between US or metric units.

To create a map to print or a graphic to export.
Create a map including a title and legend, or export only the map. Can choose a variety of formats, including PDF and JPG.

Info. The Layer List panel displays the list of layers to choose from.

Figure 3. Multnomah County NPDES Service Area Map