

**Brief description of stormwater
monitoring studies not part of
Tacoma's Annual Stormwater
Monitoring Report**

Attachment B6

Attachment B6. 2008 Tacoma Stormwater Monitoring Studies

Thea Foss Stormwater Monitoring and Source Control Program

Under a Unilateral Administrative Order and a Consent Decree with EPA (AOC), the City of Tacoma implements the Thea Foss Post-Remediation Source Control Strategy, a stormwater monitoring and source control program for the municipal storm drains entering the Thea Foss and Wheeler-Osgood Waterways.

The monitoring program component evaluates the quality of stormwater discharges to the Thea Foss Waterway and the effect of those discharges on sediment quality. The monitoring results are being used in an ongoing evaluation of source loadings to the waterway to help identify and manage new or existing sources and to protect sediment quality in the years following the sediment remedial action. Chemicals predicted with the greatest potential to affect sediment quality in the years following cleanup action include polycyclic aromatic hydrocarbons (PAHs) and phthalates.

For a period of seven years (August 2001-2008), seven outfalls were sampled to obtain stormwater and baseflow whole-water samples and stormwater suspended particulate matter (SPM) samples. A total of 436 stormwater samples were collected with between 46 and 68 stormwater samples collected at each outfall (includes 17 storms collected at the new location OF237Anew). A total of 210 baseflow samples were collected with 30 baseflow samples collected at each outfall (includes 12 baseflow events collected at the new location OF237Anew). For each of the seven monitoring periods, 81 stormwater SPM samples were collected in pipeline sediment traps deployed over a six to eight month period at six of the seven outfalls.

The whole-water samples were analyzed for target analytes selected from the list of problem chemicals identified in the AOC, including selected semi-volatiles (PAHs and phthalates), total metals (lead, mercury and zinc), hardness, pH and TSS. The stormwater SPM samples from the sediment traps and the sump were analyzed for the target analytes including PAHs and phthalates, total solids, grain size, TOC, selected total metals (lead, zinc and mercury), Pesticides/PCBs and NWTTPH-Dx.

Media Filtration Stormwater Treatment Device Monitoring – WSDOT Lake Union Ship Canal Research Facility

The City has entered into an Interagency Memorandum of Agreement (IMOA) with the Washington State Department of Transportation (WSDOT) and the City of Seattle, Seattle Public Utility for participation in a study of structural stormwater controls. For the City of Tacoma, the overall intent of this IMOA is to work collaboratively to verify the performance of temporary and permanent stormwater treatment technologies, and to evaluate the applicability of these technologies to the conditions in the Thea Foss Watershed.

The facility, located in Seattle, Washington, in the Interstate 5 right-of-way beneath the north side of the Lake Union Ship Canal Bridge, is being used to test the ability of selected media filtration systems to remove stormwater pollutants, especially metals, PAHs and phthalates. A grant received by the City from the Federal Highway Administration has been used to fund the majority of the study costs.

The StormFilter BMP testing was completed and the final report summary was presented in the 2007 Stormwater Source Control Report.

The AquaFilter unit was updated and hydraulic testing on the unit was completed in 2005 and retested in 2006 on an upgraded unit. Sampling began in 2006 and was completed in December 2008. A final report will be prepared in 2009 to evaluate the treatment performance of this treatment system.

Tacoma Landfill Pervious Pavement Demonstration Project

The Surface Water and Solid Waste Utilities created a demonstration project at the Tacoma Landfill to study various types of pervious pavements and how each affect flow control, water quality, maintenance and durability. The 36,100 square-foot paved area, which is used to provide employee parking, was constructed with equal sections of pervious interlocking pavers, pervious concrete, pervious asphalt and standard asphalt. Additionally, a grass area adjacent to the site will be used as a control and tested for water quality and flow control. The project's prime location in a closed section of the Tacoma Landfill allows for complete collection of water infiltrating the pervious pavement sections due to the existing impermeable landfill liner beneath the pavement.

Test results for both impervious and pervious pavement areas will be compared and results will be used for future stormwater modeling of the landfill cap and to evaluate the effectiveness of pervious pavements for flow control and water quality treatment.

Construction of the project was completed in April 2006. Sampling of the project was started in late 2006 and is anticipated to be completed by summer 2009.

City of Tacoma Wet/Dry Atmospheric Sampling Study

Tacoma completed nine rounds of atmospheric deposition from May 2006 through April 2007 at five sampling locations in the Thea Foss Watershed, in Tacoma, Washington. The sites represent predominately commercial, industrial, and residential areas.

Three additional sampling rounds were completed in 2008. The samplers were deployed July 14 and retrieved August 20; deployed September 4 and retrieved October 6; deployed November 12 and the estimated retrieval date was December 15. This study will likely continue into spring 2009. Once a sufficient number of sampling data is collected, Tacoma will prepare a report and compare the Tacoma data to King County's data upon completion of sampling.

Thea Foss Basin Source Control Sampling Activities

The Stormwater Collection System field support staff complete a variety of sampling and monitoring projects throughout the Thea Foss Basin as part of the source control efforts to prevent recontamination of the Thea Foss Waterway. These activities in 2008 included quarterly sampling of "Pom-Pom" oil snare devices in 13 different locations within the collection system connected to Outfalls 245 and 254 and Tattle Tale samplers

used to prioritize cleaning of areas within the collection system connected to Outfall 237A. Staff also conducted a pilot study of the effectiveness of Absorb-It Filter Blankets for treating discharge water from downtown business property cleaning activities and determined that the filter blankets significantly reduced turbidity and oil sheen from the discharge.

Wapato Lake Stormwater Sampling

Monthly and storm event sampling was initiated April 2008 to determine nutrient and water budgets for the north pond and south lake. A water budget is a spatial-temporal accounting of the inflows, outflows and storage in the lake. Similarly, a nutrient budget is a similar accounting which includes chemical transformations (including sediment/soil interactions) and changes in ecology. Primary elements of the budget included precipitation, stormwater runoff, sheetflow runoff, interflow (near surface groundwater) and groundwater interactions.

Additionally, four synoptic surveys were conducted in the stormwater system draining to Wapato. Each survey consisted of sampling water from 20 manholes in the storm system for total phosphorus and using this information to identify areas for additional investigation. Results of this effort have led to corrections of four sanitary/stormwater cross-connections.

Volunteer Stream Team Water Quality Monitoring

The Pierce Stream Team coordinates collection of water quality data by volunteers for the following list of streams in Tacoma: Buckley Gulch Creek, Crystal Creek, Flett Creek, Mason Creek, Puget Creek, Titlow Park Creek, and Swan Creek. Monitoring parameters include pH, dissolved oxygen, nitrate, temperature, and turbidity. Qualitative observations of water appearance, visible discharges, stream bed coating, odor, weather, debris, or wildlife are also documented. Monitoring frequency varies from monthly to quarterly.

Puget Creek Flow Monitoring

In November 2007, following the City's efforts to restore flows to Puget Creek by closing off some historic storm drains located in the creek bed, a flow meter was placed in the channel to monitor the change in flows resulting from the work. The flow meter was placed where the creek enters the piped section that leads to the outfall into Commencement Bay. The system is currently collecting data which is biased by tidal influence during high tides. It is anticipated that results will be available for presentation in subsequent annual reports.