ATTACHMENT B

CITY OF SEATTLE
2012 NPDES PHASE I MUNICIPAL STORMWATER PERMIT
Program Evaluation and Other Activities Narrative

Prepared by
Seattle Public Utilities

March, 2013

This Page Intentionally Blank

Table of Contents

B.1 Changes in Authorization (G19.C)(S9.E.9)

There have been no changes to the duly authorized representative pursuant to G19.C at the City during 2012. In January of 2010 Michael McGinn became the 52nd Mayor of Seattle. Mayor McGinn reauthorized the Deputy Director (or Acting Deputy Directory) of the Utility Systems Management Branch (USM), Seattle Public Utilities (SPU), to sign on his behalf any documents required by the permit and any other official correspondence related to the NPDES program that would otherwise bear the Mayor's signature, to the full extent allowed by permit or law.

B.2 Actions Taken Pursuant to S4F (S9.E.3)

The City, through Seattle Public Utilities (SPU), provided notifications to the Department of Ecology under S4.F of potential water quality problems that may be related to discharges from the City of Seattle's (City) municipal separate storm sewer system (MS4). The City continues to apply and implement its programs for stormwater management and to seek improvement to those programs through increased understanding of stormwater impacts and mitigation tools. A summary of the 2012 notifications and the Washington Department of Ecology (Ecology) required actions under S4.F.2 is below. In addition, this section contains S4.F.2 notifications from prior years (2007-2011) where a report on additional actions is required by Ecology.

B.2.1 Notification for Lower Duwamish River

This S4.F notification was submitted in 2007 to notify Ecology of potential water quality problems that may be related to discharges from the City's MS4 for the Lower Duwamish River. Ecology determined that a report under S4.F.2.a was not necessary, with that determination conditioned on certain City actions. Ecology required the City, beginning with its Phase I Permit Annual Report for 2008, to include a summary of its stormwater management efforts in basins that discharge to the Lower Duwamish River. The City must notify Ecology if Seattle's involvement in Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and associated Source Control Strategy processes change or new information becomes available regarding phthalate recontamination in the Lower Duwamish Waterway.

The Lower Duwamish River extends from approximately the north end of Harbor Island in the City of Seattle to the upper turning basin in the City of Tukwila. This area is subject to and is undergoing, contaminated sediment studies and cleanup actions governed by CERCLA and State Model Toxics Control Act (MTCA) cleanup laws. This area includes the East and West Waterway operable units of the Harbor Island Superfund site and the Lower Duwamish Waterway (LDW) Superfund site. The City of Seattle and others are conducting source tracing and source control activities on adjacent upland public and private properties. As explained in the 2007 S4.F notification letter, Source Control activities are organized and prioritized across drainage areas to minimize the possibility for recontamination of the waterway.

Regarding City stormwater management efforts in basins that discharge to the Lower Duwamish River, the City implements several source tracing programs with specific emphasis to the Lower Duwamish Waterway. These programs include:

- Business Inspections: In support of the clean-up effort, multi-media inspections are conducted, which cover stormwater pollution prevention, hazardous waste management and industrial waste management. In 2012, 467 initial inspections were conducted with the Lower Duwamish Waterway (LDW) and East Waterway Basins (EWW). Each business is inspected for compliance with the City's Stormwater Code and required to be brought into compliance with all relevant best management practices (BMP) for source control. The inspections resulted in 190 Corrective Action Letters and none (0) of these sites were referred to Ecology for potential NPDES Industrial Stormwater permit coverage. Nine facilities were issued NOV's for non-compliance with the City's Stormwater Code and one facility entered into a Voluntary Compliance Agreement.

- Stormwater Facility Inspections: While inspecting a business for source control BMPs, the flow control and/or treatment facility is also inspected. Within the LDW and EWW basins, 52 sites were inspected for Code compliance with regard to flow control and treatment system code requirements during 2012.

- Illicit Discharge Detection and Elimination (IDDE): SPU conducts sediment sampling of onsite catch basins, right of way catch basins and drainage system mainlines to identify sources of contamination and potential illicit discharges and illicit connections. Sampling is conducted in tandem with business inspections to identify and terminate sources of pollution. In 2012, SPU took 108 samples to assist in identifying and source tracing sources of pollution. Samples are analyzed for the LDW contaminants of concern, including TOC, SVOC's, TPH-Dx, select Metals, PCB's, Grain Size and occasionally site specific parameters, such as pH, additional metals, VOC's.

- Water Quality Complaints: Inspectors respond to complaints as they are received through the water quality hotline, web form or from agency referrals. In 2012, 47 water quality complaints were reported in the LDW and EWW basins. When a complaint is reported at a business, a full business inspection is completed.

- Spill Response: Spills are dispatched through the SPU Operations Response Center to on-call Spill Coordinators as they are received. In 2012, SPU responded to 41 spills within the LDW and EWW basins.

- Education and Outreach: SPU funds the Resource Venture, a conservation service for Seattle businesses. Resource Venture implements the City's Spill Kit Incentive Program, which provides free spill kits, assistance in developing spill plan and site specific technical assistance to Seattle businesses. Approximately 139 businesses in the LDW and EWW basins received spill kits, either stemming from a business inspection or through targeted outreach. Surveys conducted of spill kit recipients

statistically show that businesses who participate in this program show an improved understanding of stormwater pollution prevention.

B.2.2 Duwamish East Waterway Electroplating Wastewater Tank Spill

A 55,000 gallon wooden tank holding electroplating wastewater at a private business failed in March 2008. Following a call by SPU, Ecology personnel arrived on site. SPU issued a Notice of Violation for the spill and conducted a business inspection that resulted in a corrective action letter. Because the private business drained to the City's MS4, the City submitted an S4.F notification to Ecology in April 2008.

Ecology determined that Seattle's response to the incident occurred as required in Special Condition S5.C.8.b.viii and that a report under S4.F.2.a was not necessary because the incident was a spill, which is typically a one-time event, and Seattle has taken steps regarding the second wooden tank of the property to ensure that another such spill was unlikely to occur. Ecology stated that the City should prioritize this facility and others like it, for annual source control inspections under S5.C.7.

The City has developed its initial list of businesses to be inspected under S5.C.7, prioritized facilities that have high pollution generating activities and conducted business inspections in 2012.

B.2.3 Coho Pre-Spawn Mortality

The City provided S4.F notification in regard to the coho salmon (*Oncorhynchus kisutch*) pre-spawn mortality phenomenon in creeks to which the City's MS4 drains, including the possible influence of the MS4 upon water quality problems in receiving waters. Notification was provided in May of 2008, following general notification in December 2007. The City has worked with NOAA Fisheries, by providing direct financial support and City staff resources, to collaboratively investigate the causes of coho pre-spawn mortality (PSM) for the period 2000-2009. Information about the possible causes of PSM is evolving. Experts cannot definitively say what is causing PSM in coho in urban streams in Seattle.

Ecology determined that a report under condition S4.F.2.a.was not necessary because the correlation between coho PSM and stormwater discharges is based upon urbanization and/or arterial roads, and a link to any single or combination of parameters that would be potentially present in stormwater has not yet been found. Ecology's determination that a S4.F.2.a report was not necessary is conditioned, based in part, on the following: the City will continue to be involved in investigating causes and/or collecting data associated with the coho PSM phenomenon; when the City becomes aware of the exact cause(s) of PSM, Ecology must be notified immediately; and should parameter-specific information about the cause(s) or contribution(s) to pre-spawn mortality become available, Ecology reserves the ability to require a response under S4.F.2.a. Beginning with the Phase I Permit Annual Report for 2008, Seattle must include a summary of the reporting year's studies or findings associated with the coho PSM phenomenon.

As to such summary, the NOAA NWFSC Ecotoxicology Group, partnering with USFWS, SPU, WSU, UW and others, has led an investigation to search for the causes of coho pre-spawn

mortality (PSM) since 2002. The daily surveys with SPU, which had been conducted in Longfellow Creek in Seattle from 2002 to 2009, were discontinued in 2010. Instead, efforts were focused on preparing publications summarizing the findings to date. Although a correlation exists between coho PSM and stormwater discharges and the level of urbanization, the researchers involved in these studies are still unaware of the exact cause(s) of PSM, and have not found a link to any single, or combination, of parameter(s) that would be potentially present in stormwater. However, NOAA acting without SPU conducted daily surveys in Longfellow Creek during 2012. At the time of this report, NOAA has not shared the results of the surveys with SPU.

B.2.4 NPDES Phase I Monitoring Results

SPU was monitoring stormwater for compliance with S8.D of the permit in the MS4 outfall to Venema Creek, a sub-basin of Piper's Creek. During WY 2008 SPU sampling detected that fecal coliform analytical results were greater than the extraordinary primary contact recreation criteria Water Quality Standard.

To address these results, SPU is conducting the following stormwater management activities in the Pipers' Creek Watershed: business inspections, IDDE screening of the MS4 to determine if there are illicit connections, education and outreach to citizens in the Piper's creek watershed to inform them on proper pet waste practices, and in the future, construction of a Natural Drainage System project to provide flow control and water quality treatment for a significant portion of the Venema Creek drainage basin.

Ecology determined that an adaptive management response under condition S4.F.3 was not necessary because the potential water quality impacts will be eliminated through implementation of existing permit requirements. However, Ecology requested that the City include a description of the public education and outreach, illicit discharge detection and elimination screening, business source control inspections and a structural control retrofit project in our MS4 Annual Report for 2010, and beyond.

Description of Activities
The City continued to implement the Doo Diligence pet waste program in the Piper's Creek Watershed. The program has 12 pet waste bag dispensers located in Piper's Creek. Overall bag use in the City was126 000 in 2012. The Piper's Creek watershed was the first MS4 basin screened during 2010 as part of the IDDE dry weather screening program. The screening did not detect any illicit connections to the MS4. SPU is in the design phase for the Venema Natural Drainage System where stormwater from multiple blocks will be infiltrated by use of green stormwater management in an effort to reduce the effects of over 100 years of urbanization on the ecological health of Piper's Creek while providing citizens with local drainage, pedestrian, and other street right-of-way improvements using a naturalistic design.

B.2.5 Source Control Sediment Sampling Data Results, Seattle Iron & Metals

SPU has been engaged with Ecology in inspection and enforcement of City code and a state issued NPDES permit, respectively, regarding a private business, Seattle Iron & Metals Corp, 601 S. Myrtle St. Evidence indicates that the source control BMPs implemented by the

business have failed to contain and eliminate the discharge of pollutants from the work site of the business into the City's MS4. The City's MS4 discharges into the Duwamish Waterway, which is part of the Lower Duwamish Waterway (LDW) Superfund site. SPU has been engaged in storm drain solid sampling from private and public catch basins in the City's MS4 as part of the LDW source control program. Results from storm drain samples collected by SPU in 2008-2009 indicated elevated PCBs in the MS4 on S. Myrtle St. that could be associated with operations at Seattle Iron & Metals. SPU conducted a business inspection at Seattle Iron & Metals on January 30, 2009 and after sampling both the MS4 in the vicinity of the property and onsite catch basins, sent a corrective action letter on July 10, 2009, requiring the following improvements:

- Eliminate track out of sediment and dirt onto adjacent City streets.
- Cover all outside materials that have a potential to leach or spill to the Duwamish River, including scrap piles adjacent to the dock where gaps in the dock permit material and stormwater to discharge directly to the river.
- Remove scrap metal storage bins from the City right-of-way.
- Prepare a written spill response plan for the site and post at an appropriate location onsite.
- Improve onsite housekeeping by regularly 1) sweeping the lot, 2) checking catch basins for sediment accumulation and maintaining as needed, and 3) cleaning up leaks/spills when they occur and employing the spill plan when necessary.

Following the business inspection and source tracing sampling of the MS4, SPU jetted and cleaned all the MS4 and associated MS4 structures (inlets, catch basins and maintenance holes) to remove sediment from the City's MS4 that discharges to the LDW at S. Myrtle St.

Following the jetting and cleaning of the MS4, SPU conducted a joint inspection of Seattle Iron & Metals with EPA. During the inspection, SPU and EPA collected sediment samples from the roofs of the main office and maintenance buildings, as well as the catch basins in the Seattle Iron & Metals employee parking lot and from a City-owned catch basin in the right-of-way adjacent to Seattle Iron & Metals' property. The data collected by SPU indicated that contaminants in the City's MS4, that had accumulated after jetting and cleaning, continued to exceed source control screening levels and these contaminants might be associated with stormwater discharges from Seattle Iron & Metals. Because of this, SPU issued a Notice of Violation (NOV) to Seattle Iron & Metals on July 8th, 2010. Upon receipt of the NOV, Seattle Iron & Metals requested, and SPU agreed to a, Voluntary Compliance Agreement (VCA) on September 29th, 2010. The VCA requires Seattle Iron & Metals to implement the following source control measures:

A. Roof Drains:
   SIM agreed to survey roofs and drains for solid buildup and provide a report on this survey to SPU for review

   SIM agreed to clean roof and drains per the roof survey results. Wash water associated with this cleaning will be routed to the onsite treatment system.

   SIM agreed to design a roof drain treatment system and provide the design to SPU by November 15, 2010. SPU will review and provide comments or approve the design within two weeks of receiving the design.

After approval, SIM will install the roof drain treatment system consistent with the design plans by December 31, 2010, provided that permitting, engineering design and equipment manufacturing make installation of the stormwater filters feasible. If infeasible, SIM and SPU will negotiate a revised installation date.

B. Track Out:
SIM will continue to implement a sweeping regiment that includes: sweeping at least once per day at the end of shift, moving employee vehicles to the employee parking lot onsite, rather than in the street, and more frequent sweeping as needed.

C. Storm Drain Cleaning:
SIM agreed to clean the catch basins located on the south side of S. Myrtle Street from the end of Myrtle St. to 7th Ave. South by November 15, 2010.

Failure by SIM to comply with the Voluntary Compliance Agreement may result in further administrative, legal action or both by SPU.

Ecology responded to the S4.F Notification on September 20th, 2010 that improved source control efforts by Seattle Iron & Metals will address their contribution to pollutant discharges, but Ecology expressed concern that Seattle Iron & Metals efforts by themselves may not eliminate the problem because there may be contribution to MS4 from an unpaved right-of-way on S. Myrtle St. Because of the potential for contribution to the MS4 from the unpaved right-of-way, Ecology determined that an Adaptive Management Response under condition S4.F.3 was necessary.

SPU submitted the Adaptive Management Response Report (AMPP) to Ecology on November 22, 2010. The Adaptive Management Response report addressed the requirements detailed in S4.F.3.a and the required elements requested by Ecology in their September 20, 2010, response to the S4.F notification. Ecology acknowledged receipt of the Adaptive Management Response report on November 29, 2010, but as of December 31, 2010, Ecology had not approved the additional BMPs and implementation schedule or required SPU to modify the report as needed to meet AKART on a site specific basis.

Per the requirements of Special Condition S4.F.d, SPU provides the following summary of the status of the Adaptive Management Response report.

Status of implementation in 2012:

Assessment of Evaluation Efforts
The City will continue to use storm drain solid sampling from the MS4 on S. Myrtle St. to evaluate the effectiveness of the AMRR. During 2012, SPU monitored sediment accumulation in catch basins in the vicinity of SIM. The table below details the results of this monitoring effort.

EQNUM	576148	576126	576140	576158	576162	576145	576165	943593
Location	S Myrtle St cul-de-sac, west	S Myrtle St cul-de-sac, north	north side S Myrtle St, west of SIM	south side S Myrtle St, west of SIM	south side S Myrtle St, east of SIM	S Myrtle St and Fox Ave S	south side S Myrtle St at 7th Ave S	north side S Myrtle St, east of SIM
Type	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL
January 5, 2012								
% Full	0%	1%	10%	11%	50%	13%	19%	27%
June 22, 2012								
% Full	1%	19%	11%	16%	57%	11%	41%	20%
October 11, 2012								
% Full	1%	9%	16%	27%	62%	14%	45%	27%

The Large Catch Basin (CBL) numbered 576162, located adjacent to the main entrance for truck traffic into SIM, is at the City of Seattle's maintenance standard (60% full). SPU will require SIM to clean this CBL. This CBL is the discharge point for the Filterra units that SIM is installing in the City's Right of Way, and it is hoped that the Filterra units will capture much of the sediment that is currently being discharged off the roadway into the City's MS4.

Seattle Iron and Metals (SIM) Voluntary Compliance Agreement (VCA)
SPU has entered into a VCA with SIM to resolve stormwater discharges and source control implementation issues. The following elements and deadlines have been implemented during 2012.

- Track Out – SIM continued to implement a pavement sweeping regiment as agreed to in the VCA.

On February 15, 2012, SPU and SIM agreed to a revised VCA, which included the requirement that SIM install a Filterra Biofiltration system in RCB 225. The Filterra unit was installed by SIM but not connected or functional by December 31, 2012.

B.2.6 Turbidity Discharge from MS4 Outfall into Elliott Bay at Shilshole Marina

On April 10, 2012, SPU submitted an S4.F notification to Ecology for a discharge of turbid water into Elliott Bay at Shilshole Marina. The turbid discharge was associated with runoff from BNSF railroad line. SPU issued BNSF a Notice of Violation that required installation of BMPs to prevent future discharges of turbid water.

Ecology responded that it determined that an adaptive management response under condition S4.F.3 is was not necessary because the Phase I Permit's Stormwater Management Program Requirements are designed to address spills into the MS4.

B.3 Assessment of Best Management Practice Appropriateness (S9.E.6 and S8.B.2)

This section provides an assessment of the appropriateness of the City's program design and/or specific BMPs identified for each component of the SWMP, including any changes made or anticipated to be made, and why.

B.3.1 Public Involvement and Participation (S5.C.4)

The permit requires the City to develop and implement a process to create opportunities for the public to participate in the development of the Stormwater Management Program (SWMP) Documentation. The City's BMP used for public involvement and participation is to create opportunities for the public to learn about, comment on and question the City's approach to the management of stormwater. Public participation is encouraged by providing multiple opportunities for public involvement. These include, but are not limited to, opportunities to comment on funding allocation for the NPDES related programs and projects, to give input and review codes describing the technical standards for control of stormwater discharges and enforcement of impacts to the MS4, and to review and comment on the ongoing development of stormwater management activities. Additional opportunities for the public to learn about the City's stormwater program are provided on the City's web site: (http://www.seattle.gov/util/Documents/Plans/StormwaterManagementPlan/index.htm) The web site contains the email address (swmp@seattle.gov) that the public can use to email questions and comments to the City about stormwater management.

The City has found that these methods of soliciting public comments are an appropriate BMP for public participation because they reach a wide audience. Additional information on public involvement and participation can be found in the City's SWMP, submitted as Attachment A of the City's 2009 Phase I Permit Annual Report Form.

B.3.2 Controlling Runoff from New Development, Redevelopment and Construction Sites (S5.C.5)

The 2007 NPDES Phase I Municipal Stormwater Permit required the City to implement the following elements of the program for controlling runoff from new development, redevelopment and construction sites: begin a local program that adopts by ordinance or other enforceable document equivalent to Appendix 1 of the permit; establish legal authority to inspect private stormwater facilities and enforce maintenance standards for all new and redevelopment, implement a process of permits, plan review, inspections and enforcement; make available copies of Ecology's documents: "*Notice of Intent for Construction Activities*" and "*Notice of Intent for Industrial Activities*"; and train staff to properly implement the program to control stormwater runoff from new development, redevelopment and construction sites.

The City continued to implement its existing program to control runoff from new development, re-development and construction sites in 2012 under the Revised Stormwater Code (SMC 22.800-22.808) and related Directors' Rules. This program, which was documented in Section III.5 in the City's SWMP dated March 2012, is led by the Department of Planning and Development (DPD). This program has conducted 1611 temporary sediment and erosion control (TESC) inspections and 109 enforcement actions during 2012.

The determination of equivalency by Ecology indicates that the revised Stormwater Code is appropriate for implementation of the minimum requirements in Appendix 1, and will

protect water quality, reduce the discharge of pollutants to the maximum extent practicable (MEP), and satisfy the state requirement under chapter 90.48 RCW to apply all known, available, and reasonable methods of prevention, control and treatment (AKART).

During 2012, DPD made copies of Ecology's documents: "*Notice of Intent for Construction Activities"* and "*Notice of Intent for Industrial Activities"* available to the public. These documents were made available to the public at the DPD Applicant Services Center (ASC), which is located on the 20th floor of Seattle Municipal Tower at 700 Fifth Avenue in downtown Seattle. Providing the documents at the ASC is appropriate because the majority of the people who seek permits from the City visit the ASC and have the opportunity to view and learn about the Ecology NOI requirements.

In 2010, SPU led five different types of Stormwater Code implementation training classes designed to educate City staff whose primary job duties are implementing the requirements of the revised Stormwater Code and Directors' Rules as they relate to redevelopment and construction sites, including permitting, and plan review construction site inspections. The training was provided to 319 employees from SPU, DPD, SDOT, Parks, FFD and SCL, with some employees attending multiple trainings. Below is a brief description of the training classes. This training was effective in providing information and education on the revised Stormwater Code and Directors' Rules in addition to providing an opportunity for staff from different departments to meet one another and discuss how their work relates to other departments' work and how they can coordinate on Stormwater Code implementation.

Modeling – This training class provided staff with a description of the minimum requirements for projects with a specific focus on each type of drainage basin; combined sewer, non-listed creek, listed creeks and wetlands. In addition, the class presented information on plan submittal requirements and design aids such as the technical information report, Hydro-stats (the modeling post-processor), the pre-sized tables and spreadsheets.

Green Stormwater Infrastructure for projects in the right-of-way – This training class provided staff with an overview of the requirements for implementation of green stormwater infrastructure (GSI) to the maximum extent feasible (MEF) as part of projects conducted in the City's right-of-way that trigger flow control or water quality treatment under the Stormwater Code. Examples of GSI to the MEF were provided along with a review of the GSI calculator and reviewer checklists.

Green Stormwater Infrastructure for parcel based projects - This training class provided staff with an overview of the requirements for implementation of green stormwater infrastructure (GSI) to the maximum extent feasible (MEF) for parcel based projects that trigger flow control or water quality treatment under the Stormwater Code. Examples of GSI to the MEF were provided along with a review of the GSI calculator and reviewer checklists.

Overview of Standard Plans – This training class provided staff with an overview of the new requirements for standard plans and what types of elements to look for when conducting plan review.

Stormwater Construction Control Training – This training class provided staff with an introduction to the new Construction Stormwater Control plans for large and small construction projects, with a focus on Stormwater Code changes. The training described what Stormwater Construction Control plans should contain, an introduction to the usual BMPs, and a discussion on what an inspector, designer, planner or reviewer needs to look for either during project development, when reviewing plans, or when conducting an on-site inspection.

All staff whose primary job duties are implementing the program to control stormwater runoff from new development, redevelopment, and construction sites, including permitting, plan review, construction site inspections, and enforcement, are trained to conduct these activities. In addition, all site inspectors have had Certified Erosion and Sediment Control Lead (CESCL) training. This level of training is appropriate because it is BMP 160 in the Stormwater Management Manual for Western Washington.

Information on how the City is implementing the minimum performance measures for controlling runoff from new development, redevelopment and construction sites can be found in the City's SWMP, submitted as Attachment A of the City's 2012 Phase I Permit Annual Report Form.

B.3.3 Structural Stormwater Controls (S5.C.6)

The 2007 NPDES Phase I Municipal Stormwater Permit required the City to implement the development of a structural stormwater control program (SSCP).

The City has implemented a SSCP, which is appropriate because it uses a comprehensive planning process to support the SSCP. The geographic scale of the program is the area served by the City's MS4 and the MS4-related receiving water bodies. The SSCP projects are prioritized using asset management principles. Asset management is the process by which projects are evaluated for their whole-life cycle cost benefit including social, economic, and environmental factors (known at SPU as the "triple bottom line"). Projects are prioritized by SPU staff based on an assessment of receiving water body conditions, anticipated benefits of the project, regulatory compliance needs, opportunity, and application of asset management principles that have been adopted by SPU under the guidance of the Asset Management Committee (AMC). Projects must pass through several AMC evaluation screens and funding allocation phases before they are formally approved by SPU management for implementation.

Information on how the City is implementing the 2012 minimum performance measures for the structural stormwater controls program can be found in the City's SWMP, submitted as Attachment A of the City's 2012 Phase I Permit Annual Report Form.

B.3.4 Source Control Program for Existing Development (S5.C.7)

The City continued to implement the following elements of the source control program for existing development as required by the 2007 NPDES Phase I Municipal Stormwater Permit for areas that discharge to Seattle's MS3s: adopt and enforce the Seattle Municipal Code and Directors' Rules; create an inventory or listing of the businesses using the categories in Appendix 8; establish a complaint-based response to identify other pollutant generating sources such as mobile or home-based businesses; implement an audit/inspection program for sites identified as pollution generating per the permit; implement a progressive enforcement policy and provide training to staff involved in the source control program.

The approval of the Seattle revised Stormwater Code and Directors' Rule Source Control BMPs by Ecology indicates that the revised Stormwater Code will protect water quality, reduce the discharge of pollutants to the maximum extent practicable (MEP), and satisfy the state requirement under chapter 90.48 RCW to apply all known, available, and reasonable methods of prevention, control and treatment (AKART).

The City has established, and updated in 2012, a list of businesses that have the potential for outdoor pollution generating sources. The list is based on a comparison of the most current list of businesses, which was compared to Appendix 8. This list resulted in identification of 2,700 businesses that have the potential to have outdoor pollution generating sources. Each of these businesses was provided with a flyer on the stormwater requirements for businesses during 2009. The flyer was provided to each business that received an audit inspection during 2012.

In 2008, SPU conducted a review of the business list against the business inspection database and determined that a number of businesses have common urban land uses that lack pollutant generating sources or activities. Consequently, these businesses have been removed from the list, leaving approximately 2,700 businesses eligible for inspection. The groups of businesses removed from the inspection list are summarized below along with rationale for removing them from the list.

- Personal Services – Standard Industry Code Industry Group 723 and 724, Beauty Shops (7231) and Barber Shops (7241). The City has screened and inspected this sector in previous years and determined that these industry groups do not conduct outdoor pollution generating activities and that stormwater source control requirements are not relevant to this sector. The facilities generally do not have loading docks - shipments are hand carried through the front door and there is no outdoor storage of either product or waste. These facilities do not have wastes that could impact stormwater. Any sites with private drainage systems (flow control or treatment) will be inspected through the Stormwater Facility Inspection Program.
- Transportation Services – Standard Industry Code Industry Group 4121, Taxicabs. Within the City of Seattle, individual taxicab drivers must obtain a business license in order to drive for a taxicab company. Due to this licensing process, the licensed business address is actually the private residence of the individual and these

locations are not pollution generating with regards to the targeted activity. Within this grouping, there are taxicab maintenance facilities, and these businesses will be kept on the list and inspected.

In 2007, SPU used a portion of the Local Government Stormwater Grant it received from Ecology to hire a consultant (R. W. Beck) to review the evaluation of business stormwater runoff pollution potential that was completed by SPU for their Source Control program. SPU used federal guidelines based on the Standard Industrial Code (SIC) to rank each business as having low, medium-low, medium, or high stormwater runoff pollution potential. Based on its ranking, each business was assigned one of four levels of action within SPU's Source Control program. The intent is to assign a higher or more thorough level of inspection for businesses that have higher stormwater runoff pollution potential.

R.W. Beck's review determined that SPU's ranking of business stormwater runoff pollution potential is appropriate for implementing the business inspection program. Following initial implementation of the program and follow-up evaluation of its effectiveness, SPU may modify these rankings based on the activities observed at sites and ability to implement appropriate BMPs.

The City continued to implement its business inspection program for compliance with S5.C.7 during 2012. In 2009 SPU began conducting stormwater pollution prevention *audits,* as part of the business inspection program, of businesses in selected neighborhoods as a way to educate businesses on the stormwater system, provide technical assistance on preventing stormwater pollution, and rank businesses according to their pollution-generating potential for future inspection cycles. During the audit, inspectors examine storm drains, facilities, and activities at the business; educate the staff member who guides the inspector on the site about the stormwater system and best management practices; supply printed information on reducing stormwater pollution; and provide a form detailing recommended changes tailored to the business based on the audit. The *audit* inspection is a new type of inspection, and because of this SPU had a desire to determine if it was an effective tool in educating businesses about the Stormwater Code and BMPs for stormwater pollution prevention.

In summer 2010, SPU worked with Cascadia Consulting Group to assess the effectiveness of the stormwater pollution prevention audits and gather feedback from businesses on how to improve the audits and increase businesses' compliance with stormwater rules. Cascadia and SPU developed and conducted a telephone survey of businesses that had received audits. The survey addressed whether the interviewees remembered the audit and implemented the changes recommended during the audit. Respondents were also asked to discuss the challenges they faced in making changes, describe what helped or would help them make changes, rate and suggest improvements for the audits, and rate potential motivators for compliance.

The 2010 survey found measurably increased awareness of stormwater issues and adoption of BMPs. The survey helped SPU determine that the audit program is an effective tool for educating low- and medium-risk businesses. In addition, audits provide SPU an

opportunity to assess the stormwater risk posed by business for prioritizing future inspections. With both an audit inspection program and a stormwater inspection program, SPU can more efficiently allocate resources to address both outreach and compliance.

In summer 2011, SPU worked with Cascadia Consulting Group (Cascadia) to evaluate the effectiveness of stormwater pollution prevention inspections using a telephone survey. To assess effectiveness, survey respondents were asked about a variety of the business's stormwater practices such as outdoor washing or water use, outdoor material storage, stormwater facilities, and spill response preparedness. The survey also included questions on the respondent's knowledge of Seattle's stormwater system, rating of the stormwater inspection, attitude toward stormwater pollution prevention, and demographics.

To the extent possible, the 2011 study was designed to determine whether business compliance decreased as time increased and whether there were differences in responses related to the estimated level of risk to stormwater posed by the business. After fielding the survey, SPU and Cascadia determined that businesses with stormwater permits issued by the Department of Ecology or King County are not comparable to businesses without a permit; as a result, responses from businesses with Ecology or King County permits were analyzed separately.

Based on the results of the 2011 study, stormwater pollution prevention compliance and knowledge appear to be fairly high among all subpopulations surveyed. Responses regarding most stormwater pollution prevention practices and attitudes among businesses without permits did not appear to show clear trends based on time elapsed since the last stormwater inspection or risk category. Time elapsed appeared to affect responses regarding stormwater facility inspections and rating of the inspector. Risk category at businesses without permits appeared to affect responses regarding stormwater facility inspections, spill kits and plans, and stormwater treatment. A complete evaluation of this program was included as Appendix A of the 2011 Program Evaluation and other Activities Narrative (Attachment B of the 2011 Annual Report).

SPU conducted 957business inspections in 2012, of which 250 required a corrective action letter and follow up visit to determine compliance with the Stormwater Code. Of the 250 that required corrective actions and follow up visits, 34 were issued Notices of Violation (NOV) and three entered into Voluntary Compliance Agreements (VCA) for failure to implement the BMPs detailed in the corrective action letter and during the follow up visit. The moderate number of follow up visits and low number of NOV incidents shows that the City's source control program for existing development is an appropriate BMP for meeting the permit requirements to reduce pollutants in runoff from areas that discharge to the MS4.

The City's complaint-based response program includes the water quality hotline, business inspections, and illicit discharge, detection and elimination programs. The City staffs a 24-hour water quality hotline to allow citizens and businesses to report illicit discharges into the MS4. Businesses, including mobile and home-based, and citizens who are found to be causing illicit discharges, receive education and are potentially subject to enforcement

actions if they refuse to voluntarily correct the problem. During 2008, the City conducted an evaluation of the water quality hotline to determine if it is an effective program for identifying other pollutant generating sources via a complaint-based program. The evaluation determined that the majority of callers reporting incidents to the water quality hotline were calling primarily because they witnessed dumping or a spill (54%), with the rest calling to report negative environmental impacts or drainage problems.

The City's complaint-based response program received over 239 reports in 2012, all of which were investigated and 25 of which resulted in business inspections. This program is an appropriate BMP as it provides a mechanism for the public to take an active role in stormwater pollution prevention, identifies businesses that require source control information or inspection and help the City increase awareness of activities that have negative impacts on stormwater.

All staff involved in the Source Control program receive the following basic training; EPA Basic Inspector Training: Overview of all aspects of inspection preparation, conduct, and follow-up and various federal environmental laws and regulations, 40 Hour Hazardous Waste Operations and Emergency Response, 24 Hour Hazmat Emergency Spill Response, Blood-borne Pathogens, Confined Space Entry, First Aid and Traffic Control and Flagging Certification. These trainings are appropriate because the trainings are considered the industry standards and taught by instructors that are certified by the respective sponsoring organization In addition, all IDDE staff will receive the following program-specific training: IDDE Standard Operating Procedures – field and laboratory training, Field Hazards and Illicit Drug Lab Identification.

B.3.5 Illicit Connections and Illicit Discharge Detection and Elimination (S5.C.8)

The City continued to implement the following elements of the Illicit Connection and Illicit Discharge Detection and Elimination (IDDE) program as required by the 2007 NPDES Phase I Municipal Stormwater Permit during 2012 for illicit connections and illicit discharges into Seattle's MS3s: continue implementation of an on-going IDDE program; evaluate and updated existing ordinances or other regulatory mechanisms to effectively prohibit non-stormwater, illegal discharges and/or dumping into the MS4; ensure that all staff who are responsible for IDDE are trained to conduct the required activities; provide a publicly listed water quality citizen complaint/reports telephone number; prioritize complete field screening of the conveyance system; and develop and implement procedures to investigate and respond to spills and improper disposal into the MS4.

During 2012, SPU continued to lead the City's illicit connection, detection and elimination (IDDE) program, which was first implemented to meet the requirements of the 1995 NPDES Municipal Stormwater permit. Citizens can report water quality concerns and complaints, which may lead to a discharge to the City's MS4 by either calling the publicly listed 24 hour "water quality hotline" phone number or by using the internet-based form on the City website.

In 2012 the hotline received 237 surface water quality calls. The water quality hotline and web based reporting mechanism enable the general public to take an active role in stormwater pollution prevention and enhance the City's ability to prevent illicit connections and discharges. This BMP is appropriate as it provides a mechanism for the public to take an active role in stormwater pollution prevention and help the City increase awareness of activities that have negative impacts on stormwater. An evaluation of the water quality hotline can be found in sections B.3.4 and B.3.7.2.6 of this document.

There were 14 illicit connections investigations during 2012 which resulted in 11 enforcement actions. The City notified Ecology of the IDDE events by way of the Environmental Response Tracking System (ERTS), which also serves as the City's process for notification under G3. The IDDE program resulted in elimination of 13 illicit connections in 2012 with other corrections pending. There were no referrals from the City of IDDE violations to Ecology after making a good faith and documented effort of progressive enforcement to terminate the violation(s) in 2012.

The SPU Spill Response Program is staffed by a Senior Spill Coordinator and a network of on-call Spill Coordinators. Spill Coordinators work in 3 or 4 day on-call shifts and are available 24 hrs/ 7 days a week. Spill Response calls are dispatched through the Operations Response Center (ORC) and are received via a publicly-available phone number (206-386-1800). The water quality hotline advises citizens who are reporting an active spill to call the ORC to report the spill. Once a spill call is received, the Dispatcher contacts the on-call Spill Coordinator and advises them of the situation. Spill Coordinators follow written procedures for investigation, clean-up and reporting to appropriate agencies.

Each of the major departments at the City has a spill prevention and response program that includes procedures on how to respond and report spills and training to keep staff involved in spill response current on how to conduct their responsibilities. Each department's procedure includes instructions on when and how to report spills to SPU that enter the MS4.

Resource Venture, a contracted consultant of SPU, provides free site visits, spill kits and education to Seattle businesses to assist them with development of a spill prevention plan and proper clean-up and disposal of spills. The spill kit program is promoted on the Resource Venture web site, and a workshop for high risk potential polluters group is offered each year. Spill Plans are reviewed by Resource Venture, and businesses receive training with the spill kit. Resource Venture is an effective method of providing businesses with BMPs so they can voluntarily comply with the City's Stormwater Code.

In 2008, the City conducted an evaluation of the spill kit program to determine if it is an appropriate BMP. The evaluation included a survey of kit recipients since 2004 to assess their understanding of stormwater pollution prevention and their use of spill plans and kits. A previous survey was conducted among Seattle businesses in 2005. The survey in 2008 of spill kit recipients included many elements of the previous survey to examine changes since 2005. The majority of those surveyed were auto repair and maintenance

businesses (24%). Industry, restaurants and sales made up the next highest business types (~14% each).

Among respondents who reported experiencing spills that require spill kit materials, more respondents in 2008 than 2005 said that they utilize spill kits to clean-up routine spills. Similar percentages of respondents in 2008 and 2005 said that their business had written and posted a plan for dealing with a spill, but more respondents in 2008 said that the plan was posted near the spill kit.

Respondents in 2008 expressed similar confidence to respondents in 2005 about their ability to clean-up spills quickly, knowledge of whom to contact for help containing or cleaning up a spill, stock of spill clean-up materials on hand, and knowledge of where to obtain and dispose of clean-up material. However, respondents in 2008 expressed higher levels of agreement that having a spill plan and clean-up kit makes their employees more aware of surface water pollution and how their business practices can help reduce impacts on water quality.

This evaluation indicates that spill kits are an appropriate BMP for spill prevention and clean-up and verified that information provided directly to the general public helps to reduce behaviors that cause or contribute to adverse stormwater impacts.

All staff involved in the IDDE program receive the following basic training which is appropriate because the trainings are considered the industry standards and taught by instructors that are certified by the respective sponsoring organization; EPA Basic Inspector Training: Overview of all aspects of inspection preparation, conduct, and follow-up and various federal environmental laws and regulations, 40 Hour Hazardous Waste Operations and Emergency Response, 24 Hour Hazmat Emergency Spill Response, Blood-borne Pathogens, Confined Space Entry, First Aid and Traffic Control and Flagging Certification. In addition, all IDDE staff will receive the following program-specific training: IDDE Standard Operating Procedures – field and laboratory training, Field Hazards and Illicit Drug Lab Identification.

In 2012 the City continued to implement a conveyance field screening program for compliance with S5.C.8.b.vi (1) that is based upon the methods identified in Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection, October 2004. SPU is implementing the program to meet the permit requirement to conduct on-going screening and source tracing per Special Condition S5.C.8.b.vi of the permit. If a suspected illicit connection is detected, source tracing is initiated within 21 days. Upon confirmation of the source or illicit connection, SPU uses the progressive enforcement process detailed in Directors' Rule 18-2009, SPU 2009-006, Volume IV – Stormwater Code Enforcement Manual to eliminate the connection.

Information on how the City is implementing the 2012 minimum performance measures for the illicit connection and illicit discharge detection and elimination program can be

found in the City's SWMP, submitted as Attachment A of the City's 2012 Phase I Permit Annual Report Form.

B.3.6 Operation and Maintenance Program (S5.C.9)

During 2012 the City continued to implement the following elements of the operation and maintenance program in areas served by Seattle's MS3s: establish maintenance standards for stormwater facilities, adoption and enforcement of the Seattle Municipal Code and Directors' Rules, development of an initial inspection schedule for all known, permanent stormwater treatment and flow control facilities regulated by the Permittee, establish practices to reduce stormwater impacts associated with runoff from parking lots, streets, roads, and highways owned or operated by the Permittee, and road maintenance activities conducted by the Permittee and establish and implement policies and procedures to reduce pollutants in discharges from lands owned or maintained by the Permittee.

The determination of equivalency by Ecology indicates that the revised Stormwater Code will protect water quality, reduce the discharge of pollutants to the maximum extent practicable (MEP), and satisfy the state requirement under chapter 90.48 RCW to apply all known, available, and reasonable methods of prevention, control and treatment (AKART).

The Source Control (SC) group at SPU is responsible for inspecting private stormwater facilities regulated by the City. During a facility inspection, all aspects of the system are inspected: flow control devices, catch basins, etc. When any part of that system (including catch basins) is found to be out of compliance with Stormwater Code requirements for maintenance, a corrective action letter is sent to the facility owner and the owner or contractor must certify that the work has been completed. The City has established an initial inspection schedule for privately-owned stormwater treatment and flow control facilities in areas served by Seattle's MS3s and inspected 426 private facilities during 2012, which resulted in 230 corrective action letters for maintenance of the private facilities.

Maintenance of stormwater facilities owned or operated by the City that are located in areas served by Seattle's MS3s are divided between the departments. SPU inspects and maintains stormwater facilities located in the right of way. Inspection and maintenance of stormwater facilities outside the right of way on City owned property is conducted by the City Department that manages the property. All departments have continued to implement a program to annually inspect all permanent stormwater treatment and flow control facilities that they own or operate in 2012. The inspection and maintenance is conducted per the requirements in Appendix D of Volume 3 of the Directors' Rules. These standards have been determined by Ecology to be equivalent to the maintenance standards in Chapter 4 of Volume V of the 2005 *Stormwater Management Manual for Western Washington* and as such, are the most appropriate BMPs for implementation of this permit requirement.

The Seattle Department of Transportation (SDOT) is the lead City agency for establishing practices to reduce stormwater impacts associated with runoff from streets, parking lots, roads or highways owned or operated by the City. In addition to the revised draft Stormwater Code and Directors' Rules, SDOT has developed Maintenance Management

Systems Performance Sheets that reference BMPs and elements of the Regional Road Maintenance Initiative to meet Endangered Species Act (ESA) and NPDES requirements. These BMPs have been adopted by 23 different agencies in Western Washington, so it is appropriate that the City use these BMPs.

Parks, FFD, SCL and SPU are governed by the Stormwater Codes and Directors' Rules to reduce pollutants in discharges from lands owned or maintained by the City. The departments are governed by the current Stormwater Code and implement appropriate BMPs when conducting construction and maintenance activities on or near streets, parking lots and roads. The individual City departments have and will continue to implement a spill program and provide training on spill and source control.

DPD and SDOT have revised the temporary erosion and sediment control (TESC) training that is provided to City staff and the public involved in ground disturbing activities to reflect the changes in the 2009 Stormwater Code. This new training, called Stormwater Construction Controls (SWCC), was provided to 131 city staff during the first quarter of 2010. The Class is available to members of the public if requested during 2012; however no training sessions were requested.

The SWCC class is an appropriate BMP for training staff and the public on the proper use of stormwater construction controls for retaining sediment on site and preventing erosion as it provides descriptive training and real life examples of the BMPs required by the City Stormwater Code.

Information on how the City is implementing the 2012 minimum performance measures for the operation and maintenance program can be found in the City's SWMP, submitted as Attachment A of the City's 2012 Phase I Permit Annual Report Form.

B.3.7 Education and Outreach Program (S5.C.10)

The 2007 NPDES Phase I Municipal Stormwater Permit directs the City of Seattle to implement a program for conducting education and outreach to specific audiences on specific topics. The City has prepared an education and outreach program of work to meet these requirements over the term of the Permit and is therefore the best management practice for managing stormwater by education and outreach. The following sections include a brief description of the education and outreach activities associated with each of the BMPs and what strategies are in place to track improvements in the target audience's understanding of the problems.

B.3.7.1 Audience: General Public

B.3.7.1.1 Restore Our Waters (ROW) Community and Youth Programs

This program educates the general public about the impacts of stormwater flows into surface waters and the impacts associated with impervious surfaces. The program includes teacher training, curriculum support, field trips and community service/service learning activities. Programs are implemented through a partnership between Seattle Public Utilities, Seattle Parks, and Seattle Public Schools (SPS).

SPU and SPS have identified existing curriculum areas where applied stormwater issues can support and enrich student learning. As a result local geographic references, stormwater-related content and new lessons have been added to the district science curriculum for elementary (5th grade) and middle school (6th grade)students district wide. In addition field trips at the elementary level tie the investigation of an applied problem- the impacts of stormwater on a real stream to district-wide grade level content (either the Land and Water science kit, or Salmon in the Classroom program). The field trips bring children to a local urban streams where they explore hydrologic concepts and the impacts of urbanization on lotic systems. Community service and service learning opportunities, such as storm drain stenciling, extend the reach of this content into the adult community and build a personal stewardship ethic.

In 2012 SPU provided materials for 50 stormwater related district-wide science kits. Materials included the Ecology GROSS grant-funded *Lost and (Puget) Sound* video and lessons and an original power point presentation titled *Discovering Seattle's Land and Water*. Thirty-nine teachers received training on the kits and the use of the new materials. In addition 782 children attended urban watershed fieldtrips related to Salmon in the Schools at Piper's Creek and Longfellow Creek, and 750 students attended a field trip extension to the Land and Water unit at either Longfellow or Thorton Creek. Thirty-one different public, private and parochial schools participated in the program. Several years of teacher surveys have indicated that teachers in both programs see increases in student understanding of the impacts of stormwater and impervious surfaces.

Working with the Seattle School District provides an opportunity to reach a diverse geographic audience and engage students with direct, applied learning. The program links closely with current school science curriculum to reinforce target messages and illustrate concepts with real, local examples.

In 2012, programs for the general public included direct education, social marketing, partnerships, inclusive engagement and personal stewardship strategies to promote water quality and watershed health. ROW provided public tours of creek watersheds and stormwater projects, staffed public festivals and events and supported volunteer storm drain marker and stencil events. In addition educational materials such as Puget Sound restoration map; E-newsletters and beverage coasters were distributed. ROW also supported public stewardship programs such as Salmon Watcher and Salmon Stewards, watershed community advisory councils, and the Green Infrastructure Partnership and collaborated with regional Tribes to produce Salmon Homecoming.

This program is the most appropriate BMP because it reaches a large diverse geographic audience and engages them in applied learning. The program links closely with school science curriculum to reinforce target messages and illustrate concepts with real, local examples.

B.3.7.1.2 Doo Diligence Pet Waste Program

The Pet Waste Program is a city-wide outreach effort that educates the general public about the impacts of pet waste on water quality. In 2012, the program employed several programmatic strategies to engage residents on the topic of source control BMP's, environmental stewardship actions, and opportunities to improve pet waste disposal practices. Strategies in 2012 included: highly visible signage in public places, the distribution of targeted outreach materials, and maintenance of pet waste dispensers at key locations throughout Seattle.

Partnerships in 2012 included collaborations with Seattle Animal Control, Seattle Parks and Recreation, Block Watch organizations, and multiple local businesses such as veterinarians, animal hospitals, clinics, and pet stores. In 2012, the program distributed 126,000 mutt-mitts that were used at 60 locations, an increase of 30% over last year, and 2,400 brochures were distributed to the public.

This program is an appropriate BMP to address pet waste because it makes educational materials accessible to the target audience and provides them with a means to personally implement a BMP.

B.3.7.1.3 Automotive Maintenance Program (AMP)

In 2012, SPU continued to deliver an automotive maintenance education and outreach program that targeted the general public and focused on BMPs for source control and storage of products related to vehicle maintenance. Outreach activities focused on raising awareness about car maintenance BMPs through posters, brochures, and social media that were developed in 2011 and 2012. Posters and brochures also were translated into Chinese, Vietnamese, Spanish, and Amharic languages and these materials were distributed to 13 Department of Neighborhoods (DON) Service Centers and Seattle Parks and Recreation Community Centers throughout the city as well as 1,500 private businesses.

Three issues of Seattle's Curb Waste and Conserve direct mail newsletter (distribution approx. 280,000) included information promoting the auto leaks classes and program BMPs. In addition, a 10-week radio media campaign launched from March 5 – June 15, 2012. Following the campaign, an analysis of website activity was performed on SPU's Fix My Car webpage. The year-to-year comparison showed a 722% increase in website traffic over last year and a 300% increase in SPU's automotive discount coupon downloads. During 2012, there were also 2,260 YouTube video hits on the automotive video detailing the proper disposal of automotive fluids.

In addition to the marketing accomplishments, partnerships were established with local auto parts and repair shops within Seattle and BMP brochures were distributed to several locations. Partnerships with King County and the Washington Department of Ecology continue to play a pivotal role in Seattle's AMP campaign and regional messaging. The AMP program experienced a 355% increase in the number of partners working with SPU to educate the public about proper automotive maintenance growing from 20 in 2011 to 91 in 2012.

SPU in collaboration with South Seattle Community College hosted 15 workshops reaching 370 participants in 2012. The target audience was "do-it-yourself" drivers between the ages of 16 -24, as well as "quick-lube" users. The goal of each four-hour workshop is to remove barriers for BMP adoption and create the connection between clean water and vehicle maintenance. Do-it-yourself oil change kits were provided to 260 workshop participants during the year.

This program is an appropriate education outreach strategy for vehicle maintenance BMPs for the general public because it targets the use, storage, and disposal of car products.

B.3.7.1.4 Natural Soil Building

The Natural Soil Building Program (NSB) is supported by SPU Solid Waste and Water Supply funding as well as SPU Drainage funding and the Local Hazardous Waste Management Program in King County. The NSB Program has two components: the Master Composter Soil Builder (MCSB) volunteer training and outreach program, and the Garden Hotline (which answers phone and email requests, and also conducts classes especially for underserved and ESL audiences). The NSB program provides outreach and education on Natural Yard Care (including pesticide and fertilizer reduction) and also on RainWise techniques (LID and GSI) for the general public, residents, property owners and landscape professionals.

In 2012 the Master Composter Soil Builder program conducted three multi-day trainings for volunteers: one in the Spring for English-speaking MCSB volunteers, one in summer for multi-ethnic at-risk youth in collaboration with Safe Futures Youth Center in SW Seattle, and one in early fall for diverse low-income volunteers participating in the Just Garden program who will be doing outreach with future low-income participants. The newly trained volunteers joined the existing volunteer cadre in completing 789 hours of outreach and making 8,865 customer contacts on Natural Yard Care and RainWise at community events, demonstrations, and classes around Seattle.

The Garden Hotline serves all of King County through additional funding from the county-wide Saving Water Partnership and the Local Hazardous Waste Management Program in King County. The Garden Hotline responded to 10,267 public requests for information on Integrated Pest Management (IPM), plant selection, soil building, RainWise, and other resource conservation issues. Seventy-six percent of the Garden Hotline contacts were with residents within the City of Seattle, and 24% in King County outside Seattle. Besides phone and email contacts the Hotline conducted 157 classes and outreach events, with 35% of event contacts provided in underserved, immigrant, or communities of color. Hotline staff also wrote articles for community media, updated factsheets and guides, and assisted in preparing materials for translation. A survey of Hotline customers in 2012 indicated 90% satisfaction and usefulness of the information they received in helping them change behaviors.

This program provides information and resources to the public that help them change their behaviors to reduce the impact of their yard on stormwater quality.

B.3.7.1.5 Seattle reLeaf

Seattle Public Utilities' reLeaf program is a citywide interdepartmentally supported program that engages residents to plant and maintain healthy tree canopy on private property. The two major components of the program are the Tree Ambassador and Trees for Neighborhoods projects.

The Tree Ambassador project is a reLeaf-led collaboration with the Seattle Department of Transportation and Forterra, a local nonprofit, which trains residents to become neighborhood urban forestry leaders. In 2012, reLeaf trained 25 new Tree Ambassadors in neighborhoods across Seattle. In a 7-week series of workshops, participants learned how the urban forest is managed by City government, basics of tree biology, pruning, and planting, and community engagement techniques. After completing the workshops, participants put together team projects based on their interests and the needs of their neighborhoods. Volunteers donated a total of 643 hours in 2012 to complete projects including public Tree Walks, tree mulching /care days and restoration work parties.

Seattle reLeaf's second major project is Trees for Neighborhoods. In October and November 2012 residents planted 1,000 trees at 400 private residential households through the program. The Trees for Neighborhoods is open to residents in all areas of Seattle, but outreach to enroll participants in the program was focused in the Georgetown, Greenwood, Meadowbrook, Rainier Beach, and South Park neighborhoods. Program participants completed a workshop on proper tree planting before receiving their tree. Workshops also focus on the importance of urban trees, including the benefits trees have on storm water reduction and clean water. Participants received watering bags for their trees.

A follow up evaluation with Trees for Neighborhoods participants showed that 80% of respondents reported learning something new from the workshops. One hundred percent of the responses indicated that they would recommend the program to others. One participant commented, "Our neighborhood generally has larger plot sizes and lots of invasive species. Encouraging removal of these and offering people free trees (and the right sort) as a replacement should promote this process and help the neighborhood and the watershed and nearby salmon filled creek."

Residents who have planted program trees in the past years were offered an opportunity to attend a free pruning workshop and were sent regular reminders to water their trees during Seattle's hot, dry summer months.

Seattle reLeaf is an appropriate BMP for the educating the public about landscaping and buffers because it engages residents in the stewardship and restoration of the urban forest canopy.

B.3.7.2 Audience: General Public & Business

B.3.7.2.1 Spill Kit Program

Resource Venture, an SPU funded conservation service, provides free site visits, spill kits and education to Seattle businesses to assist them with development of a spill prevention plan and proper clean-up and disposal of spills. This work continued in 2009. Because of the detailed evaluation conducted in 2008 and the modification of the permit, an evaluation of this program was not conducted in 2010. Please see the 2008 and 2009 City of Seattle Annual Report Attachment B for information on this evaluation. In addition, the spill kit evaluation report is available on the Ecology web site at: http://www.ecy.wa.gov/programs/wq/stormwater/municipal/MUNIdocs/SPU2008NPDESEOeval.pdf

B.3.7.2.2 Car Wash Program

In 2012, the Car Wash Program was directed towards residential car washing BMPs and developing new strategies for groups using car washes for fundraisers. For the general public, SPU partnered with Brown Bear to offer coupons for a free car wash in the Utility's *@Your Service* and *Curb Waste and Conserve* bill insert newsletters. SPU's *@Your Service* publication reaches approximately 180,000 households. In 2012, 9,450 Brown Bear coupons were redeemed from the *@Your Service* publication (a 317% increase from 2011). *Curb Waste and Conserve* reaches approximately 290,000 residents. In 2012, 7,564 coupons were redeemed from the *Curb Waste and Conserve* publication.

Organizations using car washes for fundraisers were encouraged to use the "green" ticket sales program offered by Brown Bear and Puget Sound Car Wash Association (PSCWA) or "host sites" in combined sewer areas. The City identified two new host site businesses where groups could be directed to hold events. Three host sites declined to continue their partnership with the city in 2012, and the total number of host sites fell to two as a result.

Informational postcards were mailed to approximately 138 organizations to raise awareness about the impacts of car washing and provide information on the recommended BMPs. In 2012 nine groups used host site locations, and 25,291 "green" tickets were purchased and sold by 55 groups who actively used car washing as a fundraising strategy.

In an effort to discourage car wash events in the MS4, SPU water quality inspectors handed out postcards to illicit car washers and host sites when they were discovered. In addition businesses located in the MS4 that were reported for hosting car wash events were contacted, educated and informed that they should discontinue those activities.

The City feels that these BMPs are appropriate for reducing the impacts of car washing in the MS4 because they support the adoption of new behaviors.

B.3.7.2.3 STORM/Puget Sound Starts Here (PSSH)

In 2012, the City continued to participate in STORM (Stormwater Outreach for Regional Municipalities) strategic planning and program activities. SPU supports STORM as an

active member of the Core Team and participates in the North King County Stormwater Outreach Group (SOGgie). SPU is a partner in the STORM grant for the Vehicle Leaks Campaign, which complements the City's grant for the Automotive Maintenance Program. SPU staff participated in the intensive planning effort for the PSSH Phase 2 Regional Campaign which began in 2012 and will launch in 2013. SPU co-led planning for PSSH month including the major outreach event at a Mariners Game. SPU staff also regularly shared examples of programs and materials with other municipalities (both Phase I and Phase II permitees) through STORM. The City continued to include the PSSH brand and website address on many related outreach materials. The Puget Sound Starts Here (PSSH) website focuses on stormwater BMPs for cars, pets, yard care and home cleaning. STORM and the PSSH campaign are appropriate BMPs because information is available and accessible for a wide general public audience.

B.3.7.2.4 Automotive Maintenance Program (AMP) and Spill Kits

AMP – see B.3.7.1.3
Spill Kits - see B.3.7.2.1

B.3.7.2.5 Resource Venture

To supplement inspections and provide outreach to small businesses, SPU funds Resource Venture, a free resource conservation program for Seattle businesses, currently being implemented by Cascadia Consulting, under contract with SPU. Under this contract, Resource Venture provides supplemental site specific technical assistance to businesses, develops targeted outreach materials in multiple languages, organizes and hosts industry-specific stormwater pollution prevention workshops, and implements SPU's Spill Kit Incentive Program, which provides free spill kits and assistance in developing a spill plan. Since its inception in 2005, SPU and Resource Venture have reached over 1,000 Seattle businesses that have created spill plans and received free spill kits. The spill kit program is promoted on the web and during inspections.

Resources and information on use and storage of automotive chemicals, hazardous cleaning supplies, carwash soaps and other hazardous materials are provided directly to the general public and business owners to help reduce behaviors that cause or contribute to adverse stormwater impacts. The web site includes information, brochures, posters and stickers on stormwater pollution prevention best management practices (BMPs) for facilities, shops, kitchens, storage areas and anywhere liquids are handled or vehicles are stored including:

- How to Clean Up a Spill (PDF, 325 kb) outlines the proper steps to control a spill on your property.
- FOG flyer for your kitchen which will help you abide by the law and keep fats oils and grease (FOG) out of your drain (PDF).
- 'Mop bucket' (PDF, 305 kb) poster showing proper wash water disposal.
- Grease trap maintenance stickers (PDF, 116 kb) explain proper cleaning and maintenance procedures.

- Stormwater Pollution Prevention summary sheet (PDF, 50 kb) explains requirements for businesses and identifies high-risk activities.
- Storm Drain Maintenance (PDF) poster shows best practices around storm drains.
- Lot Maintenance (PDF, 2.5 mb) poster shows best practices with lot maintenance around storm drains.
- Materials Storage (PDF) poster shows best practices for outdoor waste and materials storage.
-
- Best Management Practices: Mobile Pressure Washers (PDF, 63 kb)
  Best management practices for mobile pressure washers, and the businesses that hire them, when washing equipment, vehicles, buildings, parking lots, sidewalks, etc.
- Best Management Practices: Vehicle and Equipment Washing (PDF, 75 kb)
  Provides tips on how to wash vehicles and equipment at your business without polluting Seattle's lakes, bays and rivers.
- Best Management Practices: Washing with Soap (PDF, 77 kb)
  Learn how to wash boats, restaurant mats and paved surfaces without polluting stormwater or harming aquatic life.
- Preventing Pollution from Heating Oil Tanks (PDF, 71 kb)
  Provides residents and businesses with tips on monitoring, inspecting, repairing and replacing heating oil tanks that may have leaks.
- Seattle Source Control Technical Requirements Manual (PDF, 1,661 kb)
  Explains operational and structural measures required of Seattle businesses to control the sources of stormwater pollution.
- Stormwater Pollution Prevention Fact Sheet (PDF, 71 kb)
  Describes the City's Stormwater Code, stormwater measures required of all Seattle businesses, measures required of businesses involved in High-Risk Pollution Generating activities and measures required for those businesses seeking new building permits.
- Seattle Public Utilities Guidance on Pressure Washing (PDF, 361 kb) Describes best management practices for pressure washing outdoors. Seattle Municipal Code 22.800 (The Stormwater Code) prohibits the discharge of anything other than stormwater into the storm drainage system.
- Spring cleaning with a conscience (PDF)

This program is an appropriate BMP because specific educational resources, training and outreach materials are accessible to the target audiences providing them with a means to implement stormwater BMPs.

B.3.7.2.6 Water Quality Hotline

The City staffs a 24-hour water quality hotline to allow citizens and businesses to report illicit discharges into the MS4. Businesses and citizens who are found to be causing illicit discharges receive education, and potentially enforcement actions, if they refuse to voluntarily correct the problem. Because of the detailed evaluation conducted in 2008 and

the modification of the permit, an evaluation of this program was not conducted in 2012. Please see the 2008 and 2009 City of Seattle Annual Report Attachment B for information on this evaluation. In addition, the water quality hotline evaluation report is available on the Ecology web site at: http://www.ecy.wa.gov/programs/wq/stormwater/municipal/MUNIdocs/SPU2008NPDESEOeval.pdf

B.3.7.3 Audience: Homeowners, landscapers, and Property Managers

B.3.7.3.1 Green Gardening Program

The Green Gardening Program educates nursery and landscape professionals and horticulture students on how to reduce their use of pesticides. The program promotes Best Management Practices (BMPs) for environmentally-sensitive landscaping practices, with emphasis on Integrated Pest Management (IPM), as well as water conservation, landscape stormwater mitigation, and the recycling of organic materials, either on-site or via collection programs.

Two IPM Workshops were held in fall of 2012. The workshops serve private sector landscape professionals who generally work throughout Seattle and the County, as well as public sector landscapers, landscape business managers and owners, program managers, students, and educators. The first workshop, titled "Honing the Sustainable Edge: Integrating Design, Installation, and Maintenance", was held at South Seattle Community College on October 16 and attracted 214 participants. The second workshop, titled "Landscapes at the Cutting Edge: Soil/Water/Plant Relationships", was held at South Seattle Community College and attracted 131 participants.

Five trainings were offered for non-English speaking professional audiences, some in collaboration with the Saving Water Partnership's irrigation program; three in Spanish, and one each in Vietnamese and Cambodian. A total of 103 participants attended, about double that of 2011.

Six IPM classes were presented at three local horticulture schools and Seattle Central Community College's sustainable agriculture program in 2012, reaching a total of 75 students. The courses continue to be rated very highly by students and instructors alike. As the horticulture schools continue their practice of integrating the new material into their program offerings, the Green Gardening program continues to expand its development of new content, keeping this a vital program offering.

The Natural Yard Care Nurseries recognition program completed its transition into the King County EnviroStars program in 2012. This change resulted in continuing to motivate nurseries to commit to sustainable practices and education, while reducing program costs and increasing efficiencies. Ten trainings to nursery professionals reached a total of 143 nursery staff representing 15 nurseries.

This is an appropriate BMP for yard care techniques protective of water quality as it provides the target audience with information on how to change their behaviors to improve stormwater quality.

B.3.7.3.2 RainWise

SPU continued to implement the RainWise program in 2012 to meet the requirement to educate general public, homeowners, landscapers and property managers about low impact development techniques, including site design, pervious paving, vegetation retention, sustainable landscape practices, and other green stormwater practices. This program provides education and outreach on how to slow, spread, filter and infiltrate stormwater. In 2012 the following educational/technical elements were implemented to raise awareness about GSI (including stormwater treatment and flow control) and promote behavior change.

- Rain garden and cistern design information, plant lists and maintenance guidelines that can be downloaded from www.seattle.gov/util/rainwise. The RainWise program also provides information and brochures in hardcopy format.
- RainWise Tools, www.rainwise.seattle.gov, an internet-based education, recruitment, tracking and marketplace outreach tool that helps educate property owners about GSI techniques they can use on their property, is available online. The RainWise tool connects residents with trained contractors who can construct rain garden and cistern facilities.
- Two RainWise contractor training workshops were offered in 2012 to build capacity in the landscape contractor community for implementing GSI projects. Thirty-six contractors attended the workshops. A contractor fair was held in fall, and over 80 attendees were able to meet and discuss potential rain garden and cistern installations with the twelve contractors in attendance.
- Under the RainWise rebate program, 110 rain gardens and cisterns were installed.

RainWise is an appropriate BMP to educate general public, homeowners, landscapers and property managers about low impact development techniques, including site design, pervious paving, and retention of forests and mature trees. The program uses a variety of tools to reach the target audiences ranging from printed material to class presentations and demonstrations.

B.3.7.3.3 Green Your Rug

The City developed and implemented two programs in 2008 directed towards educating homeowners and property managers about BMPs for carpet cleaning. The Green Your Rug residential pilot program was aimed at the homeowners who rent do-it-yourself carpet cleaning machines. The second part of the Green your Rug program included developing a baseline measurement of property manager awareness, understanding of, and adoption of proper disposal of used wash water from carpet cleaning. Both programs determined that the majority of the Target Audience are adopting the proper behaviors and using practices to reduce or eliminate adverse stormwater impacts associated with carpet cleaning.

B.3.7.3.4 Green Your Rug Residential

Education and outreach on this subject was provided on an as needed basis by Resource Venture during 2012.

B.3.7.3.5 Green Your Rug for Property Managers

Education and outreach on this subject was provided on an as needed basis by Resource Venture during 2012.

B.3.7.3.6 Business Inspections

In 2010 SPU developed and implemented an evaluation of businesses that had received an audit inspection during 2009 to assess the effectiveness of the audit inspection for increasing awareness and compliance with the City's Stormwater Code and to obtain input from the businesses on how to improve audit inspections and improve compliance. The evaluation addressed whether the businesses remembered the audit inspection and implemented the changes recommended during the audit by the SPU Source Control Inspector. Respondents were also asked to discuss the challenges they faced in making changes, describe what helped or would help them make changes, rate and suggest improvements for the audit inspector, and rate potential motivators for compliance. The survey found measurably increased awareness of stormwater issues and adoption of BMPs. The survey helped SPU determine that the audit inspection program is an effective tool for educating low- and medium-risk businesses about source control BMPs. In addition, audit inspections provide SPU an opportunity to assess the stormwater risk posed by business for prioritizing future inspections. With both an audit inspection program and a stormwater inspection program, SPU can more efficiently allocate resources to address both outreach and compliance.

In summer 2011, SPU worked with Cascadia Consulting Group (Cascadia) to evaluate the effectiveness of stormwater pollution prevention inspections using a telephone survey. To assess effectiveness, survey respondents were asked about a variety of the business's stormwater practices such as outdoor washing or water use, outdoor material storage, stormwater facilities, and spill response preparedness. The survey also included questions on the respondent's knowledge of Seattle's stormwater system, rating of the stormwater inspection, attitude toward stormwater pollution prevention, and demographics.

To the extent possible, the 2011 study was designed to determine whether business compliance decreased as time increased and whether there were differences in responses related to the estimated level of risk to stormwater posed by the business. After fielding the survey, SPU and Cascadia determined that businesses with stormwater permits issued by the Department of Ecology or King County are not comparable to businesses without a permit; as a result, responses from businesses with Ecology or King County permits were analyzed separately.

Based on the results of the 2011 study, stormwater pollution prevention compliance and knowledge appear to be fairly high among all subpopulations surveyed. Responses

regarding most stormwater pollution prevention practices and attitudes among businesses without permits did not appear to show clear trends based on time elapsed since the last stormwater inspection or risk category. Time elapsed appeared to affect responses regarding stormwater facility inspections and rating of the inspector. Risk category at businesses without permits appeared to affect responses regarding stormwater facility inspections, spill kits and plans, and stormwater treatment.

The City selected this program for the evaluation required in S5.C.10.b.ii. A complete evaluation of this program was included as Appendix A of the 2011 Program Evaluation and other Activities Narrative (Attachment B of the 2011 Annual Report).

SPU inspects businesses, including mobile businesses and works with them to prevent pollutants from entering private and public storm drains. Inspections include responses to complaints and concerns on the Water Quality Hotline. Inspections are focused on High-Risk Pollution Generating Activities and provide education and outreach on City Code requirements and use of BMPs. This BMP is appropriate because it provides information and resources directly to businesses at their location that educate them on how to change their behaviors to comply with City Code and reduce the impact of their activities on stormwater quality.

In 2012, the business inspection program continued. However, the auto maintenance program described in B.3.7.1.3 was used to meet S5.C.10.b.(3) requirement to educate homeowners and property managers about BMPs for auto repair and maintenance.

B.3.7.3.7 RainWise

Please see the description inB.3.7.3.2.

B.3.7.3.8 Natural Landscaping Professional Development

This program is a series of well attended professional workshops (and supporting guides and web content) which target the specified behaviors and practices in the permit (low impact development (LID) techniques: including sustainable site design, soil BMPs and retention of native vegetation, plant selection and maintenance options that reduce pesticide and fertilizer use, and Natural Drainage/LID strategies for on-site stormwater management, and stormwater treatment and flow control). These workshops target permit audiences including engineers, design professionals, landscape contractors (including non-English-speakers), developers, builders, permitting and inspection staff, and land use planners. The program is built on survey and focus group work with these professionals and customers. Professionals who attend the workshops incorporate LID techniques into their designs and pass on information to the homeowners, landscapers and property managers that they work with. Many participants fill out in-class evaluations and they identify (pledge) the actions they intend to take as a result of the training.

In 2012 the program conducted 41 training events, in collaboration with professional organizations and local governments, which were attended by a total of 2,275

professionals: landscape and building contractors, developers, landscape architects and designers, engineers, architects, inspection and permitting staff, and outreach trainers. While the funding comes from several sources, most training events focused on LID and Green Stormwater Infrastructure design, construction, and maintenance, IPM and other chemical-reduction maintenance practices, soil best practices, and construction site erosion and sediment control. Ninety-one percent of respondents to post-workshop surveys rated the workshops as good or excellent, and 76% said they would use the guidelines and techniques presented in the workshops in current or future projects.

B.3.7.3.9 Private Facility Inspections

SPU conducts inspections of private stormwater and flow control facilities to determine that they are installed and maintained to City Code. In additions to conducting the inspection, SPU provides education and outreach on how to change their behaviors to comply with City Code and maintain their facility to function properly and reduce the impacts to water quality. Outreach materials include handouts on BMPs and codes. Inspections are tracked and reviewed.

The SC group tracks private facility inspection and enforcement records through a Microsoft Access database and file management system. The database tracks information for both source control inspections and drainage system maintenance inspections. Records are managed in accordance with the State record keeping codes. Enforcement actions are tracked both in the database and electronically in a separate folder on the City network. Any enforcement paperwork is kept with the file.

The City evaluated the appropriateness of using the private facility inspection program as a method to meet the education and outreach requirement for educating homeowners, landscapers and property managers about stormwater treatment and flow control BMPs and determined that this education and outreach requirement is better served by the RainWise program described in B.3.7.3.2.

B.3.7.4 Audience: Engineers, Contractors, Developers, Review staff and Land Use Planners.

B.3.7.4.1 Temporary Erosion and Sediment Control

The Department of Planning and Development (DPD) provides short courses to engineers, contractors, developers on appropriate BMPs for temporary erosion and sediment control from new development and re-development sites. This training exposes professionals to City Code requirements and is an appropriate BMP for the control of sediment and erosion.

DPD and SDOT have revised the temporary erosion and sediment control (TESC) training that is provided to City staff and the public involved in ground disturbing activities to reflect the changes in the 2009 Stormwater Code. This new training, called Stormwater Construction Controls (SWCC), was provided to 131 city staff during the first quarter of 2010. The Class is available to members of the public if requested; however, during 2012 no training sessions were requested.

The SWCC class is an appropriate BMP for training staff and the public on the proper use of stormwater construction controls for retaining sediment on site and preventing erosion as it provides descriptive training and real life examples of the BMPs required by the City Stormwater Code.

B.3.7.4.2 Natural Landscaping Professional Development

Please see the description in section B.3.7.3.8.

B.4 Information on Structural Stormwater Controls Program (S5.C.6)

The Structural Stormwater Controls Program is described in Section III.6 of the City's SWMP documentation, submitted as Attachment A of the City's 2012 Phase I Permit Annual Report Form.

B.5 Summary of Actions Taken to Comply with Applicable TMDL Requirements (S9.E.4)

There are no applicable Total Maximum Daily Loads (TMDL) listed in Appendix 2 of the 2007 NPDES Phase I Municipal Permit for receiving waters to which the City's MS4 drains. Therefore, compliance with this permit such as implementation of the actions comprising the components outlined in the City's SWMP, submitted as Attachment A of the City's 2012 Phase I Permit Annual Report Form, constitutes compliance with any applicable TMDLs not listed in Appendix 2 of the permit (S7.B).

B.6 Stormwater Monitoring Summary (S9.E.6)

In accordance with S8.B.1, this section provides a brief description of the stormwater monitoring or related monitoring studies conducted during 2012 by or for the City outside of the permit required monitoring:

B.6.1 Water Quality

Pollutant Source Control Sampling - This monitoring was conducted by SPU in support of and associated with the Water Quality Hotline, IDDE, and business inspections for source control from existing development.

Lower Duwamish source sediment samples - In 2012, SPU continued to collect source sediment samples (i.e., catch basins, inline sediment traps, and inline grab samples) to support the source control program for the Lower Duwamish Waterway superfund site. In 2012, SPU collected 96 samples, which were analyzed for the LDW contaminants of concern, including TOC, SVOC's, TPH-Dx, select Metals, PCB's, Grain Size and occasionally site specific parameters, such as pH, additional metals, VOC's.

B.6.2 Street Sweeping

The objective of the Street Sweeping for Water Quality Program (SS4WQP) is to cost-effectively reduce the pollutant load carried by stormwater runoff from Seattle's streets to receiving water bodies. The purpose of the monitoring program is to collect & evaluate performance metric data in order to (A) provide information for regulatory requirements

for solids disposal, (B) to track program performance, and (C) for developing a baseline for future effectiveness studies. Performance metrics currently being collected include mileage swept (street curb miles within a combined [sanitary] basin, and miles within an MS4 basin), sweeping velocity, solids load removed, cost, and sweeping solids chemistry (metals, SVOCs, PCBs, BTEX, grain size, total solids, Nutrients (Tot Phosphorous, TKN), total organic carbon, pH, NWTPH-Dx/Gx, BOD/COD, Fecal coliform).

B.6.3 Thornton Creek

A Centennial Grant funded four sampling events were conducted between Aug 27, 2011 and July 10, 2012 at 45 locations in the Thornton Creek watershed for bacteria. The purpose of the grant is to locate bacteria sources in this watershed that has had historically high bacteria pollution and has been on the 303(d) list for several years. All sites were sampled twice each day, in the morning and in the afternoon, primarily for E. coli and hydrolab conventional parameters (temperature, pH, dissolved oxygen, conductivity), with about a 10% also sampled for fecal coliform bacteria. Approximately 20 samples were also sampled for Bacterioides, a microbial source tracking technique to identify human bacteria contributions.

B.7 Operation and Maintenance Schedules

B.7.1 Justification of Reduced Inspection Frequency

There are no data presented here to justify reducing the inspection frequency pursuant to Permit conditions S5.C.9.b.iii (1) and S5.C.9.b.iv (2).

The permit requires that the City develop an ongoing inspection schedule in 2012 to annually inspect all stormwater treatment and flow control facilities (other than catch basins) regulated by the City (S5.C.9.b.ii(3)). To comply with this requirement, SPU conducted a study during 2010 of private stormwater facility compliance to evaluate whether there would be sufficient justification to reduce the frequency of inspections of private storm water facilities from the level specified in the permit (annually starting in 2012). The study was completed, and the results support a change in the inspection frequency of private stormwater facilities for compliance with S5.C.9.b.ii (3).

Starting on January 1, 2012, SPU changed the inspection frequency for all private stormwater facilities that discharge to the City of Seattle's MS3s to once every two years. However, if SPU receives a complaint about a private stormwater facility via its Water Quality Hotline or SPU determines during a Source Control Inspection that a site's stormwater facility is out of compliance, SPU will use progressive enforcement to bring the private stormwater facility into compliance with the City ordinances and rules.

B.7.2 Stormwater Facility Maintenance or Repairs greater than $25,000 (S5.C.9.b.v)

The City did not conduct any stormwater facility maintenance or repairs greater than $25,000 during 2012. Information on the operation and maintenance program can be found in the City's SWMP, submitted as Attachment A of the City's 2012 Phase I Permit Annual Report Form.

B.8 Notification of any Annexations, Incorporations, or Jurisdictional Boundaries (S.9.E.8)

There were no annexations, incorporations or changes in jurisdictional boundaries in the geographic area served by the City's MS4 during the 2012 reporting period.

B.9 Summary of barriers to implementation of LID and actions taken to remove the barriers

The City has been on the forefront of developing solutions to real or perceived barriers to the implementation of Low Impact Development (LID) for stormwater management. The City uses the term Green Stormwater Infrastructure (GSI) when focusing on the stormwater management aspects of LID. The stormwater management aspects of LID are the focus of this discussion on the barriers and actions.

One of the first barriers encountered by the City was the lack of authority in the Stormwater Code (SMC 22.800-22.808) to require GSI in addition to a lack of guidance and standards for design and implementation of GSI. The Stormwater Code revision project eliminated this barrier and implemented a variety of tools to educate and inform the public on GSI, including its design and application in the urban environment. The DR 17-2009, SPU 2009-005, *Vol. III - Stormwater Flow Control and Water Quality Treatment Technical Requirements Manual* (Stormwater Manual) provides the public with a suite of tools to guide the implementation of GSI that meets the Stormwater Code requirements. In fact, this document is considered by most practitioners to be the best resource in the Puget Sound region for GSI design, modeling and maintenance information. In addition to the revised Stormwater Code, the City has revised its Right of Way Improvement Manual and the Standard Plans and Specifications to inform and educate the development community on the requirements for a consistent application of GSI within the City. These tools are useful to those implementing GSI and are used by engineers and planning staff at the City for consistent review and inspection of projects.

The majority of parcels in the City are single family residential and a potential barrier is that owners of single family parcels may not be aware of the requirements for GSI in the Stormwater Code and what their responsibilities are if and when they install GSI during development. The City developed Client Assistance Memos (CAMs) for each of the GSI technologies that summarize the information in the Stormwater Manual, including site applicability, design, and construction inspection requirements, and facilitate an informative approach to understanding the Stormwater Code requirements for GSI on parcel projects. Additional tools, such as the GSI Requirement Calculator and the Pre-sized Flow Control Calculator, facilitate the sizing of GSI facilities and understanding when Stormwater Code compliance has been achieved for smaller, less complex projects. Appendix D of The DR 17-2009, SPU 2009-005, *Vol. III - Stormwater Flow Control and Water Quality Treatment Technical Requirements Manual* provides detailed information on the facilities maintenance requirements and the inspection components that City inspectors will be using during compliance inspections.

For more complex projects that require modeling to demonstrate and document stormwater code compliance, SPU contracted with the developers of the Western Washington Hydrology Model (WWHM) to develop GSI modules and provide WWHMv3 with these modules for free. This provides designers a consistent and easy approach to designing GSI. SPU also collaborated with Ecology, PSP and WSU for scoping future modeling needs and is taking an initial step to develop and calibrate modeling of bioretention with underdrain and greenroofs.

The City has developed incentive programs to remove real or perceived barriers around the cost of implementing GSI vs. traditional stormwater facilities. As an incentive to the applicant's design team to integrate significant stormwater management with GSI facilities, all projects less than 10,000 ft^2 of new plus replaced impervious surface have the option of not constructing traditional stormwater infrastructure if the project mitigates 70 percent of the new plus replaced impervious surface with GSI.

Programs such as the Stormwater Facility Credit Program and Green Factor help to remove the barriers around the cost of implementing GSI. The Stormwater Facility Credit Program rewards utility customers with up to a 10 percent break on their drainage bill if their GSI facility is installed and maintained in accordance with the Stormwater Code. A barrier that the Green Factor addressed is that the Land Use Code was inconsistent with GSI techniques. The Seattle Green Factor requires new development in neighborhood business districts, certain commercial, and multifamily residential zones to meet a landscaping target using a menu of landscaping strategies. Green Factor scoring has been revised to include green roofs, permeable paving, bioretention, vegetated walls, preservation of existing soils and rainwater harvesting, which helps to align the Land Use Code requirements with the Stormwater Code. Green Factors helps maintain and improve livability in growing neighborhoods. In addition to being attractive, green elements in the landscape may help to improve air quality, create habitat for birds and beneficial insects, and mitigate urban heat island effects. Green Factor elements may also reduce stormwater runoff, protecting receiving waters and decreasing public infrastructure costs. As part of the multifamily residential updates to require Green Factor, Seattle is also eliminating minimum parking requirements in certain areas of the City.

One of the barriers to wide spread use of permeable pavement is a lack of technical knowledge among professionals in the paving industry on the proper material supply and installation of these materials. To remove this barrier, SPU is involved in industry discussions on ASTM strength (and consequently material life) testing. Industry standards will give contractors and inspectors clear expectations on materials acceptance (i.e. what's "good enough"). SPU is also encouraging the use of experienced installers.

Another barrier to implementation of GSI is that there are certain areas in the City where it is unacceptable to infiltrate stormwater due to site conditions such as steep slopes, landslide prone areas, setbacks and areas with low infiltration rates. To address these potential barriers, the City designed its GSI performance standard to provide credit, although smaller, for non-infiltrating GSI facilities to the extent that they can be used in these areas. Additionally, where infiltration is marginal, the City allows the project to

design an infiltration BMP with backup underdrain, which includes a cap. The credits assume the marginal infiltration rate, but if construction demonstrates the infiltration rate is not meeting other City standards (primarily duration of ponded water exceeding 24-hours past end of storm event), the cap can be removed or have an orifice drilled into it to allow stormwater to discharge via the underdrain.

Another barrier to implementation of GSI is the requirement of a water right to capture rain water for storage of rainwater. Ecology issued an Interpretive Statement clarifying its interpretation of the Water Code that under certain circumstances, a water right is not required for on-site rain water storage and use of rooftop or guzzler collected rainwater.

Stormwater facility design is a relatively new discipline when compared to wastewater and flooding facility design. The technologies and practices implemented for GSI are rapidly evolving, and new information is the key to advancing the tools available to municipalities and the public. A lack of innovation and information on design and facility performance can be a barrier to the implementation of GSI. To help reduce this barrier, the City participated in Ecology's LID stakeholder advisory process during 2010 and 2011, to inform the permit requirements surrounding LID implementation for the MS4 permit reissuance and staff participate in national ASCE/EWRI technical committees for information sharing to facilitate the exchange of new research findings. The City is also supporting (technically and financially) the City of Puyallup and WSU's Stormwater Retrofit project on the WSU Puyallup campus. This functional research project is designed to implement current GSI techniques in a real world setting where researchers can evaluate the effectiveness of these techniques to inform regional manuals and ordinances.

B.10 Summary of the extent to which basin or watershed planning is being conducted in the Permittee's jurisdiction, either voluntarily or pursuant to the Growth Management Act (Chapter 36.70A RCW) or any other requirement

The City is a key participant in watershed planning and salmon recovery planning efforts in the Water Resource Inventory Area 8, Cedar/Sammamish and Water Resource Inventory Area 9, Green/Duwamish. This participation includes working with scientists to figure out what actions are most needed. The groups are also investigating planning tools to improve water quality, conserve water and restore shorelines.

SPU is in the process of developing a master plan for utility infrastructure focused on desired infrastructure that accounts for expected growth, as well as addressing existing capacity needs and service level gaps. This planning will be both short and long-term, and will be coordinated with broader City planning efforts (Neighborhood Plans, Comprehensive Plan update). Efforts will be strategically targeted to address problem areas, areas of rapid growth, and areas with significant construction activity (e.g., Sound Transit, City of Seattle transportation projects). Utility master planning will create a more systematic understanding of current and future infrastructure needs. This analysis will better inform planning and zoning decisions, identify needed capital projects, and provide

a sounder basis for responding to opportunities and challenges presented by external projects and private development.

SPU conducted and documented an evaluation of urban watersheds in 2007. This document, *State of the Waters 2007,* documented the status and current conditions of hydrology and aquatic ecology resources in the major creek watersheds in Seattle. This document serves as the current baseline for watershed and basin planning efforts.

B.11 Identification of Areas for Potential Basin or Watershed Planning that can Incorporate Development Strategies as a Water Quality Management Tool to Protect Aquatic Resources (S9.12)

The Pollution Control Hearing Board (PCHB) wrote in its August 7, 2008, Findings of Fact, Conclusions of Law, and Order (Phase I MS4, PCHB No. 07-021, -026 through -030, & -037), at page 59: "… Ecology has identified the particular importance of basin planning in areas which are relatively undeveloped where new development is occurring. The Board concludes that city or county permittees should identify such areas where potential basin planning would assist in reducing the harmful impacts of stormwater discharges upon aquatic resources. …" The PCHB ordered Ecology to modify the permit to require permittees to "identify, prior to the next permit cycle or renewal, areas for potential basin or watershed planning that can incorporate development strategies as a water quality management tool to protect aquatic resources." (p. 72)

The City of Seattle is a fully built-out city where almost all development in the City is parcel-by-parcel urban infill (redevelopment), so there are no areas in the City that are "relatively undeveloped where new development is occurring." However, protection of aquatic resources in and around the City remains an important goal. In the past the City has developed watershed action plans for certain creek basins. These plans were considered during the Stormwater Code revision process to inform the Seattle-specific threshold and standards required when parcels are redeveloped. These requirements include installing Green Stormwater Infrastructure (GSI) to the Maximum Extent Feasible (MEF) on projects. The City has included the requirement for GSI to the MEF in the Stormwater code to provide increased environmental protection and better protect the functions and values of aquatic resources. The City's intent is that GSI, where feasible, is the development tool of choice when water quality or treatment thresholds are triggered. In addition, the City's Comprehensive Plan, Environmental Critical Areas Ordinance and Shoreline Master Program, as well as strategies such as the Green Factor, encourage redevelopment that incorporates tools to protect aquatic resources.