

# ATTACHMENT B

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## CITY OF SEATTLE 2010 NPDES PHASE I MUNICIPAL STORMWATER PERMIT Program Evaluation and Other Activities Narrative

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Prepared by  
Seattle Public Utilities

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## 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 2010. In January of 2010 Michael McGinn became the 52<sup>nd</sup> Mayor of Seattle. Mayor McGinn re-established 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 2010 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 (2007-2009) 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 2010, 157 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 111 Corrective Action Letters and 13 of these sites were referred to Ecology for potential NPDES Industrial Stormwater permit coverage.. Four facilities were issued NOV's for non-compliance with the City's Stormwater Code.
- **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, 77 sites were inspected for Code compliance with regard to flow control and treatment system code requirements during 2010.
- **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 2010, SPU took 135 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 2010, 65 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 2010, SPU responded to 38 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 58 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 2010.

### 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, 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. NOAA will be hosting a public workshop in 2011 to present findings to date, and to discuss the next phase of the research.

#### B.2.4 Piper's Creek Microbial Source Tracking Study Results

On December 10<sup>th</sup> 2009, the City provided an S4.F notification for a discharge from the MS4 that is causing or contributing to a known or likely violation of the water quality standard for fecal coliform in Piper's Creek. The notification was based upon data collected during a Microbial Source Tracking Study. The study was implemented by the City to better understand the type and location of fecal coliform bacteria sources in the Piper's Creek watershed in support of the Piper's Creek fecal coliform bacteria TMDL, to improve water quality and to expand regional knowledge of bacteria in stormwater. The results of this study will be used by the City to inform the direction of Seattle's Stormwater Management Program, support the TMDL, and work towards improving the water quality of Piper's Creek. Additionally, the finalized study results will be shared with Ecology, the local community, and the stormwater community to help inform actions to improve water quality.

Although not a focus of this study, a point of non-compliance was identified by SPU staff during review of the draft study report. The point of non-compliance is based upon credible site-specific data collected during the course of this study that trigger notifying Ecology under S4.F of the Permit.

Ecology determined that an adaptive management response under condition S4.F.3 is 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.

#### 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 increased to over 81,000 in 2010, almost double the amount used in 2009 (49,000). Additional education and outreach efforts in the Piper's Creek watershed included MS4 inlet stenciling and Earth Day activities focused on educating the public about health issues surrounding improper pet waste disposal. The Piper's Creek watershed was the first MS4 basin screened during 2010 as part of the IDDE dry weather screening program (see section B.3.5 of this document for a description). The screening

did not detect any illicit connections to the MS4. SPU conducted 123 business inspections, mostly Audit Inspections, in the Piper's watershed in 2010. There were two corrective action letters issued as a result of these inspections. The Venema Natural Drainage System project is part of the Natural Drainage System (NDS) Program implemented through Seattle Public Utilities' Green Stormwater Infrastructure Program. The NDS Program implements capital improvement projects with a long range vision of reducing the effects of over 100 years of urbanization on our creeks' ecological health while providing citizens with local drainage, pedestrian, and other street right-of-way improvements using a naturalistic design.

### B.2.5 Gasoline Spill, Longfellow Creek

On February 25<sup>th</sup> 2010 SPU Spill Response was contacted by Ecology with a report of a possible gasoline spill from a service station. Investigation by SPU staff determined that gasoline had entered the MS4. A survey of the MS4 by the SPU Responder and an Ecology Spill Responder identified gasoline in the MS4 from the service station but due to high stream flows there was no fuel odor or sheen in the creek. However, the Ecology spill responder determined that prior to his arrival some gasoline had entered the creek. SPU issued a Notice of Violation for the discharge of gasoline into the MS4 and required the service station owner to clean the MS4. In addition, SPU conducted a business inspection at the service station and issued a Corrective Action Letter requiring improved spill procedures.

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.

### B.2.6 Petroleum Spill, BNSF Rail Yard

On January 13<sup>th</sup>, 2010 SPU received a report from Ecology via the spill hotline of a petroleum spill to the MS4. The SPU Spill Responder verified that a sheen was present on stormwater flowing into a private catch basin that is connected to the City's MS4. The Ecology and SPU Spill Responder observed a sheen in the vicinity of the City's MS4 outfall into Elliott Bay that was determined to be a result of the BNSF Rail Yard discharge.

Follow up actions by SPU included SPU conducting an inspection of the BNSF facility, which resulted in BNSF hiring a contractor to direct the petroleum spill and stormwater away from the private catch basin and back towards the BNSF on-site wastewater treatment system. BNSF hired a private contractor to jet and clean the private catch basin and the City's MS4. SPU and Ecology are continuing to monitor this situation.

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.

### B.2.7 Construction Stormwater Discharge to Thornton Creek

Seattle Parks and Recreation (Parks) was constructing a 3.7 acre urban park that had coverage under the Construction Stormwater General NPDES Permit from Ecology (WAR 011745 A) and City of Seattle Department of Planning and Development (DPD) Construction and Land use permits. The project's temporary erosion and sediment controls (TESC) were designed to retain all construction stormwater on site, but on March 12, 2010, the site discharged turbid stormwater via the City's MS4 to Thornton Creek.

DPD and SPU conducted an inspection of the construction site and directed Parks to install a plug in a side sewer that was discharging turbid water from the construction site into the MS4. DPD issued a Notice of Violation that required Parks and its contractor to improve the TESC on the construction site. DPD conducted follow up inspections and determined that the improved TESC was successful in controlling sediment and erosion from the construction site.

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.

### B.2.8 NPDES Phase I Monitoring Results

SPU is 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 Do 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 increased to over 81,000 in 2010, almost double the amount used in 2009 (49,000). Additional education and outreach efforts in the Piper's Creek watershed

included MS4 inlet stenciling and Earth Day activities focused on educating the public about health issues surrounding improper pet waste disposal. The Piper's Creek watershed was the first MS4 basin screened during 2010 as part of the IDDE dry weather screening program (see section B.3.5 of this document for a description). The screening did not detect any illicit connections to the MS4. SPU conducted 123 business inspections, mostly Audit Inspections, in the Piper's creek watershed in 2010. There were two corrective action letters issued as a result of these inspections. The Venema Natural Drainage System project is part of the Natural Drainage System (NDS) Program implemented through Seattle Public Utilities' Green Stormwater Infrastructure Program. The NDS Program implements capital improvement projects with a long range vision of reducing the effects of over 100 years of urbanization on the creeks' ecological health while providing citizens with local drainage, pedestrian, and other street right-of-way improvements using a naturalistic design.

#### **B.2.9 Diesel Spill from a Vehicle Accident on W. Marginal Way S.W.**

On March 29<sup>th</sup>, 2010, the Seattle Fire Department responded to a private vehicle accident on W. Marginal Way SW in Seattle. The accident caused the vehicle's fuel tanks to rupture spilling diesel onto the roadway and into the City's MS4. An SPU Spill Responder was dispatched to the site and observed a sheen on the surface of the Duwamish waterway in the vicinity of the MS4 outfall.

The SPU Spill Responder installed absorbent booms and pads around the MS4 inlet, hired a clean-up contractor to clean the MS4, and deployed absorbent booms in the Duwamish to contain any petroleum discharging from the MS4 outfall. Visual confirmation was conducted on March 30<sup>th</sup>, 2010, to confirm that the MS4 was clean and that there was no discharge of petroleum from the MS4 outfall.

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.

#### **B.2.10 Hydraulic Fluid Spill from Private Vehicle at 401 Elliott Ave. W.**

On April 23<sup>rd</sup>, 2010, a truck owned by the Shred-it-Company ruptured a hydraulic line, spilling hydraulic fluid into the MS4 at 401 Elliott Ave. W. The company took immediate action and deployed their spill response kit and contacted their clean-up contractor. However, hydraulic fluid discharged from the City's MS4 outfall and created a sheen on the surface of Elliott Bay.

The clean-up contractor removed hydraulic fluid from the MS4 and deployed a boom around the MS4 outfall to contain any discharge of hydraulic fluid. An inspection by the clean-up company and Ecology on April 24<sup>th</sup>, 2010 determined that there was no sheen on Elliott Bay.

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.

#### B.2.11 Petroleum Discharge, 100 block of Nickerson St. in Seattle

On June 9<sup>th</sup>, 2010, an SPU Environmental Compliance Inspector responded to an ERTS that was filed by the Puget Soundkeeper Alliance for discharge from an MS4 outfall with a strong chemical smell. The SPU Inspector discovered a spotty sheen on the surface of the Lake Washington Ship Canal adjacent to an MS4 outfall. The discharge was traced to a private detention facility connected to the MS4.

SPU installed absorbent booms in the private detention facility and along the Lake Washington Ship Canal to prevent and contain any discharge of petroleum at the MS4 outfall. SPU issued a Notice of Violation to the owner of the private detention facility to clean and repair the facility to prevent future releases of petroleum in the future. SPU is continuing to monitor the situation.

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.

#### B.2.12 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 trackout 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 8<sup>th</sup>, 2010. Upon receipt of the NOV, Seattle Iron & Metals requested, and SPU agreed to a, Voluntary Compliance Agreement (VCA) on September 29<sup>th</sup>, 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 7<sup>th</sup> 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 20<sup>th</sup>, 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 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 that following summary of the status of the Adaptive Management Response report.

Status of implementation in 2010:

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.

- Roof Drains: SIM completed the following VCA elements during 2010.
  - A survey of the roofs and gutters of all structures on the SIM site and assessment of their condition with regard to solids build up was completed by September 30, 2010.
  - SIM provided the roof drain and gutter assessment data, including photos and narrative to the City by October 15, 2010.
  - SIM cleaned the roof and gutters by November 11, 2010.
  - SIM prepared and submitted to SPU an engineering plan regarding design and placement of stormwater filters to prevent the discharge of contaminants from the roof drains to the storm drainage system by November 15, 2010 as required by the VCA.
  - SPU reviewed the roof drain engineering plan and provided comments back to SIM on December 1, 2010.
  - The VCA require SIM to install the roof stormwater filters consistent with the plan by December 31, 2010. However, SIM, Ecology and SPU were negotiating the final plan for roof stormwater filters as of December 31, 2010.
- Track Out – SIM continued to implement a pavement sweeping regiment as agreed to in the VCA.
- Storm Drain Cleaning – SIM cleaned the catch basins located on the south side of S. Myrtle Street by November 15, 2010.

## Monitoring Results

There are no monitoring results to report for calendar year 2010. SPU is planning on monitoring storm drain solid accumulation in the catch basins in the vicinity of S. Myrtle St. in 2011 as part of the Adaptive Management Response.

## Assessment of Evaluation Efforts

Because Ecology did not approve the Adaptive Management Response report during 2010, there has been no evaluation effort conducted during calendar year 2010.

### B.2.13 Illicit Discharge of Sewer Backup at 9824 Lake City Way NE

On July 18<sup>th</sup>, 2010 a citizen called the City's Water Quality Hotline to report that a commercial business was pumping their sanitary side sewer flow into Thornton Creek. A SPU Environmental Compliance Inspector responded and discovered a private plumbing company engaged in a hydro jetting operation to clear a blocked sanitary sewer line at a restaurant on Lake City Way NE. The hydro jetting discharge was being directed toward a drainage inlet on the private property, that is connected to the City's MS4. The SPU Compliance Inspector investigated Thornton Creek and observed the hydro jetting discharge in the creek in the vicinity of the City's MS4 outfall.

The SPU Compliance Inspector instructed the private plumbing company to stop work until a vacor truck could be on site to collect the hydro jetting discharge from the MS4. The vacor truck cleaned and collected all the material from the private inlet and MS4 and properly disposed of the material off site. SPU issued a Notice of Violation to the private plumbing company and the restaurant owner.

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.

### B.2.14 Illicit Connection Screening Results- Pritchard Beach MS4 Drainage Basin

In July of 2010 and in the subsequent investigations, the City discovered 48 illicit connections in the Pritchard Beach MS4 drainage basin as a result of the permit requirement to conduct illicit connection dry weather screening. A screening sample collected from the MS4 near the MS4 outfall during dry weather indicated the likelihood of an illicit connection. SPU initiated an investigation, following the SPU illicit discharge detection and elimination (IDDE) procedure, and discovered three stand alone illicit connections and 45 illicit connections in a subdivision developed between 2000 and 2007. SPU issued Notices of Violation or Voluntary Compliance Agreements with the owners of the properties or other responsible parties to eliminate the illicit connections in a timely manner.

Ecology responded on October 12, 2010 that additional information was required in order to determine an appropriate response under S4.F.2. As of December 31, 2010, SPU was still collecting the additional information requested by Ecology.

### 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/About\\_SPU/Drainage\\_&\\_Sewer\\_System/Plans/StormwaterManagementProgram/index.htm](http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Plans/StormwaterManagementProgram/index.htm)). Over 1358 people viewed this web page during 2010, up from 780 people during 2009. The SWMP had 482 visits, there were 116 visits to the Annual Report and 99 visits to the Attachment B Evaluation of Effectiveness. Around 30 percent of the people who view the web site download the documents. The web site contains the email address, [swmp@seattle.gov](mailto: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 2010 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 29, 2010, is led by the Department of Planning and Development (DPD). This program has conducted 596 temporary sediment and erosion control (TESC) inspections and 35 enforcement actions during 2010.

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 2010, 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 2010 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 2010 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 2010 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 : 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 2010, 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 3,790 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.

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 3,790 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 2010. 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 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.

SPU conducted 952 business inspections in 2010, of which 151 required a corrective action letter and follow up visit to determine compliance with the Stormwater Code. Of the 151 that required corrective actions and follow up visits, 25 were issued Notices of Violation (NOV) and four 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 454 reports in 2010, all of which were investigated and 48, 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 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.

### 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 2010: 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 2010, 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 2010 the hotline received 454 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.3.7.2.3 of this document.

There were 32 illicit connections investigations during 2009 which resulted in 67 enforcement actions (Note: one of the investigations resulted in the discovery of approximately 48 illicit connections). 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 2010 with other corrections pending and determined during the 32 investigations that 28 of the 32 potential sites, illicit connections did not exist. 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 2010.

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.

The City, in 2008, provided training to 953 City staff members who, as part of their normal job responsibilities, might come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. The City video-taped the training session and produced a DVD with the live presentation and Microsoft Power Point side show to serve as the on-going training program to meet this requirement. This training was appropriate because it provided examples of actual illicit discharges/connections to the students and provided them with instruction on how to properly report these violations. The DVD can be viewed by new employees and used as refresher training during staff meetings or other training sessions.

In 2010 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 2010 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 2010 Phase I Permit Annual Report Form.

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

During 2010 the City continued to implement the following elements of the operation and maintenance program: 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 and Monitoring (SCM) 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 and inspected 540 private facilities during 2010, which resulted in 266 corrective action letters for maintenance of the private facilities.

Maintenance of stormwater facilities owned or operated by the City is 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 2010. 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.

The City, in 2008, provided training to 953 City staff members who have primary construction, operations or maintenance job functions that could impact stormwater quality. This training was appropriate because it provided examples of actual BMPs for sediment and erosion control from construction sites to the students and provided them with instruction on how to properly install, inspect and maintain these BMPs to reduce impacts to stormwater quality. The City video-taped the training session and produced a DVD with the live presentation and Microsoft Power Point side show to serve as the on-going training program to meet this requirement. The DVD can be viewed by new employees and used as refresher training during staff meetings or other training sessions.

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 was available to the public as needed during 2010. 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, and conducting an on-site inspection.

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 2010 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 2010 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 The Urban Watershed School Programs

Conducted on Longfellow and Piper's Creeks, these programs educate the general public about the impacts of storm water flows into surface waters and the impacts associated with impervious surfaces. This program is conducted via a partnership between Seattle Public Utilities, Seattle Parks, and Seattle Public Schools.

The Urban Watershed School Program includes two field trip options to a local urban stream where children explore hydrologic concepts and the impacts of urbanization on lotic systems. The field trips tie the investigation of an applied problem- the impacts of stormwater, to classroom curriculum (either the Land and Water science kit, or Salmon in the Classroom program). In 2010, 1209 children attended urban watershed fieldtrips at Piper's Creek and Longfellow Creek. Twenty-four different public, private and parochial schools participated in the program. Seventeen teachers returned pre-post surveys to measure the appropriateness of this BMP. Teachers for both programs reported increases in student understanding of the three stormwater concepts

The City feels that this program is an 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 STORM/Puget Sound Starts Here

The City participated in STORM (Stormwater Outreach for Regional Municipalities) activities and the Puget Sound Starts Here (PSSH) regional campaign which focuses on stormwater BMPs for cars, pets, yard care and home cleaning. The City provided presentations and shared examples of programs and materials with other municipalities (both Phase I and Phase II permittees) through STORM. The PSSH Campaign includes a website and additional media with information to education the general public about the impacts of cleaning products on stormwater and alternative products. Mainstream

media campaign efforts for PSSH include substantial outreach and education in the City through newspapers and television. In addition the City included the PSSH brand on many related outreach materials. The City feels that the PSSH website is an appropriate BMP because information available and accessible for a wide general public audience.

#### B.3.7.1.3 Pet Waste Program

The City conducts a city-wide outreach program that promotes and educates the general public about the impacts of pet waste on water quality. In 2010, the program employed several programmatic strategies to educate and engage the public on the topic of source control BMPs and environmental stewardship actions and opportunities around the issue of pet waste disposal. Key partnerships with animal hospitals, clinics, vets and pet stores enabled the distribution of approximately 2,000 pet waste brochures. An ongoing partnership with Seattle Department of Transportation assisted with the maintenance of 39 pet waste dispensers in key locations city-wide and collaboration with Seattle Block Watch volunteers ensured that pet waste dispensers were monitored and stocked throughout the year. The program expanded to include two additional neighborhood locations for the installation of pet waste dispensers. The City and volunteers stocked 81,730 baggies around the city in 2010, an increase from 49,980 in 2009. A partnership with Seattle Parks resulted in the distribution of approximately 4,000 pet waste bags in Piper's Creek Watershed.

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.3.7.1.4 RainWise

The City has implemented the RainWise program in 2010 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. The program has implemented the following educational/technical elements to raise awareness about GSI (including stormwater treatment and flow control). SPU has provided rain garden and cistern design information, plant lists and maintenance guidelines that can be downloaded from our webpage: [www.seattle.gov/util/rainwise](http://www.seattle.gov/util/rainwise). The RainWise program also provides information and brochures in hardcopy format including a new a set of guidance for roadside rain garden installation by citizens.

RainWise Tools, [www.rainwise.seattle.gov](http://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.

Over 240 landscapers and contractors participated in two training workshops to build capacity in the landscape contractor community for implementing these types of projects. RainWise has also provided technical assistance to schools and community sites to construct and assist with construction at up to 7 sites this year. The RainWise program is in the process of developing (with SDOT) a Client Assistance Memo (CAM) to guide homeowners who want to install a rain garden in the publicly-owned right-of-way in front of their house

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 demonstration projects.

#### B.3.7.1.5 Automotive Maintenance Program (AMP)

The Automotive Maintenance Program targets the general public with BMPs for source control and storage of products related to vehicle maintenance. Outreach activities in 2010 focused on raising awareness about car maintenance BMPs through posters and brochures, hosting oil leak workshops and furthering key partnerships. Outreach materials were translated into Chinese, Vietnamese, Spanish and Amharic and were distributed to 13 Department of Neighborhoods (DON) Neighborhood Service Centers and Seattle Parks and Recreation Community Centers throughout the city as well as to local auto parts, repair shops, and emissions stations. Approximately 5,500 translated brochures and 3,100 English language brochures were distributed. In addition, two workshops were piloted that targeted both the do-it-yourself and Quicklube user audience. These half-day workshops aimed to remove barriers for BMP adoption as well as to emphasize the connection between clean water and vehicle maintenance and were conducted in partnership with South Seattle Community College. The website was regularly updated and do-it-yourself oil change kits were provided to the Water Quality Inspection team to pilot the use of the spill kits in addressing residential complaints of oil spills in Seattle neighborhoods. Key partnerships were strengthened with local auto parts and repair shops and Quicklube services such as Jiffy Lube and Grease Monkey provided coupons on the SPU website to reduce leak repair costs.

The SPU “At Your Service “ and “Curbwaste and Conserve” newsletters featured incentive coupons for a an oil change/leak inspection as well as information about curbside waste oil pick-up offered by SPU during regular garbage pick-up. Approximately 550 coupons were downloaded from the website and 300 coupons were redeemed. The curbside service recycled 2,832 gallons of motor oil.

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.3.7.2 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/SPU2008NPDESE0eval.pdf>

### B.3.7.2.2 Car Wash Kit Program

In 2010 Car Wash BMP outreach efforts were directed towards residential car washing by the general public and new strategies for fundraising groups. Based on the results of the evaluation of the Car wash program in 2008 and an analysis current challenges and opportunities for addressing this BMP, the City has decided to sunset the car wash kit program.

For the general public, SPU partnered with Brown Bear and the Puget Sound Car Wash Association (PSCWA) to offer coupons for a free car wash in the Utility's *@Your Service* bill insert newsletter. This publication reaches approximately 180,000 residents. PSCWA redeemed approximately 311 coupons and Brown Bear redeemed 1,640 coupons.

Fundraising groups were encouraged to sell car wash tickets for use at Brown Bear and Puget Sound Car Wash Association (PSCWA) commercial car wash locations rather than conduct car washes themselves. In addition, the City identified four new *Host Site* businesses in combined sewer areas at which groups could hold car wash events, and known car wash event sites in the MS4 were contacted by SPU to discontinue those activities. Flyers were developed to raise awareness about the impacts of car washing and provide information on the recommended BMPs. The flyers were distributed to approximately 111 organizations. Nine of the groups contacted adopted the ticket selling BMP. Ten car wash fundraisers were held at the host site locations in combined sewer areas.

The City has selected this program for the evaluation required in S5.C.10.b.ii. A complete evaluation of this program is included as Appendix A of this document.

### B.3.7.2.3 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 2010. 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 landscape professionals and horticulture students on how to reduce their use of pesticides. The program promotes 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.

In 2010 two IPM Workshops were held. The first had the theme of “From Restoration Horticulture to Natural Tree Care” and drew 225 professionals and horticulture students. 29 attendees responded to an online follow-up survey, with 25 talking about IPM with colleagues and co-workers, 24 talking with friends, family or neighbors, and 23 using IPM strategies to reduce their pesticide use. The second IPM Workshop had the theme “Managing Turf Sustainably”. A total of 108 landscape professionals attended the Workshop at Seattle University, touring that campus’ pesticide-free landscapes, including their athletic fields. Presentations included a summary of natural-organic fertilizer trials at the Cooperative Extension Service’s Puyallup Research Station.

Four new IPM-related classes were developed for horticulture students: IPM for Edibles, Urban Orchard IPM, LEED and Landscaping and a class held at the Woodland Park Zoo Rose Garden on Plant Disease Control. The Seattle Central Community College Sustainable Agriculture Program was added to the community college venues. Also, SPU’s consultant worked with the Woodland Park Zoo to promote an internship for horticulture students. Two interns were selected in 2010. The Green Gardening Program also funded the website IPMopedia, <http://toxipedia.org/display/ipmopedia/IPM+Education+Project;jsessionid=236B2CC1ACB19F4FE59A41F424AD5B42> to write, edit and post 20 fact sheets on IPM for common food crops.

The Natural Yard Care Nurseries Recognition, which recognizes nurseries that promote and practice IPM, resulted in six nurseries exceeding their commitment by joining the Envirostars Program, administered by King County Water & Land Division. This is a step up, because the program offers still higher levels of recognition for greater levels of effort.

Work with non-English speaking audiences continued. A total of 56 Spanish-speaking landscapers attended one of two workshops offered on less toxic weed control. A less toxic weed control workshop in Vietnamese was attended by 14 participants. A total of 16 participants attended a Cambodian language workshop on “Fall Natural Lawn Care.” All three groups gave very high ratings for the usefulness of the workshops.

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 Natural Yard Care Neighbors

This program is targeted at homeowners and property managers. It focuses on reducing water and pesticide use on lawns and gardens. In 2010, 356 people attended the Natural Yard Care Neighborhood classes in the Greenwood, Broadview, Pigeon Point/Puget Ridge/Highland Park and Rainier Beach neighborhoods. This is the highest attendance in the eight-year history of the classes. In addition to the broad range of natural yard care topics, the classes make the case for compost use in the landscape for water conservation, stormwater mitigation, pesticide reduction and organics recycling. As part of the Cedar Grove Composting’s Compost Days promotion, a P-Patch in each neighborhood received 20 cubic yards of compost for the use of class attendees and P-Patch gardeners.

A notable after-the-fact new feature of the 2010 program was a Race and Social Justice analysis of the classes, including an analysis of the effort made to reach wider, more diverse audiences. As part of this effort, SPU collected demographic information, including race and income about attendees, which most people were willing to provide.

In addition to the classes, 35 class participants attended a June tour of the home garden of one of the class presenters. The garden features a “compost fence,” 2,400 gallons of rainwater cistern storage, and a highly articulated food garden.

This program is an appropriate BMP because the workshops provide information and resources to the public that inform them on how to change their behaviors to reduce the impact of their yard on stormwater quality. The Program Managers have been evaluating effectiveness and evolving strategies for several years based on exit interviews, baseline pre-workshop surveys and longitudinal surveys. Those surveys indicate that attendees are receiving valuable new information. Follow up surveys revealed that stormwater BMPs are among the most common behavior changes reported when asked for behaviors that participants started or increased as a result of the workshop.

#### 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 2010.

#### 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 2010.

#### 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.

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 2010, the business inspection program will continue. However, the auto maintenance program described in B.3.7.1.5 will instead be used to educate homeowners and property managers about BMPs for auto repair and maintenance.

#### B.3.7.3.7 RainWise

Please see the description in B.3.7.3.7.

#### 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. Participants fill out in-class evaluations and they identify (pledge) the actions they intend to take as a result of the training.

In 2010 the program conducted 42 LID and Natural Landscaping training events, in collaboration with professional organizations and the Puget Sound Partnership, that were attended by a total of 2,010 professionals from around the Puget Sound region. Two thirds of those professionals do work in the City's service area, with the remaining third working primarily in other Central Puget Sound Basin jurisdictions. Highlights included delivering landscape-related portions of the new 9-month University of Washington LID certificate program, while continuing the PSP/WSU LID training courses, trainings for builders through the Association of General Contractors and Master Builders Associations as well as CESCL field trainings, trainings for planning and permitting staff on new stormwater code soil requirements, updating the City's Standard Specifications to include those requirements, launch of the new national Sustainable Sites green building guidelines ([www.sustainable-sites.org](http://www.sustainable-sites.org)), a large training for landscape architects that was videotaped for future distance-learning, and trainings in Spanish, Vietnamese, and Khmer (Cambodian) for low-income landscape workers.

Evaluation results from post-workshop surveys of professionals indicated that 94% of participants rated the training “good” or “excellent,” 92% said the training was at the right technical level for their professional needs and 81% pledged behavior change, saying they would take specific actions as a result of the training (most often, adopting one or more of the BMPs/specifications into their daily practice). Barriers reported included regulatory requirements that vary by jurisdiction, the need for specifications and practical techniques to implement BMPs, and clients’ aversion to paying for “new” practices in a down economy.

#### B.3.7.3.9 Private Facility Inspections

Because of the detailed evaluation conducted in 2008 and the modification of the permit, an evaluation of this program was not conducted in 2010. However, education and outreach on this subject continues.

SPU conducts inspections of private stormwater and flow control facilities to determine that they are installed and maintained to City Code. In addition 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. This program will continue into 2010.

The SCM 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.3.7.3.7

#### 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 was available to the public as needed during 2010. 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.

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 2010 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 2010 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 2010 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 2010, 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 2010, SPU took 135 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.

In November 2009, Seattle initiated a water quality study of two recently constructed synthetic turf fields owned by the Seattle Parks and Recreation Department, one AstroTurf® and one Field Turf®. These turf fields are located in Woodland Park which drains to Green Lake. The objective of the study is to determine if drainage from these fields contains high concentrations of pollutants associated with the synthetic turf and, thus, potentially impact environmental health. Concerns about the effects of synthetic turf on public and environmental health have been raised in Seattle and throughout the nation. Due to these concerns, many jurisdictions have placed moratoria on synthetic turf field construction until health effects have been adequately addressed.

A total of 39 water samples were collected from the FieldTurf during four storm events and three base flow periods from November 2009 through January 2010. No samples were collected from the AstroTurf due to lack of flow in the field's underdrains. Samples were collected as a grab sample from locations within the underdrains draining the turf fields and at a background site. Storms sampled were collected during storms that exceeded a minimum of 0.25 inches of precipitation in a 24-hour period. Base flow samples were collected following at least 2 days of dry weather. Discharge was measured using a current meter or the bucket method.

Water samples were analyzed using EPA-approved methods by Aquatic Research, Inc. for the following parameters:

<b>Parameter</b>	<b>Method Number</b>	<b>Target reporting Limit</b>
pH	SH 4500-H	None
Total Hardness	SM2340 C	2 mg/L
Total Suspended Solids	EPA 160.2	0.50 mg/L
Total Phosphorus	SM4500-P F	2 ug/L
Dissolved Phosphorus	SM 4500- P F	1 ug/L
Fecal Coliform Bacteria	SM 9222 D	2 CFU/100 mL
Total Copper, Lead and Zinc	EPA 200.8	1 ug/L
Dissolved Copper, Lead and Zinc	EPA 200.8	1 ug/L
Semivolatile Organic Compounds	EPA 8270	0.1 ug/L

Water quality results were compared to applicable state and federal water quality criteria and to previous stormwater monitoring conducted at Woodland Park by Herrera (2005) and KCM (1995). Where applicable, a statistical analysis of the water quality results was performed to determine if there were significant differences between the stormwater samples and the base flow conditions at each station. Overall water quality results for the samples collected from the FieldTurf show that the pollutant concentrations are low and should not pose an environmental impact to Green Lake.

## 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.ii(3), S5.C.9.b.iii(1) and S5.C.9.b.iv(2).

### 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 2010. Information on the operation and maintenance program can be found in the City's SWMP, submitted as Attachment A of the City's 2010 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 2010 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<sup>2</sup> 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 and rainwater harvesting, which helps to align the Land Use Code requirements with the Stormwater Code.

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.

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 that provided its interpretation of the Water Code indicating that under certain circumstances Ecology will not require a water right for rain water storage.

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 reduce this barrier, the City participated in Ecology's LID stakeholder advisory process during 2010, to inform the permit requirements surrounding LID implementation for the MS4 permit modification. 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 both 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 watershed 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.