Annual Performance Evaluation Report
Long-Term Stormwater Treatment - 2012-2013
North Boeing Field
Seattle, Washington

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Prepared for

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LIST OF ABBREVIATIONS AND ACRONYMS

µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
µm	Micron
AKART	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
ASAOC	Administrative Settlement Agreement and Order on Consent
Boeing	The Boeing Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESF	Chitosan-Enhanced Sand Filtration
City	City of Seattle
EAA	Early Action Area
Ecology	Washington State Department of Ecology
EOF	Emergency Overflow
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
FWAAC	Flow-Weighted Average Annual Concentration
ft	Foot
GAC	Granular Activated Carbon
gpm	Gallons per Minute
GTSP	Georgetown Steam Plant
g/yr	Grams per Year
hp	Horsepower
KBFI	Seattle Boeing Field-King County International Airport Rain Gauge
KCBYP	Re-routed North Lateral Storm Drain Pipe from King County
KCIA	King County International Airport
LDW	Lower Duwamish Waterway
LLI	Eurofins Lancaster Laboratories
ISGP	Industrial Stormwater General Permit
LOD	Limit of Detection
LOQ	Limit of Quantitation
LSIV	Lift Station Inlet Vault
LTST	Long-Term Stormwater Treatment
MBPS	Media Bed Pilot Study
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
mL	Milliliter
NBF	North Boeing Field
NPDES	National Pollutant Discharge Elimination System
PAHs	Polycyclic Aromatic Hydrocarbons
Panel	NBF Stormwater Expert Panel
PCBs	Polychlorinated Biphenyls
POC	Point of Compliance
ppb	Parts per Billion
ppm	Parts per Million
PSD	Particle Size Distribution
PSDDA	Puget Sound Dredged Disposal Analysis
PSEP	Puget Sound Estuary Program
QAPP	Quality Assurance Project Plan
RAWP	Removal Action Work Plan

LIST OF ABBREVIATIONS AND ACRONYMS (Cont.)

RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SIM	Selected Ion Monitoring
SM	Standard Method
SMS	Sediment Management Standards
SQS	Sediment Quality Standards
STST	Short-Term Stormwater Treatment
SVOCs	Semivolatile Organic Compounds
TAPE	Technology Assessment Protocol
TOC	Total Organic Carbon
TSS	Total Suspended Solids

1.0 INTRODUCTION

This document presents an annual performance evaluation of long-term stormwater treatment (LTST) at North Boeing Field (NBF) for the second year of system operation, covering the period from November 1, 2012 through October 31, 2013. This annual performance evaluation report follows the planned annual evaluation criteria described in the Sampling and Analysis Plan for Long-Term Stormwater Treatment (SAP; Landau Associates 2012a). The conclusion of this annual evaluation is that the monitoring procedures outlined in the SAP and the Sampling and Analysis Plan Addendum (SAP Addendum; Landau Associates 2013a) were followed and the LTST system met the applicable interim goals for removal of polychlorinated biphenyls (PCBs) and discharge water quality, as described in detail in this report.

A figure showing the vicinity of the site is provided for reference as Figure 1. The U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) have been working with The Boeing Company (Boeing), the City of Seattle (City), Washington, and King County to eliminate sources of PCBs in stormwater discharges to Slip 4 of the Lower Duwamish Waterway (LDW). On September 23, 2010, the EPA issued an *Action Memorandum for the Time-Critical Removal Action at North Boeing Field near the Slip 4 Early Action Area of the Lower Duwamish Waterway Superfund Site* (Action Memorandum; EPA 2010). On September 29, 2010, Boeing entered into an Administrative Settlement Agreement and Order on Consent for Removal Action (ASAOC) with the EPA (EPA and Boeing 2010). The ASAOC required that Boeing address the discharge of PCBs to the Slip 4 Early Action Area (EAA) through short-term and long-term stormwater treatment removal actions.

The LTST system has been functional and operational since October 28, 2011, and consists of a chitosan-enhanced sand filtration (CESF) system that preferentially treats storm flows from the onsite NBF North Lateral, while also treating storm drain base flow and a portion of all the storm flow that drains to the lift station and to Slip 4 (Figure 2). For the 2012-2013 year of operations, monitoring of LTST system performance and of compliance with LTST interim goals from the Action Memorandum (EPA 2010) has been conducted according to the SAP Addendum.

1.1 PROJECT SITE DESCRIPTION

NBF is located east of East Marginal Way South, adjacent to the King County International Airport (KCIA) and the City's Georgetown Steam Plant (GTSP). The approximate street address is 7370 East Marginal Way South, Seattle, Washington. NBF is approximately 150 feet (ft) from the head of Slip 4, which is an EAA at approximately River Mile 2.8 on the Duwamish Waterway within the LDW Superfund Site. The location of the site is shown on Figure 1.

1.2 PROJECT BACKGROUND

Boeing has conducted operations at NBF since the 1940s. NBF is used for research, flight testing, aircraft finishing, and delivery facilities. Stormwater from NBF is collected and conveyed by storm drains to Slip 4 of the LDW. In 2001, the LDW was placed on the National Priorities List (Superfund) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In 2003, the sediments and portions of the bank in Slip 4 were identified as an EAA due to the presence of PCBs in the sediment. Prior to cleanup of Slip 4, Ecology determined that ongoing sources of PCBs discharging to Slip 4 should be controlled to reduce the likelihood of recontamination of the sediment following cleanup. Previous investigations at the NBF site identified the presence of PCBs in solids in manholes, catch basins, and sediment traps, and in water in the NBF storm drain system, which discharges to Slip 4 via the KCIA Storm Drain #3 PS44 Emergency Overflow (EOF).

As defined in the ASAOC, "stormwater" shall mean all liquids, including any particles dissolved therein, in the form of base flow, stormwater runoff, snow melt runoff, and surface runoff and drainage, as well as all solids that enter the storm drainage system. "System," when used in the context of storm drainage, shall mean the combination of all manholes, catch basins, pipes, and other drainage devices and conveyances designed, constructed, and used for the purpose of carrying stormwater from NBF to Slip 4 of the LDW, and the drainage basin associated with these devices and conveyances.

The highest concentrations of PCBs in stormwater in the NBF storm drain system (which discharges to Slip 4) were previously identified to be from the North Lateral portion of the storm drain (SAIC 2011; Landau Associates 2011a). Under the ASAOC, Boeing installed a short-term stormwater treatment (STST) facility to remove PCBs from a large portion of the North Lateral of the NBF storm drain system prior to discharge to Slip 4 (Landau Associates 2010, 2011a). The STST facility, consisting of a 500-gallon per minute (gpm)-capacity CESF system, was placed into continuous operation on September 15, 2010 and operation continued until the 1,500-gpm LTST facility was installed and operating. STST monitoring results, available in the November 2011 Progress Report (Landau Associates 2011b), demonstrate that CESF was very effective at reducing the mass of total suspended solids (TSS) and PCBs in stormwater. Therefore, the LTST facility was designed around a similar CESF system, although significantly larger in footprint and capacity.

Operation of the LTST facility officially began on October 28, 2011. To provide the estimated 200,000 kilowatt-hours (kWh) required to operate the LTST system for each year of operation, Boeing continues to purchase 100 percent renewable energy through the Seattle City Light *Green Up* program.

Monitoring, as described in the SAP Addendum (Landau Associates 2013a), is ongoing at the LTST facility. The 2011-2012 Annual Evaluation Report (Landau Associates 2013b) concluded that the LTST system met the LTST interim goals from the Action Memorandum (EPA 2010).

1.3 LTST TREATMENT SYSTEM DESIGN

The CESF treatment process starts by settling out coarse solids in an aboveground settling/storage tank, then the coagulated solids [via chitosan acetate dosage (less than 1 part per million {ppm} of chitosan acetate solution containing the natural biopolymer chitin)] settle out in additional aboveground settling/storage tanks, and, finally, sand filtration (through a bank of sand filter units) removes the remaining coagulated solids. The sand filter units are automated to perform sequential backflushing. The backflush water discharges to a settling tank and the settled solids are removed periodically for disposal. Greater detail on the design of the LTST facility can be found in the 100% Design Report, Long-Term Stormwater Treatment (Landau Associates 2011c).

Stormwater is preferentially pumped from MH130A (which drains a portion of the onsite North Lateral) directly into the inlet weir tank of the LTST system for treatment at a design capacity of 500 gpm. The remaining LTST capacity (after treating the flows from MH130A) is utilized by pumping available stormwater flow from the lift station inlet vault (LSIV). The location of the LSIV pump in relation to the four King County lift station pumps is provided on Figure 3 and in Appendix B of the Removal Action/Stormwater Treatment Completion Report (Landau Associates 2012b). All stormwater from the four main NBF storm drain laterals and King County re-route storm line (with the exception of water pumped from MH130A) mixes together in the LSIV and is pumped to the LTST system (at a flow rate up to the 1,500 gpm treatment capacity of the LTST system). The LTST system operates at full capacity whenever sufficient stormwater is present. The LSIV submersible pump is set to produce the full design flow rate of 1,500 gpm at a level below which any of the four 50-horsepower (hp) King County pumps activate. Figure 3 shows the current on/off settings for both the LTST LSIV pump and the four King County lift station pumps. A schematic diagram of LTST system components is provided as Figure 4.

The CESF system was anticipated to achieve a long-term average volume capture at the lift station of 81 percent of runoff from only onsite drainage, and 59 percent of runoff from combined onsite and offsite drainage basins. As described in the LTST Removal Action Work Plan (RAWP) and RAWP Addendum (Geosyntec Consultants 2011a,b), the LTST system was predicted to achieve a total PCB load reduction of approximately 73 percent annually [or approximately 96 percent in dry weather, reduced from 6.7 to 0.24 grams per year (g/yr), and approximately 68 percent in wet weather, reduced from 32 to 10.4 g/yr]. See Section 4.1 for an analysis of PCB load reduction by the LTST system. It was also estimated that the LTST system would comply with the interim goal for PCBs for water [0.030 micrograms per liter (μg/L)] approximately 96 percent of the time during a "typical" year (or 100 percent of dry days and 90 percent of wet days per year) based on rough estimates using limited available water and filtered solids dry and wet weather monitoring data. A more detailed description of the interim goals for the LTST system is presented in Section 1.4.

Operation of the LTST system is automated, with the exception of weekly calibration, routine inspections, and troubleshooting. The CESF system is in continuous operation; maintenance and other site activities sometimes require the CESF system to be shut down from time to time. The goal for operation of the LTST system is to achieve no more than 3 percent downtime on an annual basis. During the second year of operation, the percent downtime was 3.7 percent due to required electrical upgrades made at NBF in November and December 2012. These electrical upgrades are not expected to occur routinely. During the first year of operation, the percent downtime was less than 1 percent (Landau Associates 2013b).

1.4 PERFORMANCE STANDARDS AND CLEANUP GOALS

LTST system performance standards were developed during the design process (including the 60% and 90% design report submittals); final performance standards are summarized in the 100% Design Report (Landau Associates 2011c). Treatment goals for LTST were listed in the ASAOC for PCB concentrations in both whole water and in solids discharged in stormwater. The treatment goal for PCBs in solids was actively reviewed and redeveloped with the EPA. LTST system performance standards and cleanup goals are described in more detail in the following sections.

1.4.1 LTST SYSTEM PERFORMANCE STANDARDS

As described in the *100% Design Report* (Landau Associates 2011c), the design basis and performance standards for the LTST system include:

- The system treats all dry weather base flows from the LSIV and from MH130A (which collects a portion of onsite North Lateral drainage) and preferentially treats wet weather storm flows from MH130A and, as capacity allows, additional flows from the LSIV (sometimes referred to in prior LTST documents as OWS421, based on Boeing's identification number). The LTST system was designed to capture and treat approximately 91 percent of onsite storm flows to MH130A (12.8 acres) and 100 percent of onsite and offsite dry weather base flows to the LSIV (approximately 106 acres onsite plus approximately 191 acres offsite). Additional treatment of low storm flows at the LSIV is provided as capacity is available. The system is set to operate at full capacity (1,500 gpm) whenever sufficient stormwater is present.
- The submersible pump at MH130A is connected to a force main and routes base and wet weather storm flows from MH130A directly to the LTST system. When the LTST system

has capacity beyond that which is required to treat the flows from MH130A, additional storm flows from the LSIV are pumped to the system.

- Offsite stormwater that formerly drained to the North Lateral (41.1 acres of King County drainage) was re-routed at a storm drain manhole that is located 16 ft upstream of MH178. The re-routed line is routed directly to the LSIV. The re-route minimizes overflow bypass at MH130A and allows preferential capture and treatment of onsite North Lateral storm flows. The re-route also allows some treatment of offsite North Lateral flows (as well as other laterals) at the LSIV when capacity allows.
- One hundred (100) percent of dry weather base flows from onsite and offsite laterals discharging to the LSIV are pumped to the LTST system.
- All treated flows from the LTST system are discharged to the Lift Station outlet structure, located downstream of the LSIV and the King County Lift Station pumps. The sampling location at the outlet structure is referred to as LS431.

NBF onsite and offsite drainage basins that drain to the LSIV (the inlet structure for both the King County Lift Station and for the LTST system) and are treated by the LTST system, up to its maximum 1,500 gpm, are shown on Figure 2. The boundary of the specific drainage basin that drains to MH130A and is preferentially treated at the LTST system is also shown on Figure 2.

1.4.2 LTST Treatment Goals

Interim goals for the LTST facility were set by the EPA in the ASAOC as follows:

- Water discharged to Slip 4 must be below the Aquatic Life – Marine/Chronic water quality standard of 0.030 µg/L total PCBs. Boeing conducted (AMEC Geomatrix Inc. 2011) and EPA approved (EPA 2011) a salinity study in Slip 4 that demonstrates that the use of the Marine/Chronic water quality standard for total PCBs is appropriate.
- In-line storm drain solids discharged to Slip 4 must be below 100 parts per billion (ppb) dry weight total PCBs. This interim goal shall be used as a point of departure in considering whether the long-term interim goal for in-line storm drain solids discharged to Slip 4 should be modified in accordance with the all known, available, and reasonable methods of prevention, control, and treatment (AKART; Geosyntec Consultants 2011c).

However, a recommended alternative interim goal (replacing the storm drain solids interim goal above) was approved by the EPA in a letter dated January 19, 2012 (EPA 2012). Development of the alternative interim goal is described in a memorandum, *Amended Monitoring Approach Recommendations for North Boeing Field Long-Term Stormwater Treatment System* (Jones et al. 2012). The alternative interim goal for the LTST facility is as follows:

- A flow-weighted annual average concentration (FWAAC) for total PCBs in water of 0.018 µg/L.

Both the water quality and FWAAC goals are to be met at the Point of Compliance (POC), also referred to as LS431, which is shown on Figures 4, 5, and 6. Ecology has not approved the alternative interim goal identified in this report, and has not identified the POC for the NBF-GTSP Remedial Investigation (RI).

2.0 SAMPLE AND DATA COLLECTION METHODOLOGY

This section presents the sampling objectives, sample locations, and the sample collection methodologies, frequency, and laboratory analyses. Stormwater monitoring and sampling at NBF was conducted in general accordance with the SAP Addendum (Landau Associates 2013a), which includes a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP).

2.1 SAMPLING OBJECTIVES

The objectives of LTST field sampling in 2012-2013 were to gather data to:

- Monitor stormwater discharges for comparison with the LTST interim goals
- Evaluate the design assumptions for and performance of the LTST facility
- Confirm that the interim goals are reasonably conservative and descriptive of site conditions, including the appropriateness of treating non-detect PCBs concentrations in water as zero when calculating the annual average PCB concentration
- Evaluate individual lateral storm drain inputs, and monitor the effects of future source control actions
- Characterize solids for disposal.

2.2 SAMPLING LOCATIONS

Stormwater and solids samples were collected at NBF at the following locations shown on Figures 4, 5, and 6:

- **Lift Station (LS431) – Compliance Monitoring Point**. The point of compliance for the LTST interim goals is identified in the SAP as just downstream of the King County lift station pumps. This point is also downstream of the LTST system effluent discharge. Sampling at this location consisted of collecting flow-weighted whole water samples for laboratory analysis. In addition, continuous flow monitoring was conducted at LS431, to quantify the amount of stormwater discharged.
- **LTST System Influent and Effluent**. To monitor the performance of the LTST facility, whole water samples of the treatment facility influent and effluent, and filtered solids samples from the treatment facility influent and effluent, were collected for laboratory analysis. The influent to the LTST facility from MH130A (the North Lateral) was sampled independently from the influent to the LTST facility from the LSIV (all other laterals). When the King County pumps operate and bypass of the LTST CESF system occurs, untreated stormwater from LSIV is what is discharged to Slip 4. LSIV samples provide characterization of bypass stormwater[1] as well as data on the influent to the CESF system.

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[1] Collecting samples of LSIV water that is conveyed to the treatment system is an indirect method of sampling water that bypasses the treatment system. However, during precipitation events where bypass of the treatment system occurs, stormwater enters the LSIV at high, turbulent flow rates from three very large pipes. Both the King County pumps and the LTST LSIV pump have intake structures located near the bottom of the vault. Water within the LSIV is well-mixed during these events, which is supported by visual observation through the grate at ground level. Therefore, LSIV samples are reasonably representative of bypass stormwater.

- **LTST Weir Tanks, Storage Tanks, and Sand Filters**. During the second year of operation, solids were removed from the backflush settling tank and the inlet weir tank, and sand filter media was removed and replaced. Samples of solids retained in the backflush settling tank and inlet weir tank were collected to determine appropriate disposal options for the solids. Sampling of sand filter media was not necessary as analytical data from prior waste sampling were sufficient to determine appropriate disposal options. No solids were removed and no samples were collected from the storage tanks during the second year of operation.
- **Sediment Traps**. To continue to evaluate individual lateral storm drain inputs, Boeing continued the sediment trap monitoring program that began in 2005, with the modifications described in the SAP to account for changes in flow due to the stormwater re-route. This consisted of collecting solids from sediment traps at locations SL4-T1, SL4-T2, SL4-T3, SL4-T4, SL4-T5, SL4-T4A, and SL4-T5A(2). This monitoring program is overseen by Ecology.
- **Re-routed North Lateral Storm Drain Bypass Pipe from King County**. Flow monitoring of re-routed stormwater from King County was conducted at SL4-T5A(2).

The storm drain system, sampling location LS431, and sediment trap locations are shown on Figure 5. Figure 6 shows a more close-up plan view of the LTST system and the locations of the water sample ports and filtered solids housings for the LTST system influent (both MH130A and LSIV) and effluent.

2.3 LIFT STATION (LS431)

Sampling at LS431 consisted of collecting flow-weighted composite whole water samples from stormwater at the monitoring POC. The POC is in the King County lift station effluent vault (LS431 discharge outlet structure), at a point just downstream of the location at which the CESF effluent is discharged into that structure. Storm drain discharges here represent 94 percent of the NBF onsite drainage area. The remaining 6 percent of the area is primarily used for employee parking and is known to have relatively lower PCB solids concentrations (Landau Associates 2011c). LS431 is also the farthest downstream location in the storm drain system not impacted by tidal flushing. Figures 5 and 6 show POC, LS431.

2.3.1 SAMPLING FREQUENCY

Stormwater samples were collected monthly from LS431. These 12 sampling events took place over multiple days in order to obtain representative samples of water discharged to Slip 4 during a wide variety of precipitation conditions. Setup took place and sampling commenced on the first Monday of the month. If the week of the month that included the first Monday also included a holiday, sampling instead took place the following week. Volume intervals for flow-weighted composite whole water sampling were calculated based on weather forecasts for the period starting Monday and continuing through the following Thursday, a 3-day period. Actual precipitation varied from the predicted amount used to calculate the volume interval, and sample collection sometimes occurred before Thursday due to earlier than anticipated filling of the 5-gallon glass carboy.

In addition, to ensure that at least some monitoring of LS431 discharge took place during LTST system bypass conditions, five storm events were sampled. Requirements for these five events were precipitation of 0.5 inches or greater in the sampling event (24 hours or less), and indication that bypass of the LTST system occurred during the sampling event.

A matrix of sampling events, including the type of event, sample dates, precipitation data, and sampling location is provided in Table 1.

2.3.2 Sampling and Data Collection Methods

Flow-weighted composite samples of the stormwater at LS431 were collected using an ISCO 6712 automated sampler with a jumbo base holding a 5-gallon laboratory-cleaned glass carboy. Equal volume aliquots [500 milliliters (mL)] were collected more frequently at high flow rates and less frequently at low flow rates. The volume interval between aliquots for each sampling event was calculated using the anticipated volume of stormwater runoff and base flow[2] for the period to be sampled. A regression line using flow data at LS431 from past storm events was periodically updated with recent data to estimate runoff for an upcoming sampling event based on the inches of predicted rainfall. During periods of dry weather, flow data collected at LS431 provided an estimation of base flow rates, which change seasonally.

Flow measurements were taken with a Marsh-McBirney FLO-DAR® Radar Area/Velocity Sensor mounted above the flow at the entrance to the 48-inch LS431 outlet pipe, downstream of the CESF effluent discharge. The sensor was installed so that it is oriented in the center of the flow in the pipe. Flow was measured continuously at 1-minute intervals. Data from the sensor were collected and logged by a Hach FL900 Series Flow Logger, and the ISCO autosampler was programmed to collect aliquots of stormwater based on the predetermined volume interval programmed into the flow logger.

The stormwater collected for laboratory analysis is drawn from a point at the entrance to the 48-inch LS431 outlet pipe, downstream of the King County lift station pumps and the LTST system discharge. A peristaltic pump (attached to the autosampler) and a Teflon®-lined suction line are used to collect water from this location. The intake of the suction line is connected to a stainless steel strainer to

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[2] For this project, base flow is defined as water that enters the NBF storm drain system, but is not a direct result of precipitation. Base flow primarily includes infiltrating groundwater, but may also contain small contributions from other sources (e.g., fire fighting-related water, offsite sources of landscape irrigation water, stormwater discharges allowed under the Industrial Stormwater General Permit, or other offsite stormwater discharges authorized by King County). Base flow rates are measured at LS431 during periods of zero precipitation. The rate fluctuates seasonally due to changes in groundwater elevation.

remove any large debris. The strainer is attached to an aluminum plate bolted to the floor of the outlet pipe entrance.

The sampling carboy was kept on ice for the entire sampling event. Within 24 hours after the sampling event concluded (i.e., the time the last aliquot was collected), the carboy was retrieved, capped with a Teflon®-lined cap, and submitted to the laboratory for the analyses required. Using a churn splitter or similar device, laboratory staff distributed proper volumes of homogenized stormwater to bottles for preservation or immediate analysis.

Precipitation was tracked through the Seattle Boeing Field-King County International Airport rain gauge (identified as "KBFI") at http://www.wrh.noaa.gov/mesowest/getobext.php?wfo=sew&sid=KBFI&num=48&raw=0&dbn=m. The KBFI rain gauge data were recorded to determine how much precipitation fell during sampling periods, as well as how much precipitation fell during the 2012-2013 season.

2.3.3 Laboratory Analyses

Whole water samples were analyzed for PCBs using EPA Method 8082, for TSS using Standard Method (SM) 2540D, and for particle size distribution (PSD) using the Ecology TAPE 2008 Appendix F / ASTM D3977, Method C. To provide information for the remedial investigation being conducted by Ecology at NBF and the GTSP, samples were analyzed for total and dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) using EPA Methods 200.8 and 7470, semivolatile organic compounds (SVOCs) using EPA Method 8270D, and polycyclic aromatic hydrocarbons (PAHs) using EPA Selected Ion Monitoring (SIM) Method 8270D. To provide data for compliance monitoring for the National Pollutant Discharge Elimination System (NPDES) stormwater permit at NBF, samples were analyzed for turbidity using EPA Method 180.1, for pH using a field meter, and visual observations were made for oil sheen, in accordance with permit conditions. Samples were also analyzed for pH in the laboratory using EPA Method 150.1. Because of LTST operational challenges from dissolved iron and iron-related bacterial growth (e.g., precipitation in monitoring instrumentation and additional sludge volume accumulation in the backflush tank) that are associated with groundwater infiltration into the storm drain lines, samples were analyzed for total and dissolved iron and manganese using EPA Method 6010.

2.4 LONG-TERM STORMWATER TREATMENT SYSTEM SAMPLING

Sampling at the LTST facility consisted of collecting whole water grab samples of the treatment facility effluent and influent from the MH130A line, composite or grab water samples of the stormwater from the LSIV influent line, and samples of the solids entrained in the influent (both MH130A and LSIV) and effluent.

2.4.1 SAMPLING FREQUENCY

Whole water samples and filtered solids samples were collected monthly from the treatment facility influent and effluent. In addition, five storm event samples were collected for LTST performance monitoring concurrent with LS431 storm event discharge compliance sampling. A matrix of sampling events, including the type of event, sample dates, precipitation data, and sampling location is provided in Table 1.

2.4.2 SAMPLING AND DATA COLLECTION METHODS – WHOLE WATER

Whole water grab samples were collected directly into laboratory bottles from sample ports on the MH130A influent line and the effluent line of the treatment system. To monitor the LTST system performance under a variety of conditions, efforts were taken to collect whole water grab samples from the MH130A influent and the effluent during both precipitation conditions and during base flow conditions. Reasonable efforts were made to sample at various times during a precipitation event (i.e., at the beginning of a storm and toward the end of a storm) and during various intensities of storms. Samples were collected in laboratory-supplied sample bottles after allowing water to purge from the sampling ports for a minimum of 20 seconds prior to collection of a sample.

In March 2012, in order to better meet the goal of collecting samples representative of LSIV stormwater during periods of bypass of the CESF system, an ISCO model 1640 Liquid Level Actuator was installed in the Lift Station outlet structure that could enable the LSIV autosampler whenever bypass took place. During sampling events when LTST bypass occurred, a flow-weighted composite whole water sample was collected from the LSIV influent line. Sampling duration generally matched that of LS431. The LSIV ISCO sampler was triggered from the flow logger used at LS431, as no reasonably feasible method of triggering sample collection based on flow rates into or out of the LSIV was identified. Although LS431 flow includes treated water and bypass water, triggering LSIV samples based on the LS431 flow logger still results in more aliquots being taken during higher flow rates (e.g., during bypass conditions) and less aliquots being taken during lower flow rates (e.g., discharge of treated stormwater only). Starting in December 2012, whenever there was no bypass during a sampling event, a grab sample of LSIV whole water during non-bypass conditions was collected directly into laboratory bottles from a sample port on the LSIV influent line at the end of the event, in order to provide water quality data on LTST system influent from the LSIV.

2.4.3 Sampling and Data Collection Methods – Filtered Solids

To collect solids samples from the treatment facility influent and effluent, stormwater solids were collected in filter bags using FSI model CBFP-11 carbon steel filter housings installed on the influent pipelines (MH130A and LSIV) and on the effluent pipeline. These locations are shown on Figure 6. A portion of each of the three streams passes through a filter bag where solids are captured. A flow totalizer downstream of each filter housing measures the total volume of stormwater flowing through the filter bag. Filter bags used were 16-inch-long, 7-inch-diameter, 1 micron (µm) nominal particle size rated polypropylene felt filter bags with a Polyloc® seal (to prevent bypass).

By early 2013, two filtered solids systems were installed in parallel on each of the three stormwater sampling locations, so that two bags for each location could be collected simultaneously during a sampling event. These upgrades were primarily to provide PAH and metals analyses for the RI being conducted by Ecology at NBF and the GTSP. Prior to the additional parallel housing installation, two interim sampling events were conducted in order to collect filtered solids samples for metals in November and December 2012 at MH130A.

The amount of filtration time for each filter bag to be analyzed for PCBs generally matched the duration of the LS431 water sampling (up to 24 hours for storm events, approximately 3 days for routine monthly events). Filtration time for the two interim events at MH130A varied, in an attempt to collect as much mass of solids as possible to be able to run the analyses. Only clean, new filters were used. For bags being submitted for PCB and PAH analysis, filter bags were pre-weighed and numbered at the laboratory. After successful completion of filtration, the filter bags were removed, placed in a clean Ziploc® bag, sealed, labeled, and transported to the laboratory. Readings from the flow totalizers were collected at the start and end of filtration for each sampling event.

2.4.4 Laboratory Analyses

Whole water samples were analyzed for PCBs using EPA Method 8082, for TSS using Standard Method (SM) 2540D, and for PSD using the Ecology TAPE 2008 Appendix F/ASTM D3977, Method C. To provide information on the effectiveness of the LTST system at removing metals, samples were analyzed for total and dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) using EPA Methods 200.8 and 7470. To provide information for the RI being conducted by Ecology at NBF and the GTSP, samples were analyzed for SVOCs using EPA Method 8270D and PAHs using EPA SIM Method 8270D at LSIV during every event starting with the January 2013 monthly sampling event (with the exception of the January 2013 monthly sample as the 5-gallon glass carboy was dropped at the laboratory and the entire sample was lost), at MH130A during alternating events starting with the March 2013 monthly sampling event, and at the CESF effluent during one monthly sampling event and two storm sampling events. All LTST samples were also analyzed for turbidity (except the effluent, which is continuously analyzed with a CESF system turbidity meter) using EPA Method 180.1, for pH using EPA Method 150.1, and for total and dissolved iron and manganese, using EPA Method 6010.

Filtered solids samples collected from the LTST facility influent and effluent were analyzed for PCBs by EPA Method 8082. Filtered solids samples were also analyzed on an alternating basis starting in early 2013 for metals by EPA Methods 6010/6020 and 7471 and for PAHs by EPA Method 8270D, with the exception of the CESF effluent filtered solids, which were not analyzed for metals (not enough solids are able to be scraped from the bag for analysis). Filtered solids samples were analyzed for PAHs from one monthly and two storm sampling events. For PCB and PAH analyses, new filters were weighed and numbered prior to sample collection so that each sample was matched to a unique, clean-filter weight. The used filter was dried, weighed, and processed by the laboratory. For each filter, the entire filter (not including the hard plastic ring, but including whatever material was collected) was extracted and the analytical results presented in units of total µg of PCBs or PAHs. Knowing the full weight of the used dried filter (including collected material) and the pre-filtration weight, the estimated mass of PCBs or PAHs per mass of total solids was calculated. For metals analysis, solids were scraped from the used filter bags for analysis.

2.5 WEIR TANK, STORAGE TANK, AND SAND FILTER MEDIA MONITORING AND SAMPLING

The solids levels in the inlet weir tank, each storage tank, and the backflush settling tank were inspected at least once per month. Monitoring of the thickness of accumulated solids was performed with a Sludge Judge® inserted from the top of the tank to the tank floor. The device collects a solids sample that can be retrieved and visually inspected. The thickness of accumulated solids in the sampler was observed and recorded. Three or more readings, spread approximately equally along the length of the tank, were averaged and used to determine if the solids level was deep enough to require tank cleanout. The solids in the three storage tanks were never deep enough to warrant sampling, cleaning, and disposal. Solids from the backflush settling tank and inlet weir tank were sampled on May 13, 2013. The inlet weir tank solids sample was analyzed for PCBs using EPA Method 8082, and the backflush settling tank solids sample was analyzed for PCBs using EPA Method 8082, SVOCs using EPA Method 8270D, diesel-range and motor oil-range petroleum hydrocarbons using Ecology Method NWTPH-Dx, gasoline-range petroleum hydrocarbons using Ecology Method NWTPH-Gx, metals using EPA Methods 6010, 7471, and 1311 [the toxicity characteristic leaching procedure (TCLP)], PSD using Puget Sound Estuary Program (PSEP) Method PS, and total organic carbon (TOC) using EPA Method 9060.

The sand filter media was removed and replaced on November 7, 2012, just after one full year of LTST system operation. Sampling of sand filter media was not necessary as analytical data from prior waste sampling were sufficient to determine appropriate disposal options. Observation of sand filter operation by Clear Water Compliance Services (Clear Water) during the 2012 to 2013 monitoring year has indicated that the sand filters are still filtering and backflushing effectively, and Clear Water expects that the filter media will not need to be replaced before the spring of 2014.

2.6 SEDIMENT TRAPS

The sediment trap monitoring program that began in 2005 at the NBF site, and is overseen by Ecology, was continued during operation of the LTST facility to evaluate stormwater quality from the individual NBF lateral storm drains prior to combining at the LSIV and treatment at the LTST facility. Sediment trap sampling locations are shown on Figure 5. Solids were collected by sediment traps at locations SL4-T1, SL4-T2, SL4-T3, SL4-T4, SL4-T5, and SL4-T4A. Locations SL4-T2A and SL4-T3A are monitored separately by the City or County, and analytical data for these locations are not presented in this report. At location SL4-T5A(2), a sediment trap is not used; instead, solids are collected from the bottom of the wet well, which collects solids behind a permanent weir.

2.6.1 SAMPLING FREQUENCY

The established frequency for sediment trap sampling is annually, currently once per year in the spring. Sediment trap samples were most recently collected on May 13, 2013, and sediment trap bottles were redeployed the same day for collection in spring 2014.

2.6.2 SAMPLING METHODS

Each sediment trap [with the exception of SL4-T5A(2)] consists of two stainless steel brackets and housings that each holds a Teflon® sample container. Once the containers are securely placed on the bracket, the container lids are removed and placed in a plastic sealable bag and labeled with the sample location. After the desired sample duration has elapsed, the lids are placed back on the containers and the containers removed. The solids in SL4-T5A(2) were collected from the bottom of the compartment of the wet well behind the weir using a new, clean, laboratory-supplied glass soil sampling jar affixed to the end of a decontaminated telescoping sampling pole. Water was decanted from the jar, to the extent possible, and the solids from each “pass” were combined and homogenized in a clean stainless steel bowl using a clean stainless steel spoon, and placed into a separate sample jar.

2.6.3 LABORATORY ANALYSES

Sediment trap solids samples were analyzed for PCBs using EPA Method 8082; SVOCs using Puget Sound Dredged Disposal Analysis (PSDDA) Method SW8270D; total metals (arsenic, copper, lead, mercury, and zinc) using EPA Methods 6010 and 7471; diesel-range and motor oil-range petroleum hydrocarbons using Ecology Method NWTPH-Dx; TOC using EPA Method 9060, and PSD using PSEP Method PS. Depending on the quantity of solids collected, the laboratory might not have been able to analyze all parameters, in which case, the analysis of parameters was prioritized in the order listed above.

2.7 RE-ROUTED KING COUNTY STORMWATER

Continuous flow rate monitoring of re-routed stormwater from King County took place at the new wet well near the LTST, as discussed in the Completion Report (Landau Associates 2012b), using a weir and pressure transducer.

2.8 CATCH BASIN INSERT FILTER REPLACEMENT

Although not directly related to CESF system treatment and LTST system monitoring, this source control action directly reduces the amount of solids and associated contaminants that enter the storm drain system and that the LTST system would need to filter out. Catch basin insert filters were initially installed and tested at three locations in March 2011. Catch basin insert filters were installed at 24 more catch basins in April 2012, with 13 of those locations being large catch basins that required two separate insert filter bag structures. Therefore, there are a total of 27 catch basin locations that have insert filter structures and a total of 40 individual insert filter bags used.

In January 2013, captured solids were collected from all 27 catch basin insert filters and submitted to the laboratory for PCB analysis by EPA Method 8082. All 27 insert filters were clogged with solids and were concurrently replaced. In July 2013, another round of filter replacement was conducted. For this round, filters in all 27 structures were inspected and clogged filters were replaced in 25 of those structures, but samples of filtered solids were not collected for analysis. It is planned that filter inspection will occur at least twice per year, and filters will be replaced whenever they are observed to be clogged with solids.

3.0 MONITORING RESULTS

The results from monitoring of the NBF storm drain system and LTST performance evaluation have been provided to the EPA on a regular basis as part of the detailed quarterly and brief monthly progress reports. These monitoring results are provided in this section. The results from sampling solids collected from the sediment traps and from the catch basin insert filters are also discussed.

3.1 LS431 AND LTST PERFORMANCE ANALYTICAL RESULTS

Cumulative laboratory analytical results are provided in Tables 2 through 8. Whole water results are provided in Table 2 for the LS431 point of compliance, Table 3 for MH130A, Table 4 for LSIV, and Table 5 for CESF system treated effluent. Filtered solids results are provided in Table 6 for MH130A, Table 7 for LSIV, and Table 8 for treated effluent.

3.1.1 PCBs IN WHOLE WATER

Starting with the December 17, 2012 stormwater sampling event, Analytical Resources Inc. began evaluating PCBs in whole water between the Limit of Detection (LOD) and the Limit of Quantitation (LOQ) for each Aroclor. Since the target LOQ for PCBs in whole water is 0.010 µg/L, the LOD for PCBs in whole water is 0.005 µg/L unless the LOQ is elevated. PCB concentrations below the LOQ prior to December 17, 2012 and below the LOD on or after December 17, 2012 are specified as non-detect in this report.

All water samples of the LTST CESF system effluent have been non-detect for PCBs since LTST monitoring began in 2011. For the 2012-2013 reporting period, concentrations of total PCBs at the influent to the CESF system have ranged from 0.030 µg/L to 0.31 µg/L at MH130A, and from non-detect to 0.182 µg/L at LSIV. Since May 2012 when LSIV water sampling procedures were divided between flow-weighted composite samples of bypass only (when possible) and grab samples of non-bypass flow, PCBs were detected in only one of eight grab samples of LSIV water during non-bypass conditions (at 0.010 µg/L), and in seven of nine flow-weighted composite LSIV samples of bypass, ranging from 0.014 µg/L to 0.182 µg/L. PCBs at the POC, LS431, have been non-detect in the 2012-2013 reporting period except for the September 5-6, 2013 storm event and the October 7-9, 2013 monthly event, both of which indicated a concentration of total PCBs of 0.015 µg/L. The only other PCB detection at LS431 since LTST monitoring began was 0.025 µg/L, during a storm event in November 2011. These three detections coincided with either large amounts or a high intensity of precipitation during the sampling event (1.99 inches in November 2011, 1.36 inches in September 2013, and 0.26 inches in a 1-hour period in October 2013). All PCB detections in water samples in the 2012-2013 reporting period have been

Aroclor 1254, except for two detections of Aroclor 1260 from MH130A and LSIV during the October 2013 monthly event.

3.1.2 TSS AND PSD IN WHOLE WATER

In the 2012-2013 reporting period, TSS in water samples ranged from non-detect [at a LOQ of 1.0 milligrams per liter (mg/L)] to 3.4 mg/L at the LTST CESF system effluent, from 2.7 to 168 mg/L at MH130A, and from 8.6 to 298 mg/L at LSIV. In general, TSS was higher in flow-weighted composite LSIV samples of LTST bypass and lower in grab samples at LSIV during non-bypass conditions. At LS431, TSS in water samples ranged from 1.0 to 35.5 mg/L in the 2012-2013 reporting period. The two highest TSS results (35.5 mg/L from the September 6, 2013 storm event and 27.0 mg/L from the October 2013 monthly event) coincide with the only two PCB detections at LS431 during the reporting.

Similar to the previous year, PSD data from water samples were highly variable throughout the reporting period at all sampling locations. The CESF effluent data indicate that a significant percentage of very small particulate [less than 3.9 micrometers (µm)] can pass through the CESF treatment system, as was expected. However, particles of this size are not expected to settle in Slip 4 (Jones et al. 2011). PSD data also appear to suggest that 11 of 17 effluent samples contained a majority (based on mass) of particulate greater than 250 µm, a size range that the CESF system was expected to remove. However, in most of the effluent samples analyzed, the TSS concentration given by the PSD analysis (when all particle size groupings are added together) was significantly higher than the direct TSS concentration measured using EPA Method 160.2. That difference in TSS concentration between the two analytical methods was especially pronounced in many of the samples where PSD results indicated a majority of the particulates were greater than 250 µm. It is believed that low TSS concentration in CESF treated effluent may contribute to imprecise PSD analysis in these samples, which limits the ability to draw conclusions from this data set.

3.1.3 SVOCS IN WHOLE WATER

At LS431, SVOCs in water (other than PAHs) were non-detect during the reporting period for all constituents except for phenol (two detections with a maximum concentration of 1.7 µg/L), bis(2-ethylhexyl)phthalate (two detections with a maximum concentration of 8.1 µg/L), naphthalene (one detection at 4.4 µg/L), 2-methylnaphthalene (one detection at 7.0 µg/L), and 1-methylnaphthalene (one detection at 5.9 µg/L). A number of these detections occurred during the September 6, 2013 storm event when a noticeable odor, identified by field personnel as similar to paint thinner, was observed in and around the LSIV.

Due to the lower LOQs used, PAHs continue to be more frequently detected at LS431. Data indicate a correlation between the amount of precipitation (and corresponding percentage of treatment system bypass) during the sampling event and detections of PAHs. The monthly events with little to no precipitation (and little to no CESF system bypass) had fewer detected constituents and generally lower PAH concentrations. As high molecular weight compounds with generally low solubility, similar to PCBs, PAHs in stormwater are known to be associated with the suspended solids rather than being present in a dissolved form. Therefore, it is not unexpected that the data suggest that the CESF treatment system is effective at reducing concentration of PAHs.

3.1.4 METALS IN WHOLE WATER

High concentrations of iron and manganese continued to be routinely detected in LTST CESF system influent, effluent, and LS431 water samples, consistent with the observation of base flow due to groundwater infiltration into the storm drain system and consistent with the observation of iron bacterial growth in many elements of the LTST system and storm drain system.

Of the other metals analyzed for, arsenic, cadmium, chromium, copper, lead, nickel, and zinc were detected at various concentrations at MH130A, LSIV, LS431, and the CESF effluent in the reporting period. Mercury was not detected at any sampling location in the reporting period.

Data indicate that the CESF system continues to reduce metals concentrations in stormwater. In the 2012-2013 reporting period, for total arsenic in water samples, concentrations at the CESF system influent ranged from 0.6 to 3.2 µg/L at MH130A and from 1.0 to 5.5 µg/L at LSIV, while concentrations at the CESF system effluent ranged from 0.3 to 0.7 µg/L; for total cadmium in water samples, concentrations at the CESF system influent ranged from non-detect (at a LOQ of 0.1 µg/L) to 4.1 µg/L at MH130A and from non-detect (at a LOQ of 0.1 µg/L) to 2.0 µg/L at LSIV, while concentrations at the CESF system effluent were all non-detect except for one detection at 0.1 µg/L; for total chromium in water samples, concentrations at the CESF system influent ranged from non-detect (at a LOQ of 0.5 µg/L) to 2 µg/L at MH130A and from non-detect (at a LOQ of 1 µg/L) to 12.8 µg/L at LSIV, while concentrations at the CESF system effluent ranged from non-detect (at a LOQ of 0.5 to 1.0 µg/L) to 0.7 µg/L; for total copper in water samples, concentrations at the CESF system influent ranged from 1.1 to 9.2 µg/L at MH130A and from 1.0 to 51.0 µg/L at LSIV, while concentrations at the CESF system effluent ranged from non-detect (at a LOQ of 0.5 µg/L) to 2.3 µg/L; for total lead in water samples, concentrations at the CESF system influent ranged from 0.2 to 3.3 µg/L at MH130A and from 0.1 to 43.1 µg/L at LSIV, while concentrations at the CESF system effluent ranged from non-detect (at a LOQ of 0.1 µg/L) to 0.2 µg/L; for total nickel in water samples, concentrations at the CESF system influent ranged from 0.6 to 14.2 µg/L at MH130A and from 0.6 to 8.6 µg/L at LSIV, while concentrations at the

CESF system effluent ranged from non-detect (at a LOQ of 0.5 µg/L) to 1.1 µg/L; for total zinc in water samples, concentrations at the CESF system influent ranged from 17 to 154 µg/L at MH130A and from non-detect (at a LOQ of 4 µg/L) to 292 µg/L at LSIV, while concentrations at the CESF system effluent ranged from non-detect (at a LOQ of 4 µg/L) to 36 µg/L.

As a point of comparison for the metals concentrations, the metals listed above (except nickel and chromium) have a benchmark value established in the Industrial Stormwater General Permit applicable to various industry categories. All of the CESF effluent samples and LS431 POC samples at NBF were well below the listed benchmark values for those metals.

3.1.5 PCBs in Filtered Solids

In the 2012-2013 reporting period, calculated concentrations of PCBs in filtered solids (using filter bag weights and mass of solids collected) ranged from 2.12 to 11.68 milligrams per kilogram (mg/kg) at MH130A, from 0.04 to 0.82 mg/kg at LSIV, and from 0.23 to 2.68 mg/kg at the CESF effluent. Calculated concentrations of PCBs in whole water (using PCBs in filtered solids data and filtered solids flow totalizer data) in the reporting period ranged from 0.025 to 1.284 µg/L at MH130A, from 0.001 to 0.054 µg/L at LSIV, and from 0.0001 to 0.0009 µg/L at the CESF effluent.

3.2 SUMMARY OF FLOW MEASUREMENTS AND PRECIPITATION DATA

During the period from November 1, 2012 through October 31, 2013, approximately 178 million gallons of water were treated and discharged by the CESF system. Flow rate measurements collected by the Flo-Dar sensor and Hach flow logger at the lift station discharge (LS431) indicated that 277 million gallons of stormwater were discharged from the lift station to Slip 4 in the same period. This volume includes both treated water and any water discharged by King County pumps that bypassed treatment. Therefore, an estimated 64 percent of stormwater flowing to the lift station was treated by the LTST system.

Accordingly, 99 million gallons of stormwater bypassed treatment at the LTST system and was directly discharged to Slip 4. Periods of bypass of the treatment system can be determined from the flow data collected at LS431, as evidenced by a sharp increase in flow rate of discharge when a King County pump turns on and a sharp decrease in flow rate of discharge when a King County pump turns off. A summary of the 2012-2013 LTST sampling events and information on the times and durations of bypass during each event is included in Table 9.

As described in the 2011-2012 Annual Performance Evaluation Report (Landau Associates 2013b), the vast majority of LTST system bypass occurs with just one of the four King County pumps on. The Flo-Dar meter was not calibrated for more than one King County pump on, so the accuracy of the data when more than one pump is on has not been confirmed. However, due to the low frequency and short duration of these occurrences, any error in flow data is deemed to be negligible when considering volumes for the entire year.

During the 1-year period from November 2012 through October 2013, approximately 38 inches of precipitation was measured at the Boeing Field weather station (identified as KBFI), 20.8 million gallons flowed through the re-routed King County North Lateral storm drain line, 10.2 million gallons were pumped directly from MH130A to the LTST system, and 0.53 million gallons bypassed the MH130A pump (by overtopping the adjacent MH130B weir) and flowed to the LSIV. Therefore, approximately 95 percent of stormwater at MH130A was captured and pumped directly to the treatment system (with an additional portion of the volume bypassed picked up for treatment at the LSIV). Since the start of LTST operation on November 1, 2011, the cumulative percent capture at MH130A is 91.3 percent, slightly above the design average long-term capture of 91 percent. In part to help ensure the continued capture and treatment design goal of 91 percent, the 10-hp pump at MH130A was replaced in July 2013 with a larger 15-hp pump.

Raw flow data collected at 1-minute intervals of discharge at LS431, at 15-minute intervals for CESF discharge, and at 30-second intervals at the King County re-route wet well weir and MH130B weir, are not presented in this report due to the large number of readings collected, but are available in electronic form upon EPA or Ecology's request. Precipitation totals and stormwater flow volumes by month are listed in Table 10.

3.3 SEDIMENT TRAP SAMPLING RESULTS

Sediment trap samples were most recently collected on May 13, 2013. Sediment trap sample analytical results for total PCBs for this most recent sampling event and for previous sediment trap sampling events are provided in Table 11.

The results of evaluating the historical trends in PCB concentrations at each of the sampling locations continues to be somewhat inconclusive because of the periodic instances when not enough solids had accumulated in the traps to allow the laboratory to present the PCB result on a dry weight basis; instead, the concentrations were presented "as received." It was also not possible to draw firm conclusions about reductions in PCB mass loading following source control activities using only sediment trap solids PCB concentration data, because of the potential reduction in solids mass loading (e.g., from catch basin insert filters, surface sweeping, catch basin cleanout, storm drain pipe repair). Therefore, we continue to request that the laboratory record the total mass of solids collected in the sediment traps for the past few sediment trap sampling events. Examining both sets of data together revealed apparent reductions in the PCB mass deposition rates at sediment trap locations SL4-T5 and SL4-T1 over the past two monitoring years, as shown in Table 12. The reduction in PCB mass loading rates at T5 and T1 are likely primarily attributable to the capture and treatment of stormwater in the North Lateral storm drain line at MH130A during both STST and LTST system operations. There also appears to be a reduction in the PCB mass loading rate at the north-central lateral (SL4-T4) in the most recent annual monitoring event, as shown in Table 12. The PCB mass loading rate reduction in the north-central lateral drainage basin may be attributable to the installation of catch basin inlet filters, as most of the filters installed in spring 2012 were installed within the north-central lateral drainage basin.

3.4 CATCH BASIN INSERT FILTER SOLIDS SAMPLING RESULTS

As part of continued PCB source evaluation, samples of filtered solids from the 27 catch basins with insert filters were analyzed for PCBs. Laboratory data from the January 2013 catch basin insert filter solids sampling are provided in Table 13. PCB concentrations in solids ranged from 0.77 to 22.6 mg/kg. As previously stated in Section 2.8, 25 of the catch basin insert filter structures that were found to be clogged were replaced in July 2013, but samples of filtered solids were not collected at that time. It is planned that filter inspection will continue to occur at least twice per year, and filters will be replaced whenever they are observed to be clogged with solids.

4.0 EVALUATION OF LTST PERFORMANCE

This section provides an evaluation of the NBF LTST monitoring results for the period of November 2012 through October 2013. The first 2 years of LTST monitoring and subsequent evaluation of the collected data have prompted recommendations for minor modifications to the existing SAP for the stormwater monitoring program for the November 2013 through October 2014 monitoring year. The modifications are presented in an addendum to the existing SAP, provided in Appendix B.

4.1 LTST SYSTEM AND POINT OF COMPLIANCE

Results from the second year of LTST system operation confirm the continued ability of the LTST system to meet the interim goals as described in Section 1.4.2. At the POC (LS431), all flow-weighted composite whole water samples had PCB concentrations that were below the marine chronic water quality criterion interim goal of 0.030 µg/L. Eleven out of 12 routine 3-day monthly event composite samples and four out of five composite storm event samples at LS431 were non-detect for PCBs. Both PCB detections during the 2012-2013 reporting period measured PCB concentrations of 0.015 µg/L. Both of these detections, as well as the one detection during the 2011-2012 reporting period, were recorded during very large or very intense precipitation events. This is not unexpected because more untreated stormwater will bypass the treatment system and be discharged during heavy or intense storm events.

The FWAAC at the LS431 POC, representing discharge to Slip 4, has been calculated for comparison to the 0.018 µg/L alternative interim goal. A memorandum describing the FWAAC evaluation and providing the associated calculations was prepared by Geosyntec and the NBF Stormwater Expert Panel and is provided in Appendix A. For the second year of LTST system operation, the FWAAC for total PCBs was calculated to be 0.009 µg/L, assuming that non-detect results for PCBs are taken to be zero. The calculated FWAAC, if it is conservatively assumed that non-detect values were equal to the target limit of detection (LOD), was 0.013 µg/L. Alternatively, the FWAAC was calculated to be 0.013 µg/L total PCBs if TSS and filtered solids PCB measurements are used to estimate the PCB concentrations for the whole water non-detect values. The FWAAC values using all three calculation methods are well below the alternative interim goal of 0.018 µg/L PCBs.

LTST flow monitoring indicates that the LTST system treated approximately 178 million gallons, which is 64 percent of measured stormwater volume discharged from the lift station to Slip 4 during the second year of LTST system operation. That percentage is slightly lower than the first year of operation (68 percent treated), in large part due to necessary treatment system shutdowns for electrical upgrades at NBF during November and December 2012. The 2-year cumulative capture and treatment of 66 percent of stormwater is well above the original design basis of 59 percent (Geosyntec Consultants and Landau Associates 2011), indicating the capacity of the treatment system remains appropriate.

The annual Flo-Dar flow meter calibration for low-flow conditions (conducted during discharge of treated water only, up to the design treatment flow rate of 1,500 gpm) was completed during the first quarter of 2013. The high-flow calibration (conducted during bypass of the treatment system during a period of intense precipitation) was unable to be conducted. This calibration requires intense precipitation (difficult to predict) to occur outside of a sampling event (intense precipitation events are often targeted for sampling), and requires the coordination of Landau Associates personnel, Clear Water Compliance Services personnel, and King County personnel, which is difficult to accomplish especially during nighttime and weekend hours. The high-flow calibration was previously conducted in April 2012. Continued efforts will be made to conduct a high-flow calibration as soon as possible.

Although not explicitly part of the LTST design or part of the SAP, it is worth noting that NBF is also covered under the Ecology Industrial Stormwater General Permit (ISGP). Since the LTST system has been in place, LS431 is also the designated sampling point for ISGP compliance. All LTST effluent and LS431 sampling results have met the numeric benchmark values for ISGP monitoring parameters (i.e., turbidity, pH, copper, and zinc).

4.2 VALIDITY OF ASSUMPTIONS

The alternative solids interim goal of an FWAAC for total PCBs in water of 0.018 µg/L at the LS431 POC was developed using certain estimates and assumptions (Jones et al. 2011). These assumptions were confirmed as appropriate for the first year of operation, but it is worth comparing actual measured results from the second year of LTST system operation to values assumed in that evaluation.

4.2.1 NON-DETECT RESULTS

Because the laboratory analytical LOQ for PCB aroclors was 0.010 µg/L when the alternative interim goal was established, and the alternative interim goal is an FWAAC of 0.018 µg/L for PCBs, it was decided to use zero for non-detect PCB results when calculating the FWAAC (Jones et al. 2011). The rationale is that using the LOQ, or even half the value of the LOQ, could result in a calculation that gives a false exceedance of the alternative solids interim goal. Starting in December 2012, Analytical Resources Inc. has reported whole water PCB concentrations down to the LOD (half the LOQ, which is 0.005 µg/L unless the LOQ is elevated). To demonstrate the validity of using zero for non-detect PCB results, filtered solids analytical results from treatment system effluent were evaluated to calculate apparent PCB concentrations in water for each event where data were available, as follows:

$$\frac{Mass\ of\ PCBs\ in\ filtered\ solids\ (\mu g)}{Volume\ of\ stormwater\ filtered\ (L)} = Concentration\ of\ PCBs\ in\ stormwater\ \left(\frac{\mu g}{L}\right)$$

The results of this evaluation are provided in Table 8. Calculated PCB concentrations ranged from 0.0001 µg/L to a maximum of 0.0009 µg/L for the 17 monthly and storm event samples collected of treatment system effluent during the second year of operation. The mean calculated PCB concentration of the 17 samples was 0.0005 µg/L. Comparing that result to the target laboratory LOQ for PCBs in whole water of 0.010 µg/L indicates that using zero for non-detect results is more appropriate than using half the target LOQ, 0.005 µg/L, or even half the target LOD, 0.0025 µg/L.

The above calculation can also be performed using the effluent whole water TSS measurements and the mass of filtered solids rather than the volume of stormwater filtered for the filter sample. This analysis yields a similar result of a calculated PCB concentration near 0.001 µg/L. However, that calculation is complicated by the fact that 8 of the 17 whole water measurements of treated effluent were below the TSS analytical LOQ of 1.0 mg/L, and so it is unclear whether it would be appropriate to use half the value of the LOQ or some other value for those non-detect results.

To assess the effect of using zero for non-detect results on the FWAAC, an alternative calculation of the FWAAC was performed using both LSIV and effluent filtered solids data rather than zero for the non-detect whole water concentrations, as presented in Appendix A. As listed in Appendix A, the FWAAC for PCBs using filtered solids data was calculated to be 0.013 µg/L, which is still well below the interim goal of 0.018 µg/L.

4.2.2 Other Assumptions Used to Calculate the Alternative Interim Goal

Based on hydrologic modeling, a total volume for annual stormwater discharge from the lift station to Slip 4 of 352 million gallons was estimated (Geosyntec Consultants 2011a). The measured annual discharge of 277 million gallons of stormwater in the second year was 79 percent of the expected average volume, despite measured precipitation of 38.14 inches, which was 6 percent more than the historical annual average precipitation for the site vicinity of approximately 36 inches. This is similar to the first year of LTST operation, and the measured discharge volume indicates that the original estimate of average annual runoff volume still appears to have been conservative.

During LTST system design, the annual average percentage of stormwater that was estimated to be treated was 59 percent. The measured volume of stormwater treated was 178 million gallons, corresponding to 64 percent of the volume discharged to Slip 4. Therefore, the assumption of average percentage of stormwater that will be treated still appears to have been conservative and suggests that the 0.018 µg/L PCB FWAAC would not need to be adjusted downward based on the actual measurements.

The forecast during design was that the average TSS concentration at the LSIV would be 27 mg/L, compared to the measured average LSIV TSS concentration of 86.7 mg/L during the second year of operation, up substantially from 23.3 mg/L in the first year of LTST system operation. However, the average TSS concentration at the point of discharge, LS431, decreased from 11.6 mg/L in the first year to 9.3 mg/L in the second year of operation, indicating that there is not an increase in solids being discharged to Slip 4 as a result of the higher TSS observed in the LSIV. The average CESF system effluent TSS concentration was projected during LTST system design to be approximately 0.5 mg/L based on the performance of the STST system. The measured average TSS concentration in LTST system treated effluent was 1.5 mg/L during the 2012 to 2013 monitoring year. Similar to the first year of operation, this higher than initially projected TSS concentration in the treated effluent is believed to be the result of the higher concentration of iron solids generated by the greater proportion of infiltrating groundwater to the LTST system compared to the STST stormwater source at MH130A. Overall, the measured TSS results at LSIV, LS431, and system effluent suggest a similar solids mass loading to Slip 4 compared to what was originally estimated, again suggesting that no adjustment to the 0.018 µg/L PCB FWAAC evaluation criterion would need to be made.

5.0 USE OF THIS REPORT

This report has been prepared for the exclusive use of The Boeing Company and applicable regulatory agencies for performance evaluation of a long-term stormwater treatment facility for removal of PCBs from stormwater in the storm drain system at NBF. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff.

LANDAU ASSOCIATES, INC.

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JAK/MCV/tam

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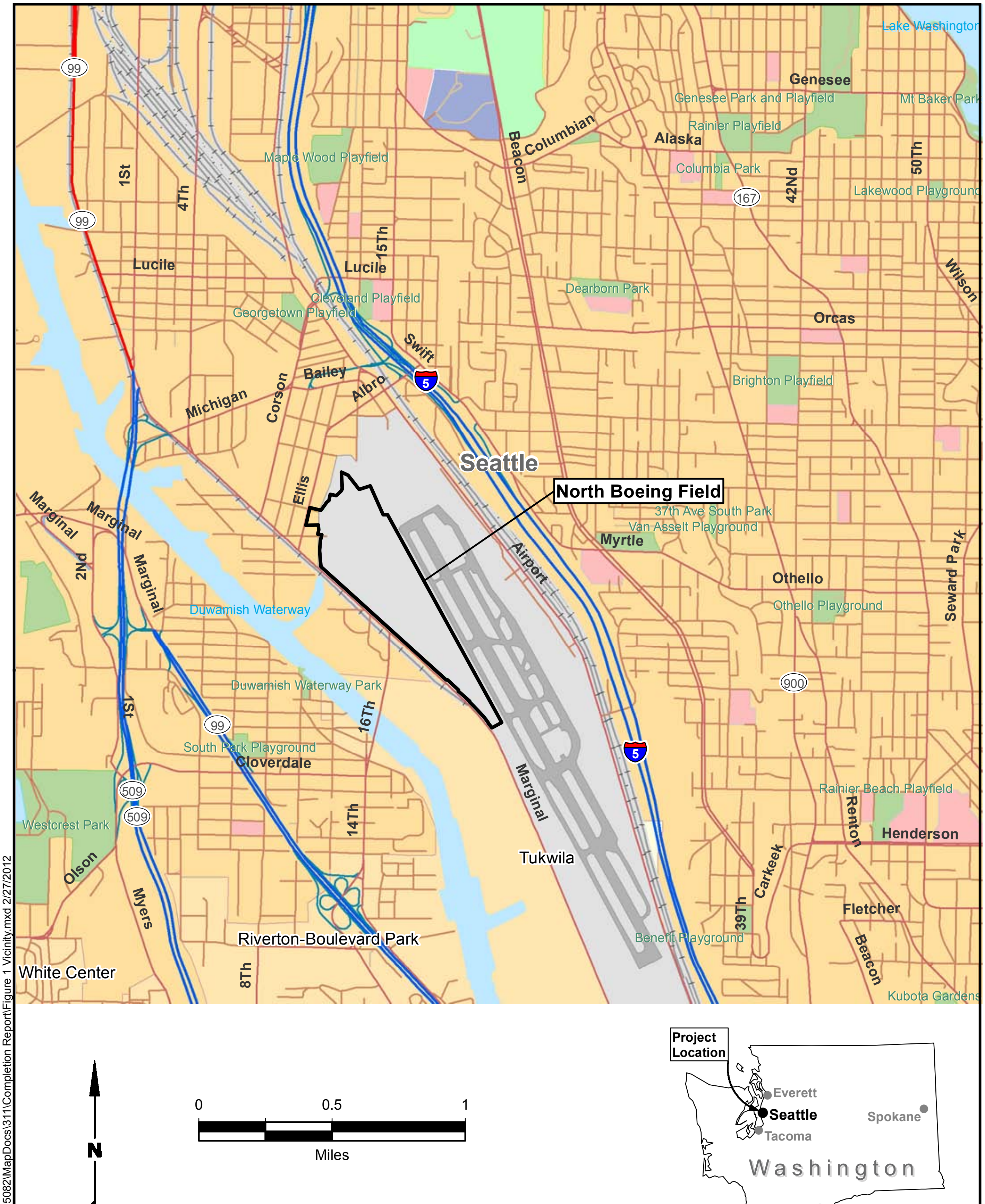

Data Source: ESRI 2008

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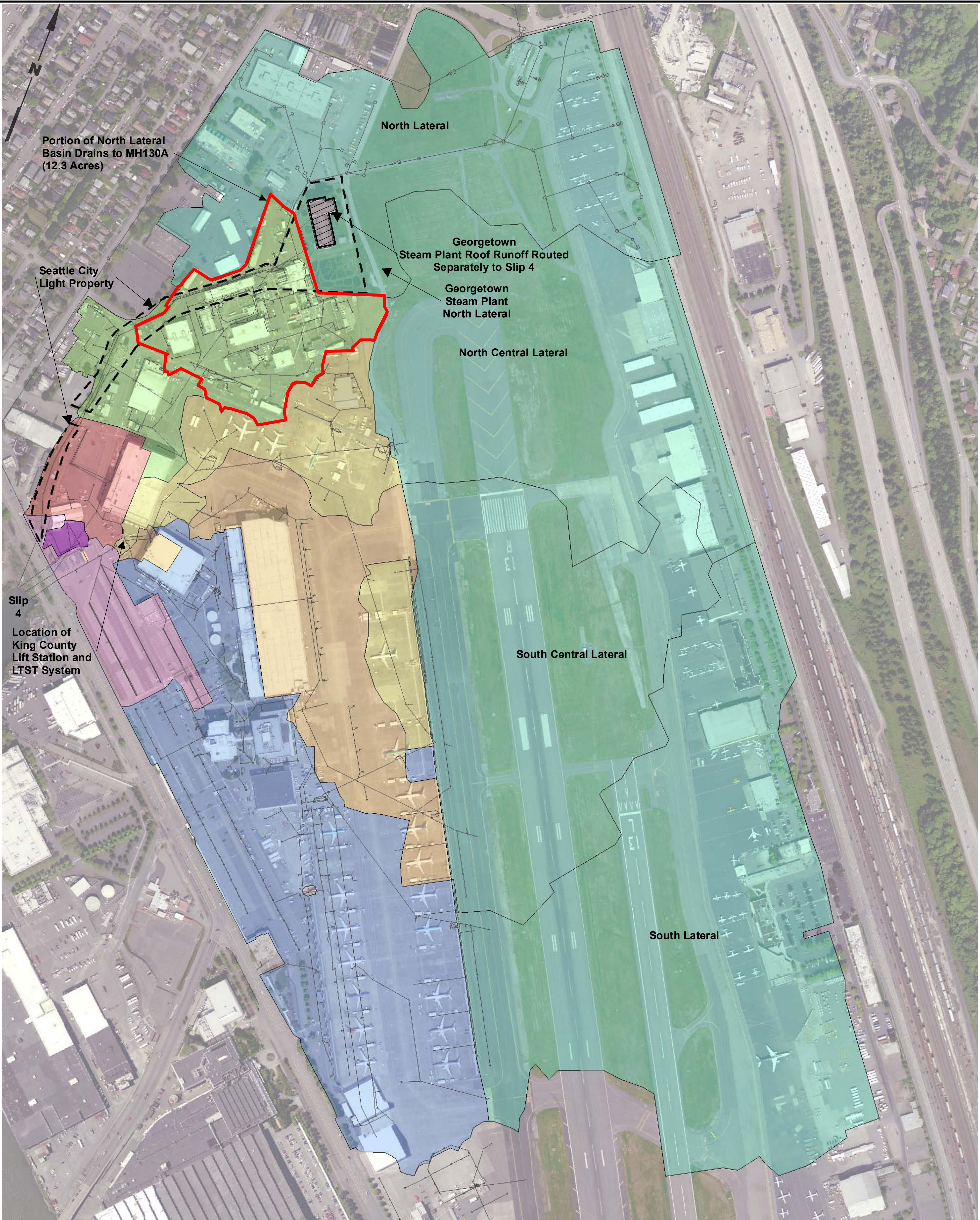
Landau Associates

North Boeing Field Seattle, Washington	**Vicinity Map**	Figure 1

G:\Projects\025\082\214\LTST Treatment\Figure 2-On_Offsite_Basins.mxd NAD 1983 StatePlane Washington North FIPS 4601 Feet



Legend

- MH130 Drainage Basin
- Off-site
- Building 3-380 Area
- North-Central Lateral
- North Lateral
- Parking Lot Area (Downstream of King County Lift Station, LS431)
- South-Central Lateral
- South Lateral
- Area Re-Routed to Combine with 3-380 Drainage Area

0 450 900

Scale in Feet

North Boeing Field Stormwater Drainage Basin Areas	Onsite Area (Acres)	Offsite Area (Acres)	Total Area (Acres)
North Lateral (Excluding Steam Plant Area)	18.1	37.0	55.1
North Lateral Steam Plant Only - No Roof	0.0	4.1	4.1
North-Central Lateral	14.7	42.6	57.3
South-Central Lateral	21.9	42.7	64.6
South Lateral	46.3	64.3	110.6
Bldg 3-380 Area	4.6	0.0	4.6
Re-Routed to Combine with 3-380 Drainage Area	0.5	0.0	0.5
Total Drainage Area to Lift Station (LS431)	106.1	190.7	296.8
Parking Lot Area (Downstream of KC Lift Station)	6.8	0.0	6.8

Data Source: Aerial - SAIC 2009; Conveyance System - The Boeing Company (On-site) and SAIC 2009 (Off-site); Basin Boundaries - The Boeing Company (On-site), SAIC 2009 (Off-site) Figure 2-1 "Storm Drain Lines in the Vicinity of NBF-GTSP Site", and City of Seattle Map "Lower Duwamish Waterway Areas Draining to Slip 4"

Note
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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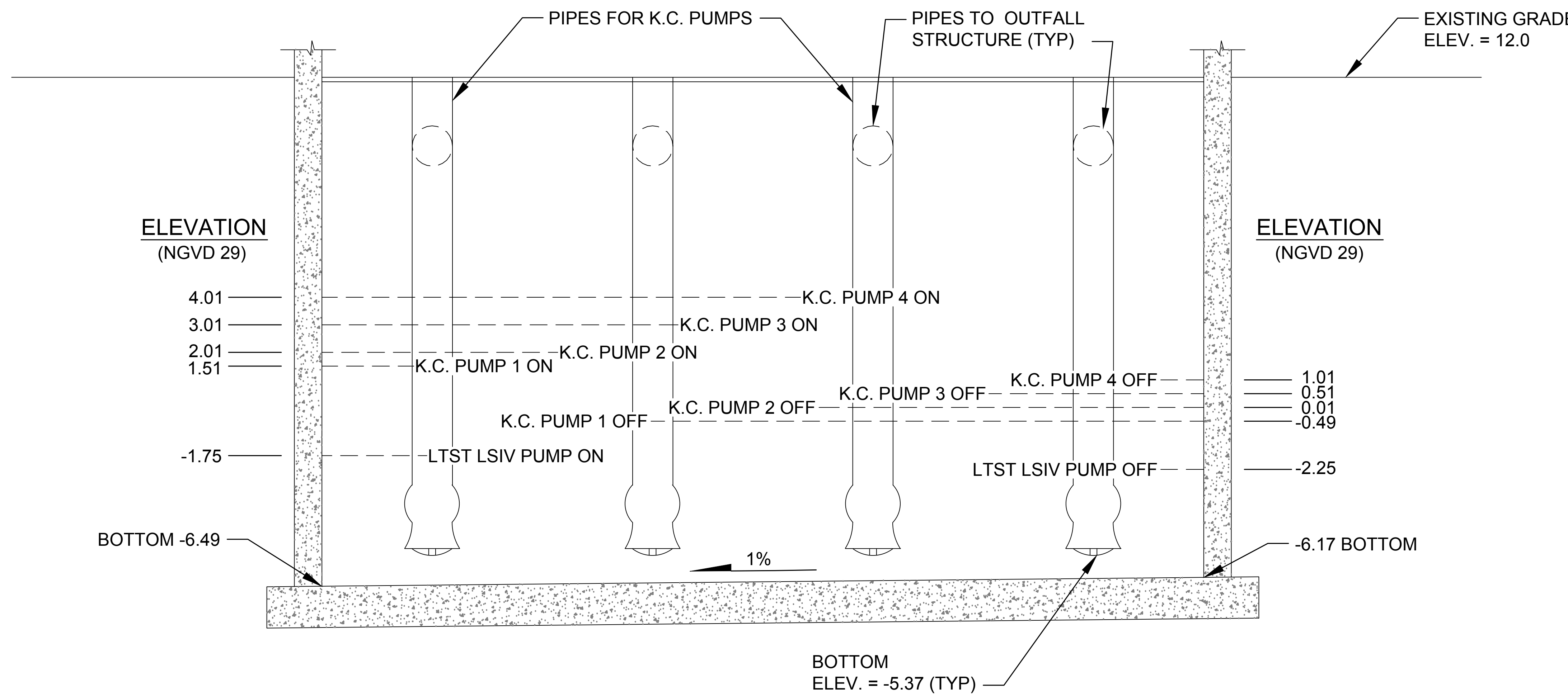
North Boeing Field
Seattle, Washington

North Boeing Field Stormwater Drainage Basins

Figure 2



LANDAU ASSOCIATES, INC. | G:\Projects\025\082\214\004\F03_DETAIL.dwg (A) "Figure 3" 2/27/2014

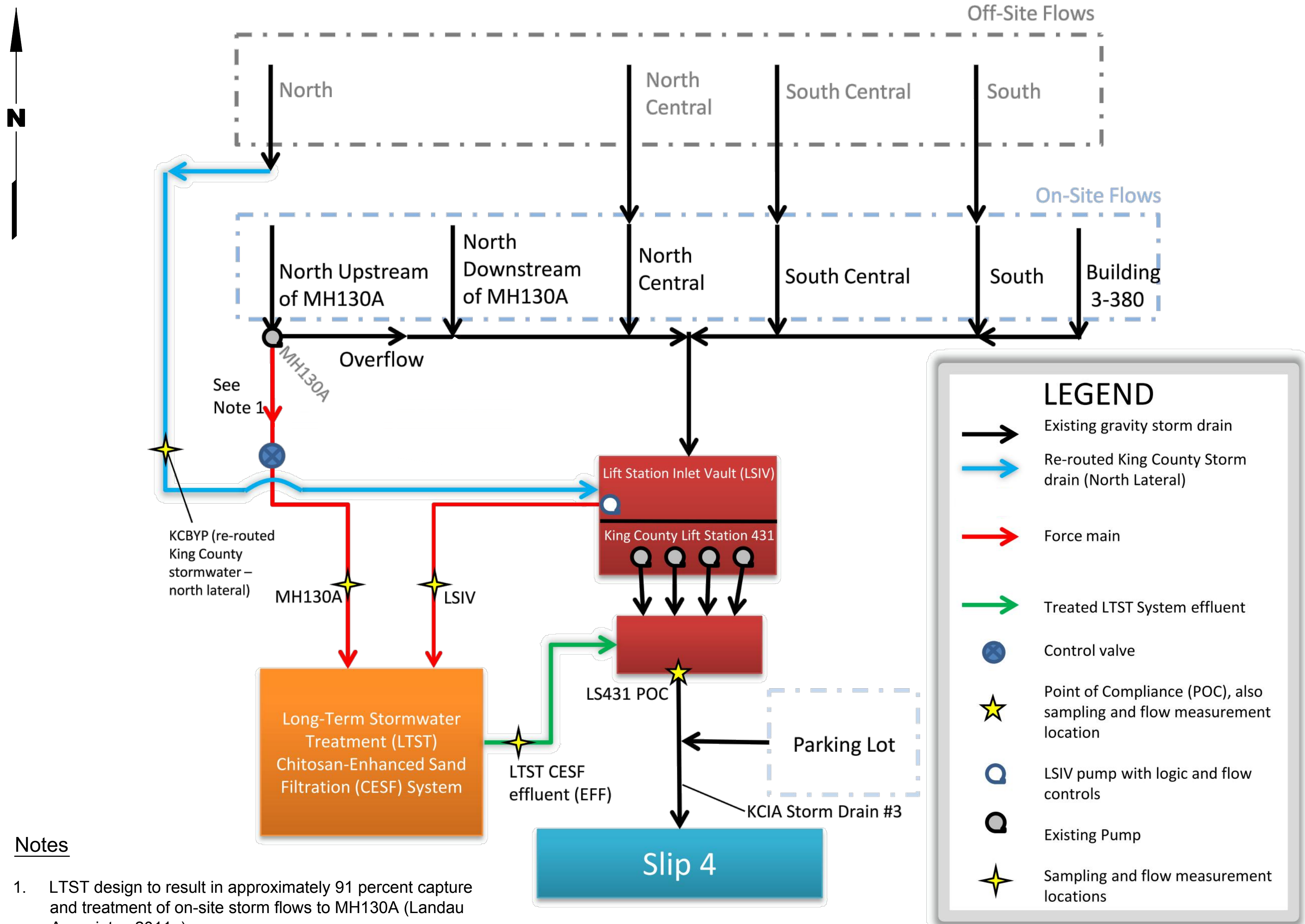
Notes

1. K.C. = King County
2. LTST LSIV pump is on a VFD. The pump on setting at elevation -1.75 triggers a flow rate of approximately 500 gpm. Flow rate is increased with rising water level, up to max LTST system capacity at approximate elevation 0.67.
3. On/Off settings as of February 2013. Settings may be adjusted to optimize treatment system operation.

SOURCE: 1944 AS-BUILT DRAWING PUMPING PLANT NO. 2 PROVIDED BY KING COUNTY

North Boeing Field Seattle, Washington	**LSIV Section Showing Pump On/Off Settings**	Figure 3

Landau Associates



Notes

1. LTST design to result in approximately 91 percent capture and treatment of on-site storm flows to MH130A (Landau Associates 2011a).

2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Adapted from Figure 1 (Jones et. al 2012)

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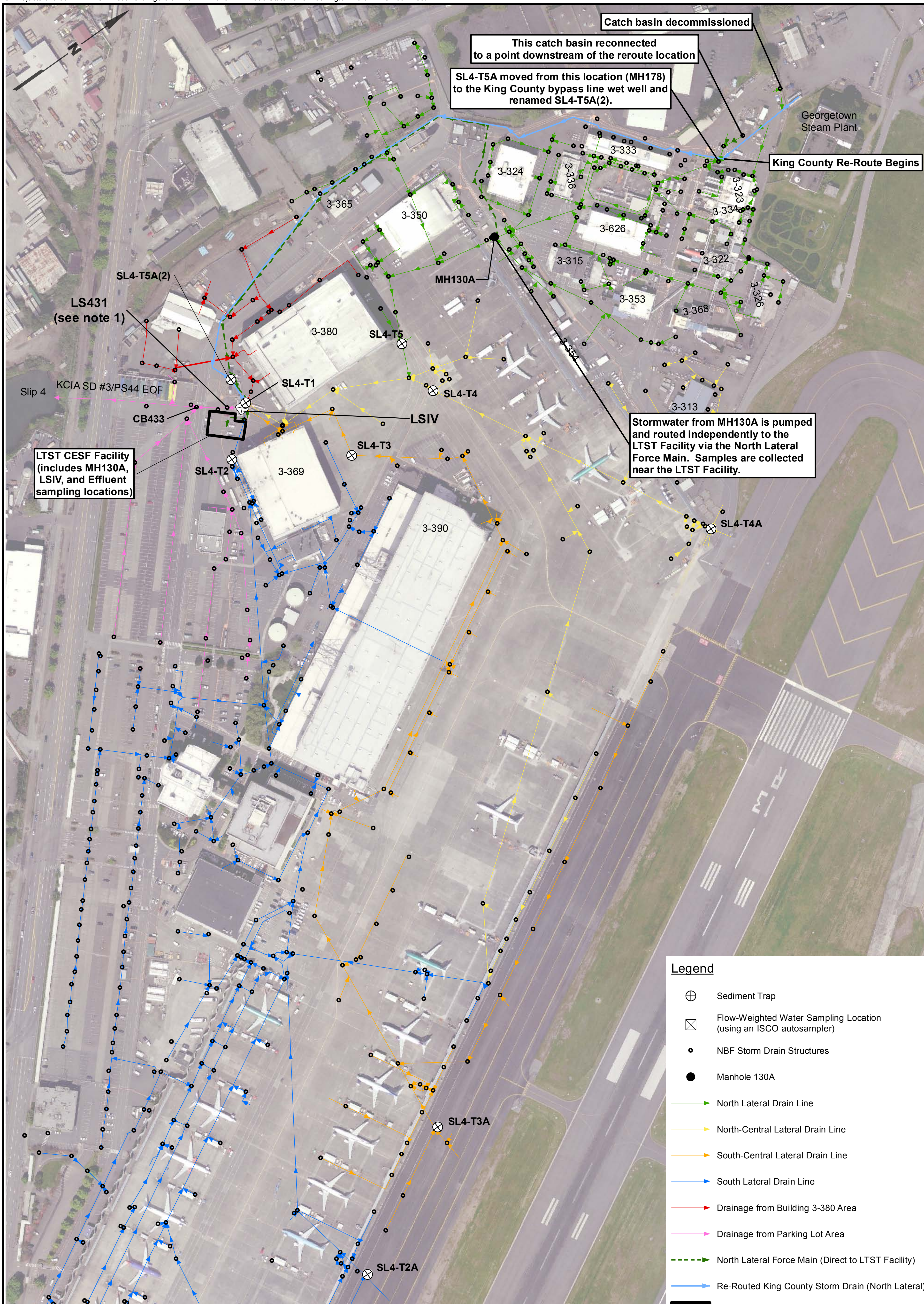
North Boeing Field Seattle, Washington	**Schematic Diagram of LTST System Components**	Figure 4



LTST = Long-Term Stormwater Treatment

CESF = Chitosan - Enhanced Sand Filtration

LSIV = Lift Station Inlet Vault

Notes:

1. LS431 is the Point of Compliance (POC).
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Storm Drain System Data Source: SAIC

0 250 500

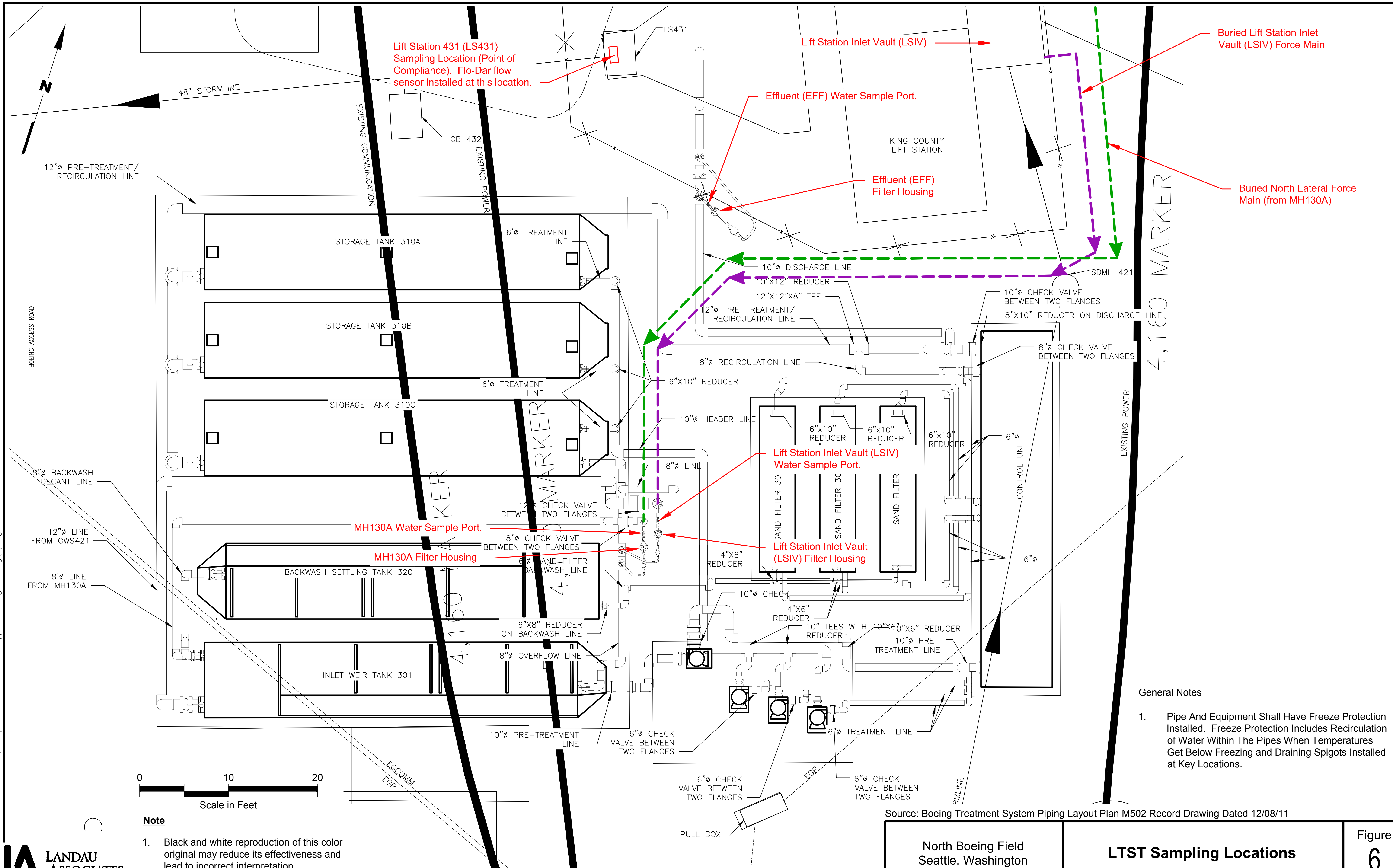
Scale in Feet

Landau Associates

North Boeing Field
Seattle, Washington

Storm Drain System and LTST Sampling Locations

Figure 5



General Notes

1. Pipe And Equipment Shall Have Freeze Protection Installed. Freeze Protection Includes Recirculation of Water Within The Pipes When Temperatures Get Below Freezing and Draining Spigots Installed at Key Locations.

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Boeing Treatment System Piping Layout Plan M502 Record Drawing Dated 12/08/11

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North Boeing Field Seattle, Washington	**LTST Sampling Locations**	Figure 6

TABLE 1
SUMMARY OF LTST 2012-2013 LTST STORMWATER SAMPLING EVENTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

					LSIV		MH130A		Effluent	
Event	**Begin Date**	**End Date**	**Precipitation (inches)** (a)	**LS431 Whole Water**	**Whole Water**	**Filtered Solids**	**Whole Water**	**Filtered Solids**	**Whole Water**	**Filtered Solids**
November Monthly	11/5/2012	11/8/2012	0.01	✓		✓	✓	✓	✓	✓
December Monthly	12/3/2012	12/6/2012	0.68 (b)	✓	✓ (c)	✓	✓	✓	✓	✓
January Monthly	1/7/2013	1/10/2013	1.68	✓	✓ (d,e)	✓	✓	✓	✓	✓
February Monthly	2/4/2013	2/7/2013	0.35	✓	✓ (f)	✓	✓	✓	✓	✓
March Monthly	3/4/2013	3/7/2013	0.87	✓	✓ (d)	✓	✓	✓	✓	✓
April Monthly	4/1/2013	4/4/2013	0.00	✓	✓ (f)	✓	✓	✓	✓	✓
May Monthly	5/6/2013	5/9/2013	0.00	✓	✓ (f)	✓	✓	✓	✓	✓
June Monthly	6/3/2013	6/7/2013 (g)	0.00	✓	✓ (f)	✓ (h)	✓	✓	✓	✓
July Monthly	7/8/2013	7/10/2013 (i)	0.00	✓	✓ (f)	✓ (j)	✓	✓ (j)	✓	✓
August Monthly	8/5/2013	8/8/2013	0.00	✓	✓ (f)	✓	✓	✓	✓	✓
September Monthly	9/9/2013	9/13/2013 (k)	0.00	✓	✓ (f)	✓	✓	✓	✓	✓
October Monthly	10/7/2013	10/9/2013 (l)	0.40 (m)	✓	✓ (d)	✓	✓	✓	✓	✓
Storm	11/11/2012	11/12/2012	0.63	✓	✓ (d)	✓	✓	✓	✓	✓
	12/16/2012	12/17/2012	0.94	✓	✓ (d)	✓	✓	✓	✓	✓
	3/19/2013	3/20/2013	0.92 (n)	✓	✓ (d)	✓	✓	✓	✓	✓
	4/5/2013	4/6/2013	0.64 (o)	✓	✓ (d)	✓	✓	✓	✓	✓
	9/5/2013	9/6/2013	1.36 (p)	✓	✓ (d)	✓	✓	✓	✓	✓
Interim (q)	11/8/2012	11/11/2012	0.00					✓		
	12/6/2012	12/16/2012	1.30					✓		

✓ = sample collected

[shaded cell] = sample not required

(a) Precipitation data is from the NOAA Quality Controlled Local Climatological Data for Station 24234/BFI - SEATTLE: BOEING FIELD/KING COUNTY INTERNATIONAL AIRPORT. Precipitation amounts listed for the monthly and storm events are for the LS431 sample collection period. Amounts sometimes differed for other locations. See the appropriate footnote for precipitation amounts in those cases.

(b) During the December monthly event, precipitation during the LSIV, MH130A, and Effluent filtered solids sampling was 0.69 inches (greater than at LS431).

(c) LSIV sample was a grab sample collected during non-bypass conditions. Although LTST bypass occurred during this event, the actuator which enables the LSIV autosampler malfunctioned during the period when precipitation occurred during this sampling event.

(d) LSIV sample was a flow-weighted composite sample collected during LTST bypass conditions.

(e) The laboratory dropped the LSIV water sample carboy and lost the sample. No analyses were conducted for LSIV water for this event.

(f) LSIV sample was a grab sample collected during non-bypass conditions (no LTST bypass occurred during the sampling event).

(g) Grab samples of LSIV, MH130A, and Effluent water were collected a day later than anticipated due to LTST tank solids cleanout on 6/6/2013. LS431 water and all filtered solids samples were collected on 6/6/2013.

(h) For the June monthly event, the laboratory could not scrape sufficient material for metals analysis from the LSIV filtered solids bag designated for metals analysis.

(i) The July monthly event was ended earlier than anticipated due to an error in programming a replacement flow logger while the permanent unit was out for repair.

(j) For the July monthly event, LSIV and MH130A filter bags were submitted to the laboratory for PAH analysis, but a laboratory equipment malfunction caused both samples to be lost.

(k) For the September monthly event, not all MH130A water sample bottles were able to be filled on 9/12/2013 due to a shortened pumping cycle from the recently installed MH130A pump during dry weather. The remaining bottles were filled on 9/13/2013. Collection of all other samples was completed on 9/12/2013.

(l) Greater than forecast precipitation during the October monthly event caused the event to be ended earlier than anticipated.

(m) During the October monthly event, precipitation during the LSIV flow-weighted composite water sampling was 0.34 inches (less than at LS431). For this event, 0.26 inches of precipitation occurred between 10:00 and 11:00 on October 8, 2013.

(n) During the 3/19/2013 - 3/20/2013 storm sampling event, precipitation during the LSIV flow-weighted composite water sampling was 0.51 inches (less than at LS431).

(o) During the 4/5/2013 - 4/6/2013 storm sampling event, precipitation during the LSIV, MH130A, and Effluent filtered solids sampling was 0.59 inches (less than at LS431).

(p) During the 9/5/2013 - 9/6/2013 storm sampling event, precipitation during the LSIV flow-weighted composite water sampling was 0.83 inches (less than at LS431).

(q) Before two filter housings were installed in parallel at each of the three sampling locations, interim sampling events were necessary to collect filtered solids samples for metals.

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	TW50A/TW50F/TW54A	TX90A/TX90D/TX91A	TY96A/TY96D/TY98A	UA56A/UA56D/UA57A	UC78A/UC78D/UC80A	UE10A/UE10D/UE11A	UE68A/UE68D/UE73A	UH75A/UH75F/UH76A	UL49A/UL49D/UL50A
Sample Collection Date	11/11/2011	11/17/2011	11/23/2011	12/08/2011	12/28/2011	1/12/2012	1/21/2012	02/08/2012	03/08/2012
Event Type	Monthly	Storm	Storm	Monthly	Storm	Monthly	Storm	Monthly	Monthly
Sample Type					Flow-weighted composite				
PCBs (µg/L) (a)									
Method SW8082A									
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1248	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1254	0.010 U	0.010 U	**0.025**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1260	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1232	0.010 U	0.010 U	0.010 U	0.030 U	0.010 U	0.012 U	0.010 U	0.010 U	0.010 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total PCBs (b)	ND	ND	**0.025**	ND	ND	ND	ND	ND	ND
SEMIVOLATILES (µg/L)									
Method SW8270D									
Phenol	**1.8**	**1.5**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bis-(2-Chloroethyl) Ether	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
1,3-Dichlorobenzene	NA	1.0 U	1.0 U	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzyl Alcohol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,2'-Oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
4-Methylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
N-Nitroso-Di-N-Propylamine	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
Hexachloroethane	NA	1.0 U	1.0 U	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U
Nitrobenzene	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
2,4-Dimethylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzoic Acid	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy) Methane	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Naphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chloroaniline	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
Hexachlorobutadiene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
2-Methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
Dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3-Nitroaniline	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
Acenaphthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dinitrophenol	NA	NA	NA	NA	NA	10 U	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
Dibenzofuran	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
Diethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
Fluorene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Nitroaniline	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA

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Laboratory Data ID	TW50A/TW50F/TW54A	TX90A/TX90D/TX91A	TY96A/TY96D/TY98A	UA56A/UA56D/UA57A	UC78A/UC78D/UC80A	UE10A/UE10D/UE11A	UE68A/UE68D/UE73A	UH75A/UH75F/UH76A	UL49A/UL49D/UL50A
Sample Collection Date	11/11/2011	11/17/2011	11/23/2011	12/08/2011	12/28/2011	1/12/2012	1/21/2012	02/08/2012	03/08/2012
Event Type	Monthly	Storm	Storm	Monthly	Storm	Monthly	Storm	Monthly	Monthly
Sample Type					Flow-weighted composite				
4,6-Dinitro-2-Methylphenol	NA	NA	NA	NA	NA	10 U	NA	NA	NA
N-Nitrosodiphenylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
Hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pentachlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Phenanthrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbazole	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA
Anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA
Benzo(a)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-Ethylhexyl)phthalate	1.0 U	1.0 U	1.0	1.0 U	2.3	1.0 U	1.0 U	1.0 U	1.0 U
Chrysene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Octyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(a)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Indeno(1,2,3-cd)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenz(a,h)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(g,h,i)perylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1-Methylnaphthalene	NA	1.0 U	1.0 U	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U
Total Benzofluoranthenes	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
PAHs (µg/L)									
Method SW8270D-SIM									
Naphthalene	0.022	0.032	0.044	0.018 U	0.021	0.012	0.080	0.021 U	0.012
2-Methylnaphthalene	0.011	0.038	0.025	0.010 U	0.013	0.0099 J	0.10	0.014	0.010 U
1-Methylnaphthalene	0.010 U	0.028	0.016	0.010 U	0.0091 J	0.0070 J	0.075	0.011	0.010 U
Acenaphthylene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010	0.010 U	0.010 U
Acenaphthene	0.087	0.030	0.0088 J	0.092	0.015	0.041	0.013	0.088	0.045
Fluorene	0.010 U	0.010	0.0093 J	0.010 U	0.0068 J	0.010 U	0.019	0.010 U	0.010 U
Phenanthrene	0.010 U	0.032	0.094	0.010	0.081	0.014 J	0.078	0.022	0.018
Anthracene	0.010 U	0.010 U	0.013	0.010 U	0.0096 J	0.010 U	0.0070 J	0.010 U	0.010 U
Fluoranthene	0.012 U	0.056 B	0.28 B	0.010 U	0.24	0.032	0.17	0.041	0.041
Pyrene	0.010 U	0.029	0.19	0.010 U	0.18	0.019	0.12	0.038 J	0.024
Benzo(a)anthracene	0.010 U	0.010 U	0.057	0.010 U	0.043	0.010 U	0.026	0.010 U	0.010 U
Chrysene	0.010 U	0.020	0.17 B	0.010 U	0.14	0.011	0.11	0.019	0.017
Benzo(a)pyrene	0.010 U	0.010 U	0.10	0.010 U	0.072	0.010 U	0.048	0.010 U	0.010 U
Indeno(1,2,3-cd)pyrene	0.010 U	0.010 U	0.10	0.010 U	0.070	0.010 U	0.048	0.010 U	0.010 U
Dibenz(a,h)anthracene	0.010 U	0.010 U	0.035	0.010 U	0.020	0.010 U	0.014	0.010 U	0.010 U
Benzo(g,h,i)perylene	0.010 U	0.010 U	0.12	0.010 U	0.086	0.010 U	0.068	0.010	0.010 U
Dibenzofuran	0.010 U	0.010 U	0.0067 J	0.010 U	0.0063 J	0.010 U	0.010	0.010 U	0.010 U
Total Benzofluoranthenes	0.020 U	0.029	0.30	0.020 U	0.23	0.011 J	0.17	0.028	0.022
CPAH TEQ	NA	0.0031	0.151	ND	0.110	0.001	0.075	0.003	0.002
TOTAL METALS (µg/L)									
Method EPA200.8/6010B,C/7470A									
Arsenic	0.6	0.5	0.7	0.8	0.7	0.7	0.5	0.8	0.7
Cadmium	0.1 U	0.1 U	0.6	0.1 U	0.2	0.1 U	0.3	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	1.7	0.5 U	1.2	1 U	1.1	1 U	1 U
Copper	0.5 U	1.8	5.1	0.6	4.3	1.2	4.0	0.8	1.1
Iron	NA	NA	NA	760	3890	2480	1970	2110	2230
Lead	0.1 U	0.5	4.9	0.3	2.5	0.2	1.9	0.4	0.2
Manganese	NA	NA	NA	833	132	593	84	639	540
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	0.5	0.6	1.2	1.3	1.1	1.4	2.4	1.4	1.8
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	7	20	48	8	38	16	50	7	9

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	TW50A/TW50F/TW54A	TX90A/TX90D/TX91A	TY96A/TY96D/TY98A	UA56A/UA56D/UA57A	UC78A/UC78D/UC80A	UE10A/UE10D/UE11A	UE68A/UE68D/UE73A	UH75A/UH75F/UH76A	UL49A/UL49D/UL50A
Sample Collection Date	11/11/2011	11/17/2011	11/23/2011	12/08/2011	12/28/2011	1/12/2012	1/21/2012	02/08/2012	03/08/2012
Event Type	Monthly	Storm	Storm	Monthly	Storm	Monthly	Storm	Monthly	Monthly
Sample Type					Flow-weighted composite				
DISSOLVED METALS (µg/L)									
Method EPA200.8/6010C									
Arsenic	**0.6**	**0.4**	**0.3**	**0.8**	**0.3**	**0.5**	**0.2**	**0.6**	**0.4**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.2**	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Copper	0.5 U	**1.3**	**1.4**	**0.8**	**1.3**	**0.9**	**1.3**	**1.0**	**0.7**
Iron	NA	NA	NA	NA	**150**	**170**	**220**	50 U	**360**
Lead	0.1 U	0.1 U	**0.2**	0.1 U	**0.2**	0.1 U	**0.2**	0.1 U	0.1 U
Manganese	NA	NA	NA	NA	**90**	**552**	**76**	**621**	**509**
Nickel	**0.6**	**0.6**	**0.5**	**1.2**	**0.7**	**1.3**	**1.8**	**1.3**	**1.8**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**7**	**16**	**21**	**6**	**17**	**13**	**37**	**8**	4 U
DISSOLVED METALS (ng/L)									
Method SW7470A									
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS									
pH (SU; EPA 150.1; SM 4500H)	NA	NA	NA	**7.05**	**6.40**	**7.06**	**6.78**	**7.17**	**7.35**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	1.0 U	**3.4**	**110**	**1.4**	**16.6**	**6.2**	**6.1**	**5.8**	**6.4**
Turbidity (NTU; EPA 180.1)	**1.33** J	**4.30**	**6.60**	**2.00**	**29.0**	**14.6**	**14.4**	**7.80**	**8.00**
PARTICLE/GRAIN SIZE (mg/L)									
Method ASTM-D3977C									
Sediment Conc. > 500 um	0.01 U	**0.1**	**62.1**	0.01 U	**1.3**	**1.8**	**0.4**	**5.1**	**0.9**
Sediment Conc. 500 to 250 um	**0.4**	**1.1**	**33.9**	0.01 U	**2.3**	**1.5**	**0.4**	**0.7**	**0.4**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	0.01 U	**16.0**	0.01 U	**11.8**	0.01 U	**7.1**	0.01 U	0.01 U
Sediment Conc. 3.9 to 1 um	**0.3**	**2.0**	**4.0**	**0.9**	**2.4**	**4.9**	**1.4**	**3.3**	**0.3**
Sediment Conc. < 1 um	**0.3**	**2.3**	**2.2**	**1.9**	**1.0**	**13.4**	**1.2**	**2.4**	**0.4**
PRECIPITATION (c)									
Amount During Test (inches)	0.0	0.38	1.99	0.0	0.86	0.23	0.85	0.10	0.06

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	UM18A/UM18C/UM19A	UO82A/UO82D/UO83A	UP29A/UP29E/UP30A	UU03A/UU03F/UU04A	UX69A/UX69C/UX70A	VB89A/VB89D/VB90A	VF37A/VF37D/VF38A	VJ50A/VJ50G/VJ52A
Sample Collection Date	03/13/2012	04/01/2012	04/05/2012	5/10/2012	6/7/2012	7/11/2012	8/9/2012	9/13/2012
Event Type	Storm	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Sample Type	Flow-weighted composite							
PCBs (µg/L) (a)								
Method SW8082A								
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.012 U	0.010 U	0.010 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1248	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1254	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1260	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1232	0.010 U	0.015 U	0.010 U	0.018 U	0.015 U	0.010 U	0.020 U	0.010 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total PCBs (b)	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES (µg/L)								
Method SW8270D								
Phenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bis-(2-Chloroethyl) Ether	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	1.0 U	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzyl Alcohol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,2'-Oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U
N-Nitroso-Di-N-Propylamine	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	1.0 U	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	3.0 U
Benzoic Acid	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U
bis(2-Chloroethoxy) Methane	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Naphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	3.0 U
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	UM18A/UM18C/UM19A	UO82A/UO82D/UO83A	UP29A/UP29E/UP30A	UU03A/UU03F/UU04A	UX69A/UX69C/UX70A	VB89A/VB89D/VB90A	VF37A/VF37D/VF38A	VJ50A/VJ50G/VJ52A
Sample Collection Date	03/13/2012	04/01/2012	04/05/2012	5/10/2012	6/7/2012	7/11/2012	8/9/2012	9/13/2012
Event Type	Storm	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Sample Type	Flow-weighted composite							
4,6-Dinitro-2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pentachlorophenol	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U
Phenanthrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-Ethylhexyl)phthalate	1.0 U	1.0 U	1.0 U	**2.5**	1.0 U	1.0 U	1.0 U	3.0 U
Chrysene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Octyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(a)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Indeno(1,2,3-cd)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenz(a,h)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(g,h,i)perylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ
1-Methylnaphthalene	1.0 U	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total Benzofluoranthenes	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U
PAHs (µg/L)								
Method SW8270D-SIM								
Naphthalene	**0.014**	**0.010**	**0.012**	**0.035**	**0.011**	0.011 U	**0.010**	0.010 U
2-Methylnaphthalene	**0.014**	**0.010**	**0.010**	**0.0080** J	**0.011**	0.010 U	0.010 U	0.010 U
1-Methylnaphthalene	**0.012**	**0.012**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Acenaphthylene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Acenaphthene	**0.011**	**0.016**	**0.043**	**0.054**	**0.035**	**0.066**	**0.090**	**0.080**
Fluorene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Phenanthrene	**0.031**	**0.026**	**0.011**	**0.0088** J	**0.040**	0.010 U	**0.010**	0.010 U
Anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Fluoranthene	**0.078**	**0.073**	**0.014**	**0.020**	**0.093**	**0.013**	**0.012**	0.010 U
Pyrene	**0.048**	**0.046**	0.010 U	**0.016**	**0.044**	0.010 U	0.010 U	0.010 U
Benzo(a)anthracene	**0.0093** J	**0.016**	0.010 U	0.010 U	**0.012**	0.010 U	0.010 U	0.010 U
Chrysene	**0.043**	**0.036**	0.010 U	**0.0089** J	**0.049**	0.010 U	0.010 U	0.010 U
Benzo(a)pyrene	**0.015**	**0.020**	0.010 U	0.010 U	**0.018**	0.010 U	0.010 U	0.010 U
Indeno(1,2,3-cd)pyrene	**0.012**	**0.021**	0.010 U	0.010 U	**0.022** J	0.010 U	0.010 U	0.010 U
Dibenz(a,h)anthracene	0.010 U	0.010 U	0.010 UJ	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Benzo(g,h,i)perylene	**0.013**	**0.025**	0.010 U	0.010 U	**0.025**	0.010 U	0.010 U	0.010 U
Dibenzofuran	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Benzofluoranthenes	**0.062**	**0.056**	0.020 U	0.020 U	**0.069**	0.020 U	0.020 U	0.020 U
CPAH TEQ	**0.0238**	**0.030**	ND	**0.0001**	**0.029**	ND	ND	ND
TOTAL METALS (µg/L)								
Method EPA200.8/6010B,C/7470A								
Arsenic	**0.4**	**0.4**	**0.5**	**0.8**	**0.7**	**0.7**	**0.7**	**0.9**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	**0.1**	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	0.5 U	**0.6**	1 U	0.5 U	1 U
Copper	**1.9**	**1.7**	**1.1**	**0.6**	**2.7**	0.5 U	0.5 U	**1.0**
Iron	**860**	**1090**	**890**	**1890**	**2690**	**1320**	**1850**	**2490**
Lead	**0.6**	**0.5**	0.1 U	0.1 U	**0.7**	0.1 U	0.1 U	0.1 U
Manganese	**69**	**178**	**482**	**752**	**344**	**660**	**779**	**960**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**0.8**	**1.2**	**1.9** J	**2.1**	**1.2**	**0.7**	**1.2**	**1.1**
Silver	NA	0.2 U	NA	NA	NA	NA	NA	NA
Zinc	**24**	**24**	**11**	**8**	**19**	**6**	**4**	**4**

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	UM18A/UM18C/UM19A	UO82A/UO82D/UO83A	UP29A/UP29E/UP30A	UU03A/UU03F/UU04A	UX69A/UX69C/UX70A	VB89A/VB89D/VB90A	VF37A/VF37D/VF38A	VJ50A/VJ50G/VJ52A
Sample Collection Date	03/13/2012	04/01/2012	04/05/2012	5/10/2012	6/7/2012	7/11/2012	8/9/2012	9/13/2012
Event Type	Storm	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Sample Type	Flow-weighted composite							
DISSOLVED METALS (µg/L)								
Method EPA200.8/6010C								
Arsenic	**0.3**	**0.3**	**0.4**	**0.6**	**0.5**	**0.5**	**0.5**	**0.6**
Cadmium	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U
Copper	**1.1**	**1.1**	**0.9**	0.5 U	**2.0**	0.5 U	0.5 U	**0.8**
Iron	**230**	**190**	50 U	**100**	**230**	**120**	**60**	**60**
Lead	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Manganese	**65**	**163**	**472**	**703**	**295**	**622**	**749**	**870**
Nickel	**0.9**	**1.2**	**1.7**	**2.0**	**1.1**	**0.7**	**0.6**	**1.0**
Silver	NA	0.2 U	NA	NA	NA	NA	NA	NA
Zinc	**17**	**19**	**9**	**5**	**14**	4 U	**4**	4 U
DISSOLVED METALS (ng/L)								
Method SW7470A								
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS								
pH (SU; EPA 150.1; SM 4500H)	**6.41**	**6.94**	**7.03**	**7.20**	**7.33**	**7.14**	**7.21**	**7.31**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**4.4**	**6.8**	**1.9**	**8.4**	**15.9**	**3.2**	**6.0**	**7.0**
Turbidity (NTU; EPA 180.1)	**4.20**	**3.60**	**5.00**	**7.30**	**14.1**	**8.50**	**8.20**	**15.0**
PARTICLE/GRAIN SIZE (mg/L)								
Method ASTM-D3977C								
Sediment Conc. > 500 um	**0.5**	**3.5**	**7.6**	**0.9**	**0.59**	**3.14**	**0.42**	**4.77**
Sediment Conc. 500 to 250 um	**1.4**	**1.3**	**8.9**	**1.5**	**2.85**	**3.66**	**0.53**	**0.20**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	**4.7**	**1.7**	0.01 U	**9.95**	0.01 U	**5.27**	0.01 U
Sediment Conc. 3.9 to 1 um	**1.2**	**0.4**	**0.5**	**4.2**	**1.42**	**0.70**	**1.32**	**2.61**
Sediment Conc. < 1 um	**2.7**	0.01 U	**0.3**	**4.8**	**0.33**	**2.70**	**0.93**	**12.12**
PRECIPITATION (c)								
Amount During Test (inches)	0.76	0.50	0.29	0.01	0.87	0.00	0.00	0.01

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	VL90A/VL90D/VL91A	VN17A/VN17B/VN18A	VR68A/VR68D/VR69A	VS17A/VS17E/VS30A	VV27A/VV27E/VV28A	VW75C/VW75G/VW76C	VZ15A/VZ15C/VZ16A	WC96A/WC96E/WC97A	WG51A/WG51E/WG56A
Sample Collection Date	10/4/2012	10/13/2012	11/8/2012	11/12/2012	12/6/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013
Event Type	Monthly	Storm	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly
Sample Type					Flow-weighted composite				
PCBs (µg/L) (a)									
Method SW8082A									
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1248	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1254	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1260	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1232	0.010 U	0.015 U	0.010 U	0.015 U	0.010 U	0.005 U	0.006 U	0.008 U	0.008 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U
Total PCBs (b)	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES (µg/L)									
Method SW8270D									
Phenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bis-(2-Chloroethyl) Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzyl Alcohol	2.0 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 UJ
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,2'-Oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
N-Nitroso-Di-N-Propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Benzoic Acid	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
bis(2-Chloroethoxy) Methane	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Naphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	VL90A/VL90D/VL91A	VN17A/VN17B/VN18A	VR68A/VR68D/VR69A	VS17A/VS17E/VS30A	VV27A/VV27E/VV28A	VW75C/VW75G/VW76C	VZ15A/VZ15C/VZ16A	WC96A/WC96E/WC97A	WG51A/WG51E/WG56A
Sample Collection Date	10/4/2012	10/13/2012	11/8/2012	11/12/2012	12/6/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013
Event Type	Monthly	Storm	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly
Sample Type					Flow-weighted composite				
4,6-Dinitro-2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pentachlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ	10 U
Phenanthrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
Di-n-Butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
Butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-Ethylhexyl)phthalate	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	1.0 U	1.0 U
Chrysene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Octyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(a)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Indeno(1,2,3-cd)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenz(a,h)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(g,h,i)perylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1-Methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total Benzofluoranthenes	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
PAHs (µg/L)									
Method SW8270D-SIM									
Naphthalene	0.010 U	0.010 U	0.010 U	0.018 U	0.010 U	**0.022**	0.010 U	**0.012**	**0.012**
2-Methylnaphthalene	0.010 U	0.010 U	0.010 U	**0.013**	0.010 U	**0.035**	0.010 U	**0.019**	**0.016**
1-Methylnaphthalene	0.010 U	0.010 U	0.010 U	**0.011**	0.010 U	**0.030**	0.010 U	**0.017**	**0.011**
Acenaphthylene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Acenaphthene	**0.10**	**0.081**	**0.046**	**0.018**	0.010 U	0.010 U	0.010 U	**0.029**	**0.016**
Fluorene	0.010 U	0.010 U	0.010 U	0.0063 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Phenanthrene	0.010 U	**0.014**	0.010 U	**0.032**	**0.014**	**0.040**	**0.013**	0.010 U	**0.014**
Anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 UJ	0.010 U	0.010 U	0.010 U	0.010 U
Fluoranthene	0.010 U	**0.010**	**0.013**	**0.060**	**0.049**	**0.13**	**0.050**	**0.014**	**0.022**
Pyrene	0.010 U	0.010 U	**0.012**	**0.033**	**0.043**	**0.095**	**0.040**	**0.012**	**0.014**
Benzo(a)anthracene	0.010 U	0.010 U	0.010 U	0.0059 U	**0.013**	**0.028**	**0.011**	0.010 U	0.010 U
Chrysene	0.010 U	0.010 U	0.010 U	**0.026**	**0.027**	**0.077**	**0.034**	0.010 U	**0.010**
Benzo(a)pyrene	0.010 U	0.010 U	0.010 U	0.0080 U	**0.016**	**0.042**	**0.017**	0.010 U	0.010 U
Indeno(1,2,3-cd)pyrene	0.010 U	0.010 U	0.010 U	0.0085 U	**0.010**	**0.038**	**0.014**	0.010 U	0.010 U
Dibenz(a,h)anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Benzo(g,h,i)perylene	0.010 U	0.010 U	0.010 U	**0.011**	**0.013**	**0.044**	**0.017**	0.010 U	0.010 U
Dibenzofuran	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.011**	0.010 U	0.010 U	0.010 U
Total Benzofluoranthenes	0.020 U	0.020 U	0.020 U	**0.032**	**0.046**	**0.14**	**0.064**	0.020 U	0.020 UJ
CPAH TEQ	ND	ND	ND	**0.003**	**0.023**	**0.063**	**0.026**	ND	**0.0001**
TOTAL METALS (µg/L)									
Method EPA200.8/6010B,C/7470A									
Arsenic	**0.6**	**1.0**	**0.7**	**0.6**	**0.6**	**0.4**	**0.6**	**0.6**	**0.5**
Cadmium	0.1 U	0.1 U	0.1 U	**0.1**	**0.1**	**0.1**	**0.1**	0.1 U	0.1 U
Chromium	0.5 U	**0.6**	**0.5**	**0.5**	**0.5**	0.5 U	0.5 U	1 U	0.5 U
Copper	0.5 U	**4.2**	**0.9** J	**3.6** J	**4.6**	**2.1**	**2.3**	**1.4**	**1.6**
Iron	**1260**	**2180**	**1720**	**2660**	**1610**	**1540**	**1320**	**1070**	**1220**
Lead	**0.1**	**0.5**	**0.2**	**0.5**	**0.7**	**1.0**	**0.8**	0.1 U	**0.3**
Manganese	**872**	**606**	**728**	**143**	**268**	**77**	**129**	**673**	**247**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**0.8**	**1.6**	**1.0**	**1.3**	**1.2**	**1.0**	**0.7**	**1.7**	**1.7**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	4 U	**9**	**13**	**26**	**23**	**29**	**26**	**14**	**14**

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	VL90A/VL90D/VL91A	VN17A/VN17B/VN18A	VR68A/VR68D/VR69A	VS17A/VS17E/VS30A	VV27A/VV27E/VV28A	VW75C/VW75G/VW76C	VZ15A/VZ15C/VZ16A	WC96A/WC96E/WC97A	WG51A/WG51E/WG56A
Sample Collection Date	10/4/2012	10/13/2012	11/8/2012	11/12/2012	12/6/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013
Event Type	Monthly	Storm	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly
Sample Type					Flow-weighted composite				
DISSOLVED METALS (μg/L)									
Method EPA200.8/6010C									
Arsenic	**0.5**	**0.9**	**0.6**	**0.3**	**0.4**	**0.2**	**0.4**	**0.5**	**0.9**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	**0.6**
Copper	0.5 U	**3.6**	1.4 U	**2.4** J	**2.8** J	**1.0**	**1.1**	**1.1**	**1.1**
Iron	**190**	**690**	50 U	**70**	**480**	**200**	**120**	50 U	**100**
Lead	0.1 U	**0.3**	0.1 U	0.1 U	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U
Manganese	**855**	**568**	**679**	**137**	**239**	**67**	**113**	**445**	**233**
Nickel	**0.8**	**1.5**	**1.0**	**1.2**	**1.1**	**0.8**	**0.6**	**1.6**	**1.6**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	4 U	**6**	**6**	**15**	**15**	**21**	**18**	**9**	**8**
DISSOLVED METALS (ng/L)									
Method SW7470A									
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS									
pH (SU; EPA 150.1; SM 4500H)	**7.59**	**7.06**	**7.07**	**6.72**	**6.60**	**6.56**	**6.88**	**7.10**	**6.97**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**5.8**	**4.7**	**6.9**	**10.0**	**13.1**	**9.0**	**8.4**	**4.1**	**9.3**
Turbidity (NTU; EPA 180.1)	**6.20**	**8.40**	**9.30**	**20.0**	**6.70**	**8.60**	**6.50**	**2.20**	**7.80**
PARTICLE/GRAIN SIZE (mg/L)									
Method ASTM-D3977C									
Sediment Conc. > 500 um	**3.99**	**0.60**	**0.21**	**64.08**	**0.21**	**0.54**	**0.94**	**0.43**	**0.85**
Sediment Conc. 500 to 250 um	**0.53**	**0.60**	**0.75**	**0.79**	**1.69**	**1.29**	**0.31**	**0.85**	**2.01**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	**8.02**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	**2.74**	0.01 U	0.01 U	**11.91**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 3.9 to 1 um	**0.80**	**2.19**	**0.15**	**0.79**	**1.40**	**3.50**	**1.98**	**4.15**	**3.68**
Sediment Conc. < 1 um	**0.39**	**5.10**	**7.01**	**2.28**	**3.70**	**5.52**	**3.90**	**3.12**	**3.20**
PRECIPITATION (c)									
Amount During Test (inches)	0.00	0.08	0.01	0.63	0.68	0.94	1.68	0.35	0.87

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	WI40C/WI40G/WI41C	WK37A/WK37E/WK38A	WK74A/WK74E/WK81A	WP40A/WP40E/WP39A	WS97A/WS97B/WS98A	WX01A/WX01E/WX02A	XA11A/XA11E/XA14A	XE07A/XE07E/XE22A	XE91A/XE91E/XE92A	XJ12A/XJ12E/XJ36A
Sample Collection Date	3/20/2013	4/4/2013	4/6/2013	5/8/2013	6/6/2013	7/9/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013
Event Type	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Flow-weighted composite									
PCBs (µg/L) (a)										
Method SW8082A										
Aroclor 1016	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1242	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1248	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1254	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	**0.015**	0.005 U	**0.015**
Aroclor 1260	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1221	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1232	0.008 U	0.008 U	0.005 U	0.008 U	0.010 U	0.015 U	0.008 U	0.005 U	0.005 U	0.005 U
Aroclor 1262	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total PCBs (b)	ND	ND	ND	ND	ND	ND	ND	**0.015**	ND	**0.015**
SEMIVOLATILES (µg/L)										
Method SW8270D										
Phenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.0**	**1.7**	1.0 U
Bis-(2-Chloroethyl) Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzyl Alcohol	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 UJ	2.0 U	2.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,2'-Oxybis(1-Chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
N-Nitroso-Di-N-Propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Benzoic Acid	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
bis(2-Chloroethoxy) Methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Naphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**4.4**	1.0 U	1.0 U
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**7.0**	1.0 U	1.0 U
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	WI40C/WI40G/WI41C	WK37A/WK37E/WK38A	WK74A/WK74E/WK81A	WP40A/WP40E/WP39A	WS97A/WS97B/WS98A	WX01A/WX01E/WX02A	XA11A/XA11E/XA14A	XE07A/XE07E/XE22A	XE91A/XE91E/XE92A	XJ12A/XJ12E/XJ36A
Sample Collection Date	3/20/2013	4/4/2013	4/6/2013	5/8/2013	6/6/2013	7/9/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013
Event Type	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Flow-weighted composite									
4,6-Dinitro-2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pentachlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenanthrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-Ethylhexyl)phthalate	1.0 U	1.0 U	**1.2**	3.0 U	3.0 U	**8.1**	3.0 U	3.0 U	3.0 U	3.0 U
Chrysene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Octyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(a)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Indeno(1,2,3-cd)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenz(a,h)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(g,h,i)perylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1-Methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**5.9**	1.0 U	1.0 U
Total Benzofluoranthenes	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
PAHs (µg/L)										
Method SW8270D-SIM										
Naphthalene	**0.041**	0.010 U	**0.021**	0.015 U	0.010 U	**0.014**	**0.015**	**4.2**	**0.098**	**0.010**
2-Methylnaphthalene	**0.055**	0.010 U	**0.026**	0.010 U	0.010 U	0.010 U	0.010 U	**6.0**	**0.11**	0.010 U
1-Methylnaphthalene	**0.041**	0.010 U	**0.022**	0.010 U	0.010 U	0.010 U	0.010 U	**4.8**	**0.11**	0.010 U
Acenaphthylene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Acenaphthene	0.010 U	**0.033**	**0.012**	**0.044**	**0.055**	**0.060**	**0.073**	**0.049**	**0.071**	**0.017**
Fluorene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.14**	0.010 U	0.010 U
Phenanthrene	**0.027**	0.010 U	**0.018**	0.010 U	0.010 U	0.010 U	0.010 U	**0.12**	0.010 U	**0.15**
Anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.013**	0.010 U	**0.032**
Fluoranthene	**0.058**	0.010 U	**0.042**	0.010 U	0.010 U	0.010 U	0.010 U	**0.26**	**0.012**	**0.38**
Pyrene	**0.038**	0.010 U	**0.024**	0.010 U	0.010 U	0.010 U	0.010 U	**0.18**	0.010 U	**0.48**
Benzo(a)anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.067**	0.010 U	**0.26**
Chrysene	**0.035**	0.010 U	**0.019**	0.010 U	0.010 U	0.010 U	0.010 U	**0.17**	0.010 U	**0.41**
Benzo(a)pyrene	**0.017**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.096**	0.010 U	**0.28**
Indeno(1,2,3-cd)pyrene	**0.018**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.11**	0.010 U	**0.20**
Dibenz(a,h)anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.021**	0.010 U	**0.039**
Benzo(g,h,i)perylene	**0.022**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.14**	0.010 U	**0.25**
Dibenzofuran	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.16**	0.010 U	0.010 U
Total Benzofluoranthenes	**0.060**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.29**	0.020 U	**0.61**
CPAH TEQ	**0.025**	ND	**0.0002**	ND	ND	ND	ND	**0.147**	ND	**0.395**
TOTAL METALS (µg/L)										
Method EPA200.8/6010B,C/7470A										
Arsenic	**0.5**	**0.6**	**0.4**	**0.6**	**0.6**	**0.6**	**0.6**	**0.7**	**0.5**	**0.7**
Cadmium	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.3**	0.1 U	**0.4**
Chromium	**0.6**	0.5 U	**0.6**	1 U	0.5 U	0.5 U	1 U	**1.7**	0.5 U	**2.0**
Copper	**2.5**	0.5 U	**2.6**	0.5 U	**0.6**	**0.5**	**1.2**	**6.5**	0.5 U	**7.2**
Iron	**2230**	**410**	**870**	**1060**	**600**	**750**	**930**	**2400**	**600**	**2880**
Lead	**0.8**	0.1 U	**0.4**	0.1 U	0.1 U	0.1 U	0.1 U	**6.1**	0.1 U	**6.0**
Manganese	**115**	**756**	**121**	**848**	**781**	**829**	**849**	**127**	**885**	**344**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**0.8**	**1.0**	0.5 U	**1.0**	**1.0**	**0.7**	**1.0**	**2.0** J	**0.9**	**1.4**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**20**	**6**	**20**	**8**	**6**	**5**	**4**	**42**	**9**	**42**

TABLE 2
LS431 WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W	LS431-W
Laboratory Data ID	WI40C/WI40G/WI41C	WK37A/WK37E/WK38A	WK74A/WK74E/WK81A	WP40A/WP40E/WP39A	WS97A/WS97B/WS98A	WX01A/WX01E/WX02A	XA11A/XA11E/XA14A	XE07A/XE07E/XE22A	XE91A/XE91E/XE92A	XJ12A/XJ12E/XJ36A
Sample Collection Date	3/20/2013	4/4/2013	4/6/2013	5/8/2013	6/6/2013	7/9/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013
Event Type	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Flow-weighted composite									
DISSOLVED METALS (µg/L)										
Method EPA200.8/6010C										
Arsenic	**0.3**	**0.5**	**0.3**	**0.6**	**0.5**	**0.5**	**0.5**	**0.3**	**0.5**	**0.3**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
Copper	**1.2**	0.5 U	**2.0**	0.5 U	0.5 U	**0.7**	**0.6**	**2.0**	**0.5**	**1.7**
Iron	**200**	50 U	**290**	**170**	**120**	**80**	**140**	**80**	50 U	**160**
Lead	0.1 U	0.1 U	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.1**
Manganese	**89**	**742**	**117**	**842**	**736**	**796**	**817**	**25**	**860**	**298**
Nickel	**0.6**	**1.2**	0.5 U	**1.0**	**0.8**	**0.7**	**1.0**	0.5 U	**1.0**	**0.6**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**10**	4 U	**16**	**4**	**4**	4 U	4 U	**13**	**8**	**12**
DISSOLVED METALS (ng/L)										
Method SW7470A										
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS										
pH (SU; EPA 150.1; SM 4500H)	**6.81**	**7.35**	**6.70**	**7.58**	**7.64**	**7.26**	**7.31**	**6.85**	**7.26**	**7.11**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**13.4**	**1.0**	**5.0**	**3.1**	**3.9**	**3.9**	**3.4**	**35.5**	**1.9**	**27.0**
Turbidity (NTU; EPA 180.1)	**13.7**	**1.66**	**4.10**	**2.80**	**2.5**	**3.90**	**4.20**	**4.38**	**3.06**	**7.88**
PARTICLE/GRAIN SIZE (mg/L)										
Method ASTM-D3977C										
Sediment Conc. > 500 um	**4.59**	**5.62**	**7.85**	**4.52**	**17.25**	**5.66**	**0.65**	**6.27**	**8.23**	**11.31**
Sediment Conc. 500 to 250 um	**3.34**	**5.81**	0.01 U	**6.53**	**8.68**	**5.13**	**0.43**	**4.89**	**10.58**	**8.22**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.01**	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.98**	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.36**	**22.21**	0.01 U	**13.85**
Sediment Conc. 3.9 to 1 um	**4.77**	**4.59**	**2.67**	**2.07**	**1.27**	**0.93**	**0.01**	**1.85**	**0.56**	**3.44**
Sediment Conc. < 1 um	**8.23**	**3.84**	**6.07**	**5.52**	**2.41**	**2.29**	0.01 U	**2.13**	**1.99**	**1.81**
PRECIPITATION (c)										
Amount During Test (inches)	0.92	0.00	0.64	0.00	0.00	0.00	0.00	1.36	0.00	0.40 (d)

NA = Not Analyzed.
ND = Not Detected.
Bold = Detected compound.
B = Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's limit of quantitation or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U = Indicates the compound was not detected at the reported concentration.

(a) Starting in December 2012, ARI evaluated PCBs in whole water between the Limit of Detection (LOD) and the Limit of Quantitation (LOQ). For these non-detect results, the reported concentration shown is the LOD (1/2 the LOQ).
(b) Total PCBs is the sum of detected aroclors or, if no aroclors are detected, is reported as non-detect (ND).
(c) Precipitation data are from the NOAA Quality Controlled Local Climatological Data for Station 24234/BFI - SEATTLE: BOEING FIELD/KING COUNTY INTERNATIONAL AIRPORT.
(d) During the October 2013 monthly event, 0.26 inches of precipitation occurred between 10:00 and 11:00 on October 8, 2013.

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	TW17B	TX51B	TY77B	TZ89A	UC19B/UC19E/UC20B	UC67A/UC67C/UC68A	UD94B/UD94E/UD95B	UE63A/UE63C/UE64A	UH75D/UH75I/UH76D	UK69A/UK69C/UK70A	UL81A/UL81C/UL82A
Sample Date	11/08/2011	11/16/2011	11/22/2011	12/5/2011	12/21/2011	12/27/2011	1/10/2012	1/20/2012	02/09/2012	03/05/2012	03/12/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PCBs (µg/L) (a)											
Method SW8082A											
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1248	0.010 U	0.10 U	0.010 U	0.050 U	0.20 U	0.075 U	0.10 U	0.050 U	0.15 U	0.045 U	0.10 U
Aroclor 1254	0.010 U	**0.088**	0.010 U	**0.046**	**0.063**	**0.090** J	**0.069**	**0.059**	**0.12**	**0.044**	**0.048**
Aroclor 1260	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.023** J	0.010 U	**0.021**	0.010 U	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1232	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total PCBs (b)	ND	**0.088**	ND	**0.046**	**0.063**	**0.113** J	**0.069**	**0.08**	**0.12**	**0.044**	**0.048**
SEMIVOLATILES (µg/L)											
Method SW8270D											
Phenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Di-n-Octyl phthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	TW17B	TX51B	TY77B	TZ89A	UC19B/UC19E/UC20B	UC67A/UC67C/UC68A	UD94B/UD94E/UD95B	UE63A/UE63C/UE64A	UH75D/UH75I/UH76D	UK69A/UK69C/UK70A	UL81A/UL81C/UL82A
Sample Date	11/08/2011	11/16/2011	11/22/2011	12/5/2011	12/21/2011	12/27/2011	1/10/2012	1/20/2012	02/09/2012	03/05/2012	03/12/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PAHs (µg/L)											
Method SW8270D-SIM											
Naphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	0.024	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	0.011	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	0.014	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	0.020 U	NA	NA	NA	NA	NA	NA
CPAH TEQ	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
TOTAL METALS (µg/L)											
Method EPA200.8/6010B,C/7470A											
Arsenic	NA	NA	NA	NA	1.2	1.1	0.8	0.9	1.1	0.7	1.1
Cadmium	NA	NA	NA	NA	0.2	0.5	0.4	0.8	0.2	0.3	0.3
Chromium	NA	NA	NA	NA	0.5 U	2.2	0.7	4.8	0.5	1.4	1 U
Copper	NA	NA	NA	NA	2.9	8.7	6.1	10.0	4.7	5.2	2.7
Iron	NA	NA	NA	NA	6180	3770	1360	3070	3700	1820	4440
Lead	NA	NA	NA	NA	6.8	6.5	1.4	12.9	0.7	3.4	0.2
Manganese	NA	NA	NA	NA	366	45	76	60	210	59	380
Mercury	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	NA	NA	NA	NA	2.2	1.7	1.6	2.4	1.3	1.1	1.0
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	52	127	81	141	34	89	71
DISSOLVED METALS (µg/L)											
Method EPA200.8/6010B,C											
Arsenic	NA	NA	NA	NA	0.6	0.3	0.5	0.2	0.6	0.3	0.8
Cadmium	NA	NA	NA	NA	0.1 U	0.1	0.3	0.3	0.1	0.1	0.2
Chromium	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Copper	NA	NA	NA	NA	0.9	2.4	2.6	2.0	2.2	1.8	1.2
Iron	NA	NA	NA	NA	100	50 U	160	50 U	90	230	2480
Lead	NA	NA	NA	NA	0.3	0.1 U	0.2	0.2	0.1 U	0.1	0.1 U
Manganese	NA	NA	NA	NA	380	7	77	19	205	49	363
Nickel	NA	NA	NA	NA	1.3	0.6	1.4	0.6	1.1	0.6	0.8
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	37	73	66	74	33	64	61
DISSOLVED METALS (ng/L)											
Method SW7470A											
Mercury	NA	NA	NA	NA	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS											
pH (SU; EPA 150.1; SM 4500H)	NA	NA	NA	NA	6.65	6.55	6.54	6.52	6.72	6.59	6.79
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	13.2 J	13.2	10.4	28.0	17.3	23.8	5.4	38.4	7.6	12.3	11.8
Turbidity (NTU; EPA 180.1)	78.0	26.0	13.6	NA	64.6	21.0	11.6	37.0	22.0	13.5	33.0

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	TW17B	TX51B	TY77B	TZ89A	UC19B/UC19E/UC20B	UC67A/UC67C/UC68A	UD94B/UD94E/UD95B	UE63A/UE63C/UE64A	UH75D/UH75I/UH76D	UK69A/UK69C/UK70A	UL81A/UL81C/UL82A
Sample Date	11/08/2011	11/16/2011	11/22/2011	12/5/2011	12/21/2011	12/27/2011	1/10/2012	1/20/2012	02/09/2012	03/05/2012	03/12/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PARTICLE/GRAIN SIZE (mg/L)											
Method ASTM-D3977C											
Sediment Conc. > 500 um	**0.6**	**0.6**	0.01 U	**0.4**	**1.7**	**2.3**	**0.4**	**0.5**	**6.6**	**6.0**	**5.1**
Sediment Conc. 500 to 250 um	**0.4**	**2.4**	0.01 U	**1.3**	**1.3**	**2.3**	**0.1**	**1.4**	**0.7**	**4.6**	**6.8**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	**4.2**	**11.8**	0.01 U	**25.2**	**10.6**	**20.8**	0.01 U	**41.4**	0.01 U	**7.8**	**5.4**
Sediment Conc. 3.9 to 1 um	**7.1**	**4.1**	**2.9**	**6.5**	**3.0**	**4.6**	**3.5**	**4.8**	**1.9**	**1.9**	**1.2**
Sediment Conc. < 1 um	**6.3**	**2.7**	**5.8**	**3.1**	**1.8**	**2.1**	**9.6**	**4.4**	**6.7**	**1.0**	**1.3**
Previous 1 Hour Precip. (inches) (c)	0.0	0.0	0.0	0.0	0.0	0.04	0.0	0.09	0.03	0.0	0.01
Previous 12 Hours Precip. (inches) (c)	0.0	0.0	0.7	0.0	0.0	0.17	0.23	0.27	0.03	0.36	0.02

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	UO82B/UO82E/UO83B	UP29C/UP29G/UP30C	UU03D/UU03I/UU04D	UX30B/UX30E/UX31B	VB89B/VB89E/VB90B	VF37B/VF37E/VF38B	VJ50B/VJ50H/VJ52B	VL90B/VL90E/VL91B	VR68B/VR68E/VR69B	VS17C/VS17G/VS30C	VV27C/VV27G/VV28C
Sample Date	03/31/2012	04/05/2012	5/10/2012	6/5/2012	7/11/2012	8/9/2012	9/13/2012	10/4/2012	11/8/2012	11/12/2012	12/6/2012
Event Type	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Storm	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PCBs (µg/L) (a)											
Method SW8082A											
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.050 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1242	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.050 U	0.010 U	0.010 U	0.10 U	0.010 U
Aroclor 1248	0.010 U	0.15 U	0.15 U	0.15 U	0.30 U	0.15 U	0.30 U	0.075 U	0.15 U	0.010 U	0.10 U
Aroclor 1254	**0.030**	**0.20**	**0.10**	**0.12**	**0.081**	**0.098**	**1.1** J	**0.081**	**0.079**	**0.030**	**0.090**
Aroclor 1260	0.010 U	0.018 U	0.010 U	0.012 U	0.010 U	0.010 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.050 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1232	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.050 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.050 U	0.010 U	0.010 U	0.010 U	0.010 U
Total PCBs (b)	**0.030**	**0.20**	**0.10**	**0.12**	**0.081**	**0.098**	**1.1** J	**0.081**	**0.079**	**0.030**	**0.090**
SEMIVOLATILES (µg/L)											
Method SW8270D											
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Octyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	UO82B/UO82E/UO83B	UP29C/UP29G/UP30C	UU03D/UU03I/UU04D	UX30B/UX30E/UX31B	VB89B/VB89E/VB90B	VF37B/VF37E/VF38B	VJ50B/VJ50H/VJ52B	VL90B/VL90E/VL91B	VR68B/VR68E/VR69B	VS17C/VS17G/VS30C	VV27C/VV27G/VV28C
Sample Date	03/31/2012	04/05/2012	5/10/2012	6/5/2012	7/11/2012	8/9/2012	9/13/2012	10/4/2012	11/8/2012	11/12/2012	12/6/2012
Event Type	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Storm	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PAHs (µg/L)											
Method SW8270D-SIM											
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL METALS (µg/L)											
Method EPA200.8/6010B,C/7470A											
Arsenic	**0.7**	**1.8**	**4.6**	**1.1**	**3.4**	**2.8**	**2.4**	**5.3**	**2.3**	**0.6**	**1.2**
Cadmium	**0.4**	**0.5**	**0.3**	**0.4**	**0.2**	0.1 U	**0.2**	**0.2**	**0.5**	**0.5**	**0.3**
Chromium	0.5 U	**1.6**	**1.1**	**1.0**	1 U	1 U	0.5 U	**0.8**	0.5 U	**0.5**	0.5 U
Copper	**3.4**	**8.1**	**5.5**	**5.8**	**4.3**	**1.6**	**2.0**	**4.2**	**2.7**	**3.9**	**9.2**
Iron	**1370**	**5140**	**21,900**	**2710**	**14,100**	**11,300**	**6140**	**19,300**	**13,300**	**1400**	**2870**
Lead	**0.5**	**3.1**	**3.0**	**1.9**	**1.9**	**0.7**	**0.4**	**1.3**	**0.6**	**0.4**	**0.4**
Manganese	**91**	**146**	**548**	**76**	**497**	**492**	**326**	**203**	**530**	**62**	**217**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**1.1**	**2.0**	**1.9**	**1.2**	**2.3**	**1.1**	**0.9**	**1.6**	**1.7**	**0.6**	**2.4**
Silver	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**126**	**124**	**48**	**97**	**30**	**25**	**18**	**40**	**45**	**154**	**45**
DISSOLVED METALS (µg/L)											
Method EPA200.8/6010B,C											
Arsenic	**0.4**	**0.6**	**0.8**	**0.6**	**0.9**	**0.8**	**1.2**	**0.4**	**0.7**	**0.5**	**0.7**
Cadmium	**0.4**	**0.2**	0.1 U	**0.2**	0.1 U	0.1 U	0.1 U	0.1 U	**0.2**	**0.5**	**0.2**
Chromium	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Copper	**2.0**	**3.0**	**0.8**	**3.0**	**0.9**	**0.5**	**1.1**	**1.5**	1.6 U	**2.2**	**3.6**
Iron	**260**	**250**	50 U	**410**	50 U	50 U	50 U	50 U	50 U	**950**	**120**
Lead	0.1 U	**0.1**	0.1 U	**0.2**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.2**	0.1 U
Manganese	**74**	**128**	**518**	**70**	**445**	**436**	**303**	**23**	**498**	**59**	**200**
Nickel	**1.0**	**1.3**	**1.2**	**0.8**	**1.6**	**1.0**	**0.8**	**1.3**	**0.8**	**0.6**	**2.2**
Silver	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**120**	**98**	**11**	**81**	**7**	**10**	**9**	**5**	**30**	**151**	**38**
DISSOLVED METALS (ng/L)											
Method SW7470A											
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS											
pH (SU; EPA 150.1; SM 4500H)	**6.62**	**6.81**	**6.64**	**6.74**	**6.86**	**6.84**	**6.81**	**7.11**	**6.66**	**6.63**	**6.50**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**3.0**	**17.1**	**28.8**	**6.6**	**32.0**	**32.0**	**12.9**	**53.2**	**34.4**	**2.7**	**7.9**
Turbidity (NTU; EPA 180.1)	**6.80**	**37.0**	**42.0**	**9.40**	**82.5**	**74.0**	**16.0**	**130**	**100**	**2.60**	**21.0**

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	UO82B/UO82E/UO83B	UP29C/UP29G/UP30C	UU03D/UU03I/UU04D	UX30B/UX30E/UX31B	VB89B/VB89E/VB90B	VF37B/VF37E/VF38B	VJ50B/VJ50H/VJ52B	VL90B/VL90E/VL91B	VR68B/VR68E/VR69B	VS17C/VS17G/VS30C	VV27C/VV27G/VV28C
Sample Date	03/31/2012	04/05/2012	5/10/2012	6/5/2012	7/11/2012	8/9/2012	9/13/2012	10/4/2012	11/8/2012	11/12/2012	12/6/2012
Event Type	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Storm	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PARTICLE/GRAIN SIZE (mg/L)											
Method ASTM-D3977C											
Sediment Conc. > 500 um	**5.8**	**11.8**	**9.8**	**0.99**	**5.13**	**1.48**	**2.26**	**1.60**	0.01 U	**0.21**	**1.30**
Sediment Conc. 500 to 250 um	**7.6**	**9.7**	**3.0**	**1.18**	**2.76**	**2.53**	**2.47**	**2.30**	**0.40**	**0.84**	**1.90**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	**14.4**	**23.8**	**9.73**	**25.36**	**17.04**	**16.85**	**35.12**	**13.47**	0.01 U	0.01 U
Sediment Conc. 3.9 to 1 um	**1.3**	**4.1**	**3.9**	**0.65**	**6.66**	**6.33**	**4.05**	**9.68**	**10.16**	0.01 U	**2.10**
Sediment Conc. < 1 um	**2.3**	**1.3**	**2.1**	**0.77**	**2.85**	**2.89**	**1.70**	**2.70**	**14.00**	**6.31**	**5.48**
Previous 1 Hour Precip. (inches) (c)	0.0	0.0	0.0	0.01	0.0	0.0	0.0	0.0	0.0	0.01	0.01
Previous 12 Hours Precip. (inches) (c)	0.43	0.12	0.0	0.44	0.0	0.0	0.0	0.0	0.0	0.26	0.04

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	VW75A/VW75E/VW76A	VY68A/VY68C/VY69A/VY69C	WC96C/WC96G/WC97C	WG51C/WG51G/WG56C	WI40A/WI40E/WI41A	WK37C/WK37G/WK38C	WK74C/WK74G/WK81C	WP40C/WP40G/WP39C	WT15B/WT15E/WT16B	WX01C/WX01G/WX02C
Sample Date	12/16/2012	1/8/2013	2/7/2013	3/7/2013	3/19/2013	4/4/2013	4/5/2013	5/9/2013	6/7/2013	7/10/2013
Event Type	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PCBs (µg/L) (a)										
Method SW8082A										
Aroclor 1016	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1242	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1248	0.05 U	0.05 U	0.038 U	0.025 U	0.25 U	0.075 U	0.031 U	0.10 U	0.10 U	0.075 U
Aroclor 1254	**0.041**	**0.052**	**0.054**	**0.034**	**0.30**	**0.11**	**0.044**	**0.13**	**0.14**	**0.089**
Aroclor 1260	0.005 U	0.005 U	0.005 U	0.005 U	0.008 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1221	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1232	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1262	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total PCBs (b)	**0.041**	**0.052**	**0.054**	**0.034**	**0.30**	**0.11**	**0.044**	**0.13**	**0.14**	**0.089**
SEMIVOLATILES (µg/L)										
Method SW8270D										
Phenol	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
1,3-Dichlorobenzene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
1,4-Dichlorobenzene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Benzyl Alcohol	NA	NA	NA	2.0 UJ	2.0 U	NA	NA	2.0 U	NA	2.0 U
1,2-Dichlorobenzene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
2-Methylphenol	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
4-Methylphenol	NA	NA	NA	2.0 U	2.0 U	NA	NA	2.0 U	NA	2.0 U
Hexachloroethane	NA	NA	NA	2.0 U	2.0 U	NA	NA	2.0 U	NA	2.0 U
2,4-Dimethylphenol	NA	NA	NA	3.0 U	3.0 U	NA	NA	3.0 U	NA	3.0 U
Benzoic Acid	NA	NA	NA	20 U	20 U	NA	NA	20 U	NA	20 U
1,2,4-Trichlorobenzene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Naphthalene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Hexachlorobutadiene	NA	NA	NA	3.0 U	3.0 U	NA	NA	3.0 U	NA	3.0 U
2-Methylnaphthalene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Dimethylphthalate	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Acenaphthylene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Acenaphthene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Dibenzofuran	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Diethylphthalate	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Fluorene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
N-Nitrosodiphenylamine	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Hexachlorobenzene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Pentachlorophenol	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA	10 U
Phenanthrene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Anthracene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Di-n-Butylphthalate	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Fluoranthene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Pyrene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Butylbenzylphthalate	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Benzo(a)anthracene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
bis(2-Ethylhexyl)phthalate	NA	NA	NA	1.0 U	1.0 U	NA	NA	3.0 U	NA	3.0 U
Chrysene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Di-n-Octyl phthalate	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Benzo(a)pyrene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Dibenz(a,h)anthracene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Benzo(g,h,i)perylene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
1-Methylnaphthalene	NA	NA	NA	1.0 U	1.0 U	NA	NA	1.0 U	NA	1.0 U
Total Benzofluoranthenes	NA	NA	NA	5.0 U	5.0 U	NA	NA	5.0 U	NA	5.0 U

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	VW75A/VW75E/VW76A	VY68A/VY68C/VY69A/VY69C	WC96C/WC96G/WC97C	WG51C/WG51G/WG56C	WI40A/WI40E/WI41A	WK37C/WK37G/WK38C	WK74C/WK74G/WK81C	WP40C/WP40G/WP39C	WT15B/WT15E/WT16B	WX01C/WX01G/WX02C
Sample Date	12/16/2012	1/8/2013	2/7/2013	3/7/2013	3/19/2013	4/4/2013	4/5/2013	5/9/2013	6/7/2013	7/10/2013
Event Type	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PAHs (µg/L)										
Method SW8270D-SIM										
Naphthalene	NA	NA	NA	0.010 U	**0.011**	NA	NA	0.012 U	NA	0.010 U
2-Methylnaphthalene	NA	NA	NA	0.010 U	**0.011**	NA	NA	0.010 U	NA	0.010 U
1-Methylnaphthalene	NA	NA	NA	0.010 U	**0.016**	NA	NA	0.010 U	NA	0.010 U
Acenaphthylene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Acenaphthene	NA	NA	NA	0.010 U	**0.026**	NA	NA	**0.024**	NA	**0.044**
Fluorene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Phenanthrene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Anthracene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Fluoranthene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Pyrene	NA	NA	NA	0.010 U	0.010 U	NA	NA	**0.012**	NA	**0.014**
Benzo(a)anthracene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Chrysene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Benzo(a)pyrene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Dibenz(a,h)anthracene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Benzo(g,h,i)perylene	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Dibenzofuran	NA	NA	NA	0.010 U	0.010 U	NA	NA	0.010 U	NA	0.010 U
Total Benzofluoranthenes	NA	NA	NA	0.020 UJ	0.020 U	NA	NA	0.020 U	NA	0.020 U
CPAH TEQ	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND
TOTAL METALS (µg/L)										
Method EPA200.8/6010B,C/7470A										
Arsenic	**0.7**	**0.8**	**1.3**	**0.8**	**3.1**	**2.0**	**0.8**	**2.5**	**3.2**	**2.1**
Cadmium	**0.2**	**0.3**	**0.2**	**0.2**	**0.2**	**0.2**	**0.3**	**0.2**	**0.2**	0.1 U
Chromium	0.5 U	**0.7**	1 U	**0.5**	1 U	0.5 U	**0.7**	0.5 U	0.5 U	0.5 U
Copper	**2.9**	**4.4**	**2.2**	**2.3**	**6.8**	**3.2**	**3.5**	**3.8**	**4.0**	**1.1**
Iron	**1520**	**1530**	**5750**	**3030**	**19,900**	**10,300**	**1960**	**12,500**	**14,800**	**6780**
Lead	**0.4**	**0.7**	**0.2**	**0.2**	**1.4**	**0.3**	**0.4**	**0.6**	**0.6**	**0.2**
Manganese	**67**	**59**	**390**	**184**	**484**	**543**	**110**	**503**	**531**	**516**
Mercury	0.1 U	20.0 U (d)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**0.6**	**1.0**	**1.3**	**1.0**	**1.9**	**1.9**	**0.7**	**1.6**	**1.7**	**1.3**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**52**	**89**	**57**	**76**	**30**	**17**	**91**	**23**	**41**	**19**
DISSOLVED METALS (µg/L)										
Method EPA200.8/6010B,C										
Arsenic	0.5 U	**0.5**	**0.8**	**0.7**	**0.7**	**0.7**	**0.5**	**0.8**	**0.5**	**0.8**
Cadmium	**0.2**	**0.2**	**0.2**	**0.2**	0.1 U	0.1 U	**0.2**	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Copper	**2.0**	**2.3**	**0.8**	**0.8**	**1.8**	**0.9**	**2.4**	**0.8**	**1.4**	**0.6**
Iron	**170**	**360**	**2200**	**2480**	50 U	50 U	**410**	50 U	50 U	50 U
Lead	0.1 U	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Manganese	**64**	**57**	**341**	**193**	**437**	**531**	**99**	**507**	**417**	**495**
Nickel	**0.6**	1 U	**1.3**	**1.1**	**1.5**	**1.7**	**0.6**	**1.5**	**0.8**	**0.5**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**49**	**80**	**47**	**71**	**12**	**8**	**77**	**9**	**13**	**10**
DISSOLVED METALS (ηg/L)										
Method SW7470A										
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS										
pH (SU; EPA 150.1; SM 4500H)	**6.27**	**6.65**	**6.63**	**6.51**	**6.72**	**6.94**	**6.47**	**6.76**	**6.65**	**6.84**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**3.8**	**6.9**	**11.8**	**3.5**	**67.0**	**34.6**	**5.4**	**40.2**	**38.0**	**39.3**
Turbidity (NTU; EPA 180.1)	**8.80**	**10.7**	**22.0**	**13.4**	**220**	**105**	**8.50**	**38.0**	**48.0**	**62.5**

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	VW75A/VW75E/VW76A	VY68A/VY68C/VY69A/VY69C	WC96C/WC96G/WC97C	WG51C/WG51G/WG56C	WI40A/WI40E/WI41A	WK37C/WK37G/WK38C	WK74C/WK74G/WK81C	WP40C/WP40G/WP39C	WT15B/WT15E/WT16B	WX01C/WX01G/WX02C
Sample Date	12/16/2012	1/8/2013	2/7/2013	3/7/2013	3/19/2013	4/4/2013	4/5/2013	5/9/2013	6/7/2013	7/10/2013
Event Type	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PARTICLE/GRAIN SIZE (mg/L)										
Method ASTM-D3977C										
Sediment Conc. > 500 um	**0.54**	0.01 U	**1.35**	**1.42**	**10.31**	**6.79**	**6.39**	**13.42**	**23.71**	**4.70**
Sediment Conc. 500 to 250 um	**0.65**	0.01 U	**1.56**	**1.09**	**10.52**	**11.81**	**8.69**	**12.61**	**11.54**	**5.12**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	**1.68**	0.01 U	0.01 U	**0.47**	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	0.01 U	0.01 U	0.01 U	**70.06**	**21.71**	0.01 U	**41.58**	**34.19**	**0.06**
Sediment Conc. 3.9 to 1 um	**2.02**	**2.36**	**4.55**	**3.03**	**16.08**	**5.95**	**1.50**	**7.25**	**6.80**	**15.12**
Sediment Conc. < 1 um	**4.78**	**5.02**	**7.81**	**6.87**	**12.66**	**3.81**	**3.24**	**5.21**	**4.34**	**21.01**
Previous 1 Hour Precip. (inches) (c)	0.03	0.02	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
Previous 12 Hours Precip. (inches) (c)	0.06	0.22	0.09	0.25	0.07	0.01	0.23	0.00	0.00	0.00

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	XA11C/XA11G/XA14C	XE07C/XE07G/XE22C	XF13A/XF13B/XF14A/XE91C	XJ12C/XJ12G/XJ36C
Sample Date	8/8/2013	9/6/2013	9/12-9/13/2013	10/9/2013
Event Type	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab
PCBs (µg/L) (a)				
Method SW8082A				
Aroclor 1016	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1242	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1248	0.125 U	0.042 U	0.041 U	0.008 U
Aroclor 1254	**0.31**	**0.043**	**0.12**	**0.23**
Aroclor 1260	0.015 U	0.005 U	0.005 U	**0.059**
Aroclor 1221	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1232	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1262	0.005 U	0.005 U	0.005 U	0.005 U
Total PCBs (b)	**0.31**	**0.043**	**0.12**	**0.289**
SEMIVOLATILES (µg/L)				
Method SW8270D				
Phenol	NA	1.0 U	1.0 U	NA
1,3-Dichlorobenzene	NA	1.0 U	1.0 U	NA
1,4-Dichlorobenzene	NA	1.0 U	1.0 U	NA
Benzyl Alcohol	NA	2.0 UJ	2.0 U	NA
1,2-Dichlorobenzene	NA	1.0 U	1.0 U	NA
2-Methylphenol	NA	1.0 U	1.0 U	NA
4-Methylphenol	NA	2.0 U	2.0 U	NA
Hexachloroethane	NA	2.0 U	2.0 U	NA
2,4-Dimethylphenol	NA	3.0 U	3.0 U	NA
Benzoic Acid	NA	20 U	20 U	NA
1,2,4-Trichlorobenzene	NA	1.0 U	1.0 U	NA
Naphthalene	NA	1.0 U	1.0 U	NA
Hexachlorobutadiene	NA	3.0 U	3.0 U	NA
2-Methylnaphthalene	NA	1.0 U	1.0 U	NA
Dimethylphthalate	NA	1.0 U	1.0 U	NA
Acenaphthylene	NA	1.0 U	1.0 U	NA
Acenaphthene	NA	1.0 U	1.0 U	NA
Dibenzofuran	NA	1.0 U	1.0 U	NA
Diethylphthalate	NA	1.0 U	1.0 U	NA
Fluorene	NA	1.0 U	1.0 U	NA
N-Nitrosodiphenylamine	NA	1.0 U	1.0 U	NA
Hexachlorobenzene	NA	1.0 U	1.0 U	NA
Pentachlorophenol	NA	10 U	10 U	NA
Phenanthrene	NA	1.0 U	1.0 U	NA
Anthracene	NA	1.0 U	1.0 U	NA
Di-n-Butylphthalate	NA	1.0 U	1.0 U	NA
Fluoranthene	NA	1.0 U	1.0 U	NA
Pyrene	NA	1.0 U	1.0 U	NA
Butylbenzylphthalate	NA	1.0 U	1.0 U	NA
Benzo(a)anthracene	NA	1.0 U	1.0 U	NA
bis(2-Ethylhexyl)phthalate	NA	3.0 U	3.0 U	NA
Chrysene	NA	1.0 U	1.0 U	NA
Di-n-Octyl phthalate	NA	**1.4**	1.0 U	NA
Benzo(a)pyrene	NA	1.0 U	1.0 U	NA
Indeno(1,2,3-cd)pyrene	NA	1.0 U	1.0 U	NA
Dibenz(a,h)anthracene	NA	1.0 U	1.0 U	NA
Benzo(g,h,i)perylene	NA	1.0 U	1.0 U	NA
1-Methylnaphthalene	NA	1.0 U	1.0 U	NA
Total Benzofluoranthenes	NA	5.0 U	5.0 U	NA

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	XA11C/XA11G/XA14C	XE07C/XE07G/XE22C	XF13A/XF13B/XF14A/XE91C	XJ12C/XJ12G/XJ36C
Sample Date	8/8/2013	9/6/2013	9/12-9/13/2013	10/9/2013
Event Type	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab
PAHs (µg/L)				
Method SW8270D-SIM				
Naphthalene	NA	**0.012**	0.010 U	NA
2-Methylnaphthalene	NA	**0.010**	0.010 U	NA
1-Methylnaphthalene	NA	0.010 U	0.010 U	NA
Acenaphthylene	NA	0.010 U	0.010 U	NA
Acenaphthene	NA	0.010 U	0.0072 U	NA
Fluorene	NA	0.010 U	0.010 U	NA
Phenanthrene	NA	**0.016**	0.0067 U	NA
Anthracene	NA	0.010 U	0.010 U	NA
Fluoranthene	NA	**0.016**	0.0085 U	NA
Pyrene	NA	**0.021**	**0.012**	NA
Benzo(a)anthracene	NA	0.010 U	0.010 U	NA
Chrysene	NA	**0.012**	0.0056 U	NA
Benzo(a)pyrene	NA	0.010 U	0.010 U	NA
Indeno(1,2,3-cd)pyrene	NA	0.010 U	0.010 U	NA
Dibenz(a,h)anthracene	NA	0.010 U	0.010 U	NA
Benzo(g,h,i)perylene	NA	0.010 U	0.010 U	NA
Dibenzofuran	NA	0.010 U	0.010 U	NA
Total Benzofluoranthenes	NA	0.020 U	0.020 U	NA
CPAH TEQ	NA	**0.0001**	NA	NA
TOTAL METALS (µg/L)				
Method EPA200.8/6010B,C/7470A				
Arsenic	**2.5**	**0.7**	**2.9**	**1.0**
Cadmium	**0.3**	**4.1**	**3.2**	**1.5**
Chromium	**2**	**1.9**	**0.7**	0.5 U
Copper	**8.9**	**7.5**	**6.4**	**4.2**
Iron	**42600**	**1260**	**6730**	**3120**
Lead	**2.3**	**3.3**	**2.6**	**0.6**
Manganese	**769**	**28**	**1070**	**245**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**4.7**	**14.2**	**6.7**	**3.4**
Silver	NA	NA	NA	NA
Zinc	**56**	**137**	**101**	**120**
DISSOLVED METALS (µg/L)				
Method EPA200.8/6010B,C				
Arsenic	**0.9**	**0.7**	**1.4**	**0.4**
Cadmium	0.1 U	**2.8**	**0.1**	**1.0**
Chromium	0.5 U	**0.8**	0.5 U	0.5 U
Copper	**1.7**	**3.9**	**0.9**	**2.4**
Iron	50 U	50 U	**90**	**80**
Lead	**0.3**	**0.2**	0.1 U	0.1 U
Manganese	**556**	**8**	**905**	**208**
Nickel	**2.3**	**11.4**	**4.9**	**2.8**
Silver	NA	NA	NA	NA
Zinc	**17**	**96**	**32**	**92**
DISSOLVED METALS (ng/L)				
Method SW7470A				
Mercury	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS				
pH (SU; EPA 150.1; SM 4500H)	**6.95**	**6.41**	**6.70**	**6.53**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**168**	**14.3**	**36.0**	**7.8**
Turbidity (NTU; EPA 180.1)	**62.0**	**3.38**	**60.0**	**7.21**

TABLE 3
MH130A WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A	LTST-W-MH130A
Laboratory Data ID	XA11C/XA11G/XA14C	XE07C/XE07G/XE22C	XF13A/XF13B/XF14A/XE91C	XJ12C/XJ12G/XJ36C
Sample Date	8/8/2013	9/6/2013	9/12-9/13/2013	10/9/2013
Event Type	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab
PARTICLE/GRAIN SIZE (mg/L)				
Method ASTM-D3977C				
Sediment Conc. > 500 um	**20.72**	**4.06**	**1.48**	**12.71**
Sediment Conc. 500 to 250 um	**25.29**	**4.79**	**9.18**	**11.55**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	**0.01**	0.01 U	**4.82**	0.01 U
Sediment Conc. 62.5 to 3.9 um	**103.68**	0.01 U	**30.58**	**7.04**
Sediment Conc. 3.9 to 1 um	**14.15**	**3.62**	**2.03**	**0.90**
Sediment Conc. < 1 um	**7.34**	**9.93**	**0.83**	**0.68**
Previous 1 Hour Precip. (inches) (c)	0.00	0.02	0.00	0.00
Previous 12 Hours Precip. (inches) (c)	0.00	1.23	0.00	0.00

NA = Not Analyzed

Bold = Detected compound.

U = Indicates the compound was not detected at the reported concentration.

J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

(a) Starting in December 2012, ARI evaluated PCBs in whole water between the Limit of Detection (LOD) and the Limit of Quantitation (LOQ). For these non-detect results, the reported concentration shown is the LOD (1/2 the LOQ).

(b) Total PCBs is the sum of detected aroclors or, if no aroclors are detected, is reported as non-detect (ND).

(c) Precipitation data are from the NOAA Quality Controlled Local Climatological Data for Station 24234/BFI - SEATTLE: BOEING FIELD/KING COUNTY INTERNATIONAL AIRPORT.

(d) Due to a laboratory receipt login error, total metals were analyzed by low level (ng/L); the client was notified and results were reported per client request.

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LSTS-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	TW50B	TX90C	TY96C	UA56C	UC19C/UC19F/UC20C	UC78C/UC78F/UC80C	UE10B/UE10C/UE11B	UE68B/UE68E/UE73B	UH75B/UH75G/UH76B	UL49B/UL49E/UL50B	UM18B/UM18D/UM19B
Sample Date	11/11/2011	11/17/2011	11/23/2011	12/08/2011	12/21/2011	12/28/2011	1/12/2012	1/21/2012	02/08/2012	03/08/2012	03/13/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm
Sample Type	Time-weighted composite, consisting of bypass and non-bypass flows						Flow-weighted composite, consisting of bypass and non-bypass flows				
PCBs (µg/L) (a)											
Method SW8082A											
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1248	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1254	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	**0.016**	0.010 U	0.010 U	0.010 U
Aroclor 1260	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1232	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total PCBs (b)	ND	ND	ND	ND	ND	ND	ND	**0.016**	ND	ND	ND
SEMIVOLATILES (µg/L)											
Method SW8270D											
Phenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	**1.6**	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Di-n-Octyl phthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LSTS-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	TW50B	TX90C	TY96C	UA56C	UC19C/UC19F/UC20C	UC78C/UC78F/UC80C	UE10B/UE10C/UE11B	UE68B/UE68E/UE73B	UH75B/UH75G/UH76B	UL49B/UL49E/UL50B	UM18B/UM18D/UM19B
Sample Date	11/11/2011	11/17/2011	11/23/2011	12/08/2011	12/21/2011	12/28/2011	1/12/2012	1/21/2012	02/08/2012	03/08/2012	03/13/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm
Sample Type	Time-weighted composite, consisting of bypass and non-bypass flows						Flow-weighted composite, consisting of bypass and non-bypass flows				
PAHs (µg/L)											
Method SW8270D-SIM											
Naphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	**0.19**	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	**0.028**	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	**0.042**	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	**0.031**	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	**0.029**	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	**0.014**	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	**0.013**	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	**0.016**	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	**0.046**	NA	NA	NA	NA	NA	NA
CPAH TEQ	NA	NA	NA	NA	**0.020**	NA	NA	NA	NA	NA	NA
TOTAL METALS (µg/L)											
Method EPA200.8/6010B/7470A											
Arsenic	NA	NA	NA	**1.2**	**1.4**	**0.9**	**1.0**	**1.6**	**1.2**	**1.0**	**0.7**
Cadmium	NA	NA	NA	0.1 U	0.1 U	**0.3**	**0.2**	**0.7**	**0.1**	**0.1**	**0.2**
Chromium	NA	NA	NA	**1.0**	**2**	**1.6**	1 U	**3.6**	1 U	1 U	**0.9**
Copper	NA	NA	NA	**1.2**	**3.7**	**8.8**	**3.6**	**11.4**	**2.1**	**2.6**	**3.7**
Iron	NA	NA	NA	**10,200**	**14,300**	**5860**	**9010**	**14,800**	**8330**	**8520**	**3490**
Lead	NA	NA	NA	**0.2**	**1.5**	**26.1**	**1.2**	**8.0**	**0.5**	**0.9**	**1.5**
Manganese	NA	NA	NA	**898**	**999**	**221**	**502**	**187**	**739**	**549**	**110**
Mercury	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	NA	NA	NA	**1.0**	**1.2**	**1.4**	**1.3**	**3.5**	**1.4**	**4.1**	**1.1**
Zinc	NA	NA	NA	**8**	**15**	**52**	**34**	**87**	**18**	**21**	**27**
DISSOLVED METALS (µg/L)											
Method EPA200.8/SW6010B											
Arsenic	NA	NA	NA	NA	**0.9**	**0.4**	**0.5**	**0.2**	**0.6**	**0.4**	**0.4**
Cadmium	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	**0.1**	0.1 U	0.1 U	0.1 U
Chromium	NA	NA	NA	NA	**0.5**	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Copper	NA	NA	NA	NA	0.5 U	**1.8**	**1.7**	**2.2**	**0.9**	**1.1**	**1.5**
Iron	NA	NA	NA	NA	**4260**	**620**	**1030**	**190**	**680**	**670**	**460**
Lead	NA	NA	NA	NA	**0.2**	**1.5**	**0.2**	**0.2**	0.1 U	0.1 U	**0.1**
Manganese	NA	NA	NA	NA	**936**	**130**	**440**	**98**	**693**	**484**	**93**
Nickel	NA	NA	NA	NA	**0.8**	0.5 U	**1.0**	**1.3**	**1.3**	**3.5**	**0.7**
Zinc	NA	NA	NA	NA	**5**	**19**	**14**	**27**	**9**	**8**	**15**
DISSOLVED METALS (ng/L)											
Method SW7470A											
Mercury	NA	NA	NA	NA	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS											
pH (SU; EPA 150.1; SM 4500H)	NA	NA	NA	**7.06**	**6.66**	**6.39**	**6.98**	**6.68**	**7.08**	**7.13**	**6.47**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**16.7**	**9.4**	**7.7**	**20.3**	**19.4**	**23.4**	**21.1**	**35.9**	**17.5**	**26.6**	**14.2**
Turbidity (NTU; EPA 180.1)	**80.0**	**38.2**	**9.30**	**76.0**	**61.2**	**20.0**	**66.0**	**37.0**	**66.0**	**52.0**	**14.0**

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LSTS-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	TW50B	TX90C	TY96C	UA56C	UC19C/UC19F/UC20C	UC78C/UC78F/UC80C	UE10B/UE10C/UE11B	UE68B/UE68E/UE73B	UH75B/UH75G/UH76B	UL49B/UL49E/UL50B	UM18B/UM18D/UM19B
Sample Date	11/11/2011	11/17/2011	11/23/2011	12/08/2011	12/21/2011	12/28/2011	1/12/2012	1/21/2012	02/08/2012	03/08/2012	03/13/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm
Sample Type	Time-weighted composite, consisting of bypass and non-bypass flows						Flow-weighted composite, consisting of bypass and non-bypass flows				
PARTICLE/GRAIN SIZE (mg/L)											
Method ASTM-D3977C											
Sediment Conc. > 500 um	0.01 U	**0.1**	**0.6**	**0.1**	**1.0**	**1.3**	**0.7**	**22.7**	**2.1**	**4.1**	**3.0**
Sediment Conc. 500 to 250 um	**2.0**	**0.2**	**1.0**	**0.6**	**1.0**	**3.6**	**3.5**	**8.6**	**1.3**	**2.0**	**2.3**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	**15.1**	**6.7**	**11.2**	**14.4**	**12.7**	**14.5**	**13.6**	**51.7**	0.01 U	**14.2**	**10.3**
Sediment Conc. 3.9 to 1 um	**8.3**	**3.6**	**2.2**	**8.0**	**4.7**	**3.0**	**5.2**	**6.3**	**4.4**	**3.3**	**1.6**
Sediment Conc. < 1 um	**8.8**	**3.5**	**1.2**	**6.7**	**3.4**	**1.3**	**4.0**	**4.3**	**17.8**	**3.8**	**1.0**
PRECIPITATION (c)											
Amount During Test (inches)	0.0	0.38	1.99	0.0	0.0	0.86	0.23	0.85	0.10	0.06	0.76

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	UU03B/UU03G/UU04B	UX69B/UX69D/UX70B	VS17B/VS17F/VS30B	VV27B/VV27F/VV28B	VW75D/VW75H/VW76D	WC96B/WC96F/WC97B	WG51B/WG51F/WG56B	WI40D/WI40H/WI41D	WK37B/WK37F/WK38B	WK74B/WK74F/WK81B
Sample Date	5/10/2012	6/7/2012	11/11/2012	12/6/2012	12/17/2012	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013
Event Type	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm	Monthly	Storm
Sample Type	Flow-weighted composite, bypass only			Grab, non-bypass flow	Flow-weighted composite, bypass only	Grab, non-bypass flow	Flow-weighted composite, bypass only		Grab, non-bypass flow	Flow-weighted composite, bypass only
PCBs (µg/L) (a)										
Method SW8082A										
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1248	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1254	0.010 U	**0.017**	**0.014**	**0.010**	0.005 U	0.005 U	**0.015**	**0.014**	0.005 U	**0.014**
Aroclor 1260	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1232	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total PCBs (b)	ND	**0.017**	**0.014**	**0.010**	ND	ND	**0.015**	**0.014**	ND	**0.014**
SEMIVOLATILES (µg/L)										
Method SW8270D										
Phenol	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzyl Alcohol	NA	NA	NA	NA	NA	2.0 U	2.0 UJ	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methylphenol	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methylphenol	NA	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Hexachloroethane	NA	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dimethylphenol	NA	NA	NA	NA	NA	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Benzoic Acid	NA	NA	NA	NA	NA	20 U	20 U	20 U	20 U	20 U
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Naphthalene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorobutadiene	NA	NA	NA	NA	NA	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
2-Methylnaphthalene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dimethylphthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthylene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenzofuran	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Diethylphthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluorene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pentachlorophenol	NA	NA	NA	NA	NA	10 UJ	10 U	10 U	10 U	10 U
Phenanthrene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Anthracene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Butylphthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pyrene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Butylbenzylphthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	**1.2**
Benzo(a)anthracene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	**3.1**
Chrysene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Octyl phthalate	NA	NA	NA	NA	NA	1.0 U	**1.0**	1.0 U	1.0 U	1.0 U
Benzo(a)pyrene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total Benzofluoranthenes	NA	NA	NA	NA	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	UU03B/UU03G/UU04B	UX69B/UX69D/UX70B	VS17B/VS17F/VS30B	VV27B/VV27F/VV28B	VW75D/VW75H/VW76D	WC96B/WC96F/WC97B	WG51B/WG51F/WG56B	WI40D/WI40H/WI41D	WK37B/WK37F/WK38B	WK74B/WK74F/WK81B
Sample Date	5/10/2012	6/7/2012	11/11/2012	12/6/2012	12/17/2012	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013
Event Type	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm	Monthly	Storm
Sample Type	Flow-weighted composite, bypass only			Grab, non-bypass flow	Flow-weighted composite, bypass only	Grab, non-bypass flow	Flow-weighted composite, bypass only		Grab, non-bypass flow	Flow-weighted composite, bypass only
PAHs (µg/L)										
Method SW8270D-SIM										
Naphthalene	NA	NA	NA	NA	NA	**0.012**	**0.021**	**0.034**	0.010 U	**0.035**
2-Methylnaphthalene	NA	NA	NA	NA	NA	**0.018**	**0.032**	**0.049**	0.010 U	**0.043**
1-Methylnaphthalene	NA	NA	NA	NA	NA	**0.016**	**0.024**	**0.035**	0.010 U	**0.036**
Acenaphthylene	NA	NA	NA	NA	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Acenaphthene	NA	NA	NA	NA	NA	**0.13**	0.010 U	0.010 U	**0.042**	0.010 U
Fluorene	NA	NA	NA	NA	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Phenanthrene	NA	NA	NA	NA	NA	**0.017**	**0.062**	**0.066**	0.010 U	**0.079**
Anthracene	NA	NA	NA	NA	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Fluoranthene	NA	NA	NA	NA	NA	**0.030**	**0.14**	**0.17**	0.010 U	**0.26**
Pyrene	NA	NA	NA	NA	NA	**0.022**	**0.11**	**0.12**	0.010 U	**0.17**
Benzo(a)anthracene	NA	NA	NA	NA	NA	0.010 U	**0.031**	**0.034**	0.010 U	**0.046**
Chrysene	NA	NA	NA	NA	NA	**0.015**	**0.10**	**0.12**	0.010 U	**0.18**
Benzo(a)pyrene	NA	NA	NA	NA	NA	0.010 U	**0.054**	**0.063**	0.010 U	**0.090**
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	0.010 U	**0.055**	**0.064**	0.010 U	**0.10**
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	0.010 U	**0.011**	**0.013**	0.010 U	**0.019**
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	0.010 U	**0.073**	**0.078**	0.010 U	**0.12**
Dibenzofuran	NA	NA	NA	NA	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Benzofluoranthenes	NA	NA	NA	NA	NA	0.020 U	**0.17** J	**0.20**	0.020 U	**0.32**
CPAH TEQ	NA	NA	NA	NA	NA	**0.0002**	**0.082**	**0.095**	ND	**0.140**
TOTAL METALS (µg/L)										
Method EPA200.8/6010B/7470A										
Arsenic	**1.5**	**1.8**	**3.8**	**1.1**	**1.2**	**1.3**	**2.4**	**2.0**	**1.4**	**1.8**
Cadmium	0.1 U	**0.4**	**0.6**	**0.1**	**0.3**	0.1 U	**0.4**	**0.4**	0.1 U	**0.4**
Chromium	**1.0**	**3.6**	**4.0**	**0.7**	**1.2**	1 U	**2.9**	**2.6**	**0.8**	**3.2**
Copper	**1.9**	**8.9**	**10.8**	**3.0**	**4.7**	**1.9**	**9.2**	**8.2**	**1.6**	**9.3**
Iron	**14,400**	**14,200**	**42,500**	**5610**	**7110**	**9340**	**20,600**	**16,900**	**10,700**	**11,300**
Lead	**0.4**	**3.2**	**5.3**	**0.4**	**2.9**	**0.3**	**3.7**	**3.3**	**0.1**	**4.3**
Manganese	**813**	**216**	**454**	**457**	**133**	**750**	**232**	**194**	**973**	**183**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**1.8**	**1.4**	**2.0**	**1.3**	**0.9**	**0.8**	**1.9**	**1.7**	**1.1**	**1.7**
Zinc	**9**	**56**	**81**	**37**	**35**	**11**	**64**	**51**	**6**	**104**
DISSOLVED METALS (µg/L)										
Method EPA200.8/SW6010B										
Arsenic	**0.6**	**0.4**	**0.3**	**0.8**	**0.3**	**0.8**	**0.4**	**0.3**	**0.6**	**0.4**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	**0.5**	0.5 U	0.5 U	0.5 U	1 U	**0.8**	0.5 U	1 U	**0.6**
Copper	**0.5**	**2.8**	**1.8**	**1.6**	**1.2**	**0.9**	**1.6**	**1.5**	0.5 U	**2.9**
Iron	**830**	**350**	**480**	**2490**	**350**	**3430**	**280**	**390**	**1470**	**480**
Lead	0.1 U	**0.2**	**0.1**	**0.1**	**0.1** U	0.1 U	**0.1**	0.1 U	0.1 U	**0.2**
Manganese	**730**	**83**	**109**	**433**	**97**	**687**	**68**	**90**	**923**	**94**
Nickel	**1.4**	**0.6**	0.5 U	**1.3**	**0.5** U	**0.8**	0.5 U	0.5 U	**1.1**	0.5 U
Zinc	**4** U	**11**	**5**	**30**	**16**	**8**	**9**	**9**	4 U	**44**
DISSOLVED METALS (ng/L)										
Method SW7470A										
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS										
pH (SU; EPA 150.1; SM 4500H)	**6.99**	**7.20**	**6.90**	**6.46**	**6.44**	**6.64**	**6.79**	**6.80**	**6.78**	**6.73**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**34.5**	**56.4** J	**176**	**9.0**	**30.3**	**8.6**	**141**	**109**	**20.0**	**65.0**
Turbidity (NTU; EPA 180.1)	**76.0**	**50.5**	**260**	**25.0**	**47.5**	**38.0**	**130**	**95.5**	**77.0**	**56.0**

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	UU03B/UU03G/UU04B	UX69B/UX69D/UX70B	VS17B/VS17F/VS30B	VV27B/VV27F/VV28B	VW75D/VW75H/VW76D	WC96B/WC96F/WC97B	WG51B/WG51F/WG56B	WI40D/WI40H/WI41D	WK37B/WK37F/WK38B	WK74B/WK74F/WK81B
Sample Date	5/10/2012	6/7/2012	11/11/2012	12/6/2012	12/17/2012	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013
Event Type	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Storm	Monthly	Storm
Sample Type	Flow-weighted composite, bypass only			Grab, non-bypass flow	Flow-weighted composite, bypass only	Grab, non-bypass flow	Flow-weighted composite, bypass only		Grab, non-bypass flow	Flow-weighted composite, bypass only
PARTICLE/GRAIN SIZE (mg/L)										
Method ASTM-D3977C										
Sediment Conc. > 500 um	**5.9**	**26.88**	**39.89**	**0.74**	**5.98**	**0.98**	**29.37**	**6.67**	**6.00**	**11.49**
Sediment Conc. 500 to 250 um	**3.3**	**13.69**	**60.18**	**1.06**	**3.31**	**2.51**	**20.60**	**22.61**	**11.68**	**7.15**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	**36.53**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	**19.9**	**30.53**	**96.30**	0.01 U	**25.47**	0.01 U	**79.47**	**78.37**	0.01 U	**3.47**
Sediment Conc. 3.9 to 1 um	**6.1**	**3.80**	**25.52**	**3.14**	**4.66**	**3.32**	**18.63**	**19.43**	**8.43**	**0.55**
Sediment Conc. < 1 um	**3.0**	**1.18**	**16.45**	**7.83**	**2.23**	**10.45**	**9.59**	**8.98**	**16.23**	**0.30**
PRECIPITATION (c)										
Amount During Test (inches)	0.01	0.48	0.63	0.69	0.94	0.35	0.87	0.51	0.00	0.64

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	WP40B/WP40F/WP39B	WT15A/WT15D/WT16A	WX01B/WX01F/WX02B	XA11B/XA11F/XA14B	XE07B/XE07F/XE22B	XE91B/XE91F/XE92B	XJ12B/XJ12F/XJ36B
Sample Date	5/9/2013	6/7/2013	7/10/2013	8/8/2013	9/6/13	9/12/13	10/8/13
Event Type	Monthly	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Grab, non-bypass flow				Flow-weighted composite, bypass only	Grab, non-bypass flow	Flow-weighted composite, bypass only
PCBs (µg/L) (a)							
Method SW8082A							
Aroclor 1016	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1242	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1248	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.020 U
Aroclor 1254	0.005 U	0.005 U	0.005 U	0.005 U	**0.030**	0.005 U	**0.13**
Aroclor 1260	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	**0.052**
Aroclor 1221	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1232	0.005 U	0.005 U	0.005 U	0.008 U	0.005 U	0.005 U	0.005 U
Aroclor 1262	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total PCBs (b)	ND	ND	ND	ND	**0.030**	ND	**0.182**
SEMIVOLATILES (µg/L)							
Method SW8270D							
Phenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzyl Alcohol	2.0 U	2.0 U	2.0 U	2.0 U	2.0 UJ	2.0 U	2.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Methylphenol	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methylphenol	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Hexachloroethane	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dimethylphenol	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Benzoic Acid	20 U	20 U	20 U	20 U	20 U	20 U	20 U
1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Naphthalene	1.0 U	1.0 U	1.0 U	1.0 U	**9.6**	1.0 U	1.0 U
Hexachlorobutadiene	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
2-Methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	**17**	1.0 U	1.0 U
Dimethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Acenaphthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenzofuran	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Diethylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.0**
Fluorene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
N-Nitrosodiphenylamine	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Pentachlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenanthrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-Butylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Fluoranthene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.5**
Pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.5**
Butylbenzylphthalate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(a)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
bis(2-Ethylhexyl)phthalate	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Chrysene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.2**
Di-n-Octyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U	**2.0**	1.0 U	**1.7**
Benzo(a)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Indeno(1,2,3-cd)pyrene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibenz(a,h)anthracene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzo(g,h,i)perylene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1-Methylnaphthalene	1.0 U	1.0 U	1.0 U	1.0 U	**14**	1.0 U	1.0 U
Total Benzofluoranthenes	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	WP40B/WP40F/WP39B	WT15A/WT15D/WT16A	WX01B/WX01F/WX02B	XA11B/XA11F/XA14B	XE07B/XE07F/XE22B	XE91B/XE91F/XE92B	XJ12B/XJ12F/XJ36B
Sample Date	5/9/2013	6/7/2013	7/10/2013	8/8/2013	9/6/13	9/12/13	10/8/13
Event Type	Monthly	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Grab, non-bypass flow				Flow-weighted composite, bypass only	Grab, non-bypass flow	Flow-weighted composite, bypass only
PAHs (µg/L)							
Method SW8270D-SIM							
Naphthalene	0.013 U	0.010 U	0.010 U	0.010 U	10	0.030	0.076
2-Methylnaphthalene	0.010 U	0.010 U	0.010 U	0.010 U	18	0.023	0.039
1-Methylnaphthalene	0.010 U	0.010 U	0.010 U	0.010 U	14	0.032	0.027
Acenaphthylene	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.011
Acenaphthene	0.12	0.054	0.052	0.11	0.12	0.13	0.21
Fluorene	0.010 U	0.010 U	0.010 U	0.010 U	0.38	0.010 U	0.10
Phenanthrene	0.010 U	0.010 U	0.010 U	0.013	0.21	0.010 U	1.4
Anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.016	0.010 U	0.27
Fluoranthene	0.010 U	0.010 U	0.010 U	0.012	0.40	0.010 U	2.8
Pyrene	0.010 U	0.010 U	0.010 U	0.011	0.27	0.010 U	4.3 J
Benzo(a)anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.080	0.010 U	2.2
Chrysene	0.010 U	0.010 U	0.010 U	0.010 U	0.30	0.010 U	3.0
Benzo(a)pyrene	0.010 U	0.010 U	0.010 U	0.010 U	0.14	0.010 U	2.2
Indeno(1,2,3-cd)pyrene	0.010 U	0.010 U	0.010 U	0.010 U	0.19	0.010 U	0.93
Dibenz(a,h)anthracene	0.010 U	0.010 U	0.010 U	0.010 U	0.034	0.010 U	0.24
Benzo(g,h,i)perylene	0.010 U	0.010 U	0.010 U	0.010 U	0.23	0.010 U	1.6
Dibenzofuran	0.010 U	0.010 U	0.010 U	0.010 U	0.40	0.010 U	0.068
Total Benzofluoranthenes	0.020 U	0.020 U	0.020 U	0.020 U	0.35	0.020 U	4.2
CPAH TEQ	ND	ND	ND	ND	0.208	ND	2.987
TOTAL METALS (µg/L)							
Method EPA200.8/6010B/7470A							
Arsenic	1.2	1.1	1.2	1.6	1.8	1.0	5.5
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.8	0.1 U	2.0
Chromium	0.8	1.0	1.1	2	3.3	1.0	12.8
Copper	1.0	1.3	1.1	2.3	13.8	1.0	51.0
Iron	9710	11,300	10,800	39100	21900	9060	26800
Lead	0.2	0.2	0.1	0.5	10.7	0.2	43.1
Manganese	926	978	1,110	1070	268	978	345
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	0.9	0.8	0.6	0.8	1.8	0.7	8.6
Zinc	6	4 U	4 U	10	98	6	292
DISSOLVED METALS (µg/L)							
Method EPA200.8/SW6010B							
Arsenic	0.8	0.5	0.6	0.5	0.4	0.6	0.3
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	1 U	0.5 U	0.6	0.5 U
Copper	0.6	0.5	0.6	0.5 U	2.1	0.5 U	2.9
Iron	1920	650	740	680	360	970	310
Lead	0.1 U	0.1 U	0.1 U	0.1 U	0.2	0.1 U	0.2
Manganese	920	861	975	867	6	915	47
Nickel	0.9	0.7	0.6	0.7	0.5 U	0.7	0.5 U
Zinc	4 U	4 U	4 U	4 U	13	4 U	12
DISSOLVED METALS (ng/L)							
Method SW7470A							
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS							
pH (SU; EPA 150.1; SM 4500H)	6.77	6.70	6.77	6.74	6.51	6.76	6.86 J
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	15.8	73.0	20.2	114	206	15.1	298
Turbidity (NTU; EPA 180.1)	56.0	90.0	86.5	240	20.0	74.4	22.0

TABLE 4
LSIV WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV	LTST-W-LSIV
Laboratory Data ID	WP40B/WP40F/WP39B	WT15A/WT15D/WT16A	WX01B/WX01F/WX02B	XA11B/XA11F/XA14B	XE07B/XE07F/XE22B	XE91B/XE91F/XE92B	XJ12B/XJ12F/XJ36B
Sample Date	5/9/2013	6/7/2013	7/10/2013	8/8/2013	9/6/13	9/12/13	10/8/13
Event Type	Monthly	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Grab, non-bypass flow				Flow-weighted composite, bypass only	Grab, non-bypass flow	Flow-weighted composite, bypass only
PARTICLE/GRAIN SIZE (mg/L)							
Method ASTM-D3977C							
Sediment Conc. > 500 um	**5.37**	**20.18**	**8.01**	**8.19**	**54.41**	**0.11**	**131.84**
Sediment Conc. 500 to 250 um	**8.15**	**18.59**	**10.22**	**47.97**	**24.45**	**10.25**	**128.76**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	**0.51**	**0.07**	0.01 U	**0.31**
Sediment Conc. 62.5 to 3.9 um	0.01 U	0.01 U	0.01 U	**65.13**	**41.27**	**39.00**	**162.08**
Sediment Conc. 3.9 to 1 um	**9.23**	**8.67**	**6.57**	**24.61**	**3.95**	**11.66**	**13.37**
Sediment Conc. < 1 um	**18.07**	**22.87**	**16.32**	**9.76**	**1.51**	**11.04**	**6.01**
PRECIPITATION (c)							
Amount During Test (inches)	0.00	0.00	0.00	0.00	0.83	0.00	0.34

NA = Not Analyzed.
ND = Not Detected.
Bold = Detected compound.
U = Indicates the compound was not detected at the reported concentration.

(a) Starting in December 2012, ARI evaluated PCBs in whole water between the Limit of Detection (LOD) and the Limit of Quantitation (LOQ). For these non-detect results, the reported concentration shown is the LOD (1/2 the LOQ).
(b) Total PCBs is the sum of detected aroclors or, if no aroclors are detected, is reported as non-detect (ND).
(c) Precipitation data are from the NOAA Quality Controlled Local Climatological Data for Station 24234/BFI - SEATTLE: BOEING FIELD/KING COUNTY INTERNATIONAL AIRPORT.

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	TW17A	TX51A	TY77A	TZ89B	UC19A/UC19D/UC20A	UC67B/UC67D/UC68B	UD94C/UD94F/UD95C	UE63B/UE63D/UE64B	UH75E/UH75J/UH76E	UK69B/UK69D/UK70B
Sample Date	11/08/2011	11/16/2011	11/22/2011	12/5/2011	12/20/2011	12/27/2011	1/10/2012	1/20/2012	02/09/2012	03/05/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PCBs (µg/L) (a)										
Method SW8082A										
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1248	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.012 U	0.010 U
Aroclor 1254	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1260	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1232	0.010 U	0.010 U	0.010 U	0.019 U	0.010 U	0.010 U	0.015 U	0.010 U	0.010 U	0.010 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total PCBs (b)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES (µg/L)										
Method SW8270D										
Phenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Di-n-Butylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Di-n-Octyl phthalate	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	TW17A	TX51A	TY77A	TZ89B	UC19A/UC19D/UC20A	UC67B/UC67D/UC68B	UD94C/UD94F/UD95C	UE63B/UE63D/UE64B	UH75E/UH75J/UH76E	UK69B/UK69D/UK70B
Sample Date	11/08/2011	11/16/2011	11/22/2011	12/5/2011	12/20/2011	12/27/2011	1/10/2012	1/20/2012	02/09/2012	03/05/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PAHs (µg/L)										
Method SW8270D-SIM										
Naphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	0.15	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	0.023	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	0.032	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	0.021	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	0.010 U	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	0.020 U	NA	NA	NA	NA	NA
CPAH TEQ	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
TOTAL METALS (µg/L)										
Method EPA200.8/6010B,C/7470A										
Arsenic	NA	NA	NA	NA	1.0	0.4	0.4	0.4	0.8	0.2
Cadmium	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.8	0.5 U	0.5 U
Copper	NA	NA	NA	NA	0.5 U	4.3	2.8	1.9	1.5	0.7
Iron	NA	NA	NA	NA	2950	1000	290	930	3080	210
Lead	NA	NA	NA	NA	0.8	18.6	0.2	0.6	0.1 U	0.1 U
Manganese	NA	NA	NA	NA	787	112	379	140	493	30
Mercury	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	NA	NA	NA	NA	1.0	0.6	0.7	0.8	1.3	0.5 U
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	8	18	31	29	8	6
DISSOLVED METALS (µg/L)										
Method EPA200.8/6010B,C										
Arsenic	NA	NA	NA	NA	0.9	0.3	0.4	0.3	0.5	0.2
Cadmium	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.6	0.5 U	0.5 U
Copper	NA	NA	NA	NA	0.5 U	1.5	0.9	1.0	1.3	0.6
Iron	NA	NA	NA	NA	2690	50 U	150	70	130	50 U
Lead	NA	NA	NA	NA	0.6	1.7	0.1	0.1 U	0.1 U	0.1 U
Manganese	NA	NA	NA	NA	790	94	370	130	386	30
Nickel	NA	NA	NA	NA	0.8	0.5 U	0.7	0.8	1.4	0.5 U
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	7	13	24	23	9	6

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	TW17A	TX51A	TY77A	TZ89B	UC19A/UC19D/UC20A	UC67B/UC67D/UC68B	UD94C/UD94F/UD95C	UE63B/UE63D/UE64B	UH75E/UH75J/UH76E	UK69B/UK69D/UK70B
Sample Date	11/08/2011	11/16/2011	11/22/2011	12/5/2011	12/20/2011	12/27/2011	1/10/2012	1/20/2012	02/09/2012	03/05/2012
Event Type	Monthly	Storm	Storm	Monthly	2nd Monthly	Storm	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
DISSOLVED METALS (ng/L)										
Method SW7470A										
Mercury	NA	NA	NA	NA	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS										
pH (SU; EPA 150.1; SM 4500H)	NA	NA	NA	NA	**6.63**	**6.63**	**6.54**	**6.58**	**6.74**	**6.79**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	1.0 U	**10.4**	1.0 U	1.1 U	**6.6**	**2.2**	1.0 U	**1.2**	1.0 U	**1.5**
Turbidity (NTU; EPA 180.1)	NA	NA	NA	NA	**6.70**	NA	NA	NA	NA	NA
PARTICLE/GRAIN SIZE (mg/L)										
Method ASTM-D3977C										
Sediment Conc. > 500 um	0.01 U	**0.2**	0.01 U	**0.4**	**0.7**	**1.8**	0.01 U	0.01 U	**0.4**	**4.7**
Sediment Conc. 500 to 250 um	0.01 U	**0.2**	0.01 U	**0.3**	**0.9**	**3.0**	0.01 U	**0.7**	**0.6**	**5.1**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**1.40**	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 3.9 to 1 um	**0.7**	**8.3**	**0.9**	**0.8**	**2.4**	**0.2**	**0.4**	**1.4**	**4.7**	0.01 U
Sediment Conc. < 1 um	**0.3**	**9.8**	**4.5**	**0.3**	**5.1**	**0.1**	**0.4**	**2.0**	**4.3**	0.01 U
Previous 1 Hour Precip. (inches) (c)	0.0	0.0	0.01	0.0	0.0	0.04	0.0	0.09	0.03	0.0
Previous 12 Hours Precip. (inches) (c)	0.0	0.0	0.7	0.0	0.0	0.17	0.23	0.27	0.03	0.36

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	UL81B/UL81D/UL82B	UO82C/UO82F/UO83C	UP29D/UP29H/UP30D	UU03E/UU03J/UU04E	UX30C/UX30F/UX31C	VB89C/VB89F/VB90C	VF37C/VF37F/VF38C	VJ50C/VJ50I/VJ52C	VL90C/VL90F/VL91C	VR68C/VR68F/VR69C
Sample Date	03/12/2012	03/31/2012	04/05/2012	5/10/2012	6/5/2012	7/11/2012	8/9/2012	9/13/2012	10/4/2012	11/8/2012
Event Type	Storm	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PCBs (µg/L) (a)										
Method SW8082A										
Aroclor 1016	0.012 U	0.010 U	0.012 U	0.010 U	0.010 U	0.015 U	0.010 U	0.012 U	0.010 U	0.010 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.012 U
Aroclor 1248	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1254	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1260	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1232	0.010 U	0.020 U	0.010 U	0.020 U	0.015 U	0.010 U	0.025 U	0.010 U	0.010 U	0.010 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total PCBs (b)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES (µg/L)										
Method SW8270D										
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Octyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	UL81B/UL81D/UL82B	UO82C/UO82F/UO83C	UP29D/UP29H/UP30D	UU03E/UU03J/UU04E	UX30C/UX30F/UX31C	VB89C/VB89F/VB90C	VF37C/VF37F/VF38C	VJ50C/VJ50I/VJ52C	VL90C/VL90F/VL91C	VR68C/VR68F/VR69C
Sample Date	03/12/2012	03/31/2012	04/05/2012	5/10/2012	6/5/2012	7/11/2012	8/9/2012	9/13/2012	10/4/2012	11/8/2012
Event Type	Storm	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PAHs (µg/L)										
Method SW8270D-SIM										
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL METALS (µg/L)										
Method EPA200.8/6010B,C/7470A										
Arsenic	**0.7**	**0.3**	**0.5**	**0.8**	**0.4**	**0.7**	**0.7**	**1.2**	**0.6**	**0.6**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	**0.5**	1 U
Copper	**0.7**	**1.0**	**1.3**	0.5 U	**1.7**	0.5 U	0.5 U	**0.7**	0.5 U	0.5 U
Iron	**2500**	**210**	**400**	**1740**	**170**	**700**	**1110**	**8130**	**690**	**260**
Lead	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.1**	0.1 U	0.1 U
Manganese	**866**	**73**	**265**	**798**	**40**	**870**	**781**	**1120**	**958**	**720**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**0.7**	**0.6**	**0.7**	**0.8**	**0.6**	**1.2**	**0.9**	**1.0**	**0.9**	0.5 U
Silver	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**19**	**27**	**16**	**7**	**14**	**6**	4 U	4 U	4 U	4 U
DISSOLVED METALS (µg/L)										
Method EPA200.8/6010B,C										
Arsenic	**0.6**	**0.2**	**0.4**	**0.7**	**0.3**	**0.7**	**0.6**	**0.7**	**0.6**	**0.6**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Copper	**0.6**	**0.8**	**1.1**	0.5 U	**1.4**	0.5 U	0.5 U	**0.6**	0.5 U	0.5 U
Iron	**480**	50 U	**90**	**650**	50 U	**310**	**290**	**260**	**160**	**110**
Lead	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Manganese	**814**	**72**	**258**	**760**	**38**	**876**	**798**	**1050**	**928**	**708**
Nickel	**0.7**	**0.6**	**1.2**	**0.7**	**0.5**	**1.2**	**1.0**	**1.0**	**0.9**	**0.8**
Silver	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**17**	**26**	**15**	**7**	**13**	**5**	4 U	4 U	4 U	4 U

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	UL81B/UL81D/UL82B	UO82C/UO82F/UO83C	UP29D/UP29H/UP30D	UU03E/UU03J/UU04E	UX30C/UX30F/UX31C	VB89C/VB89F/VB90C	VF37C/VF37F/VF38C	VJ50C/VJ50I/VJ52C	VL90C/VL90F/VL91C	VR68C/VR68F/VR69C
Sample Date	03/12/2012	03/31/2012	04/05/2012	5/10/2012	6/5/2012	7/11/2012	8/9/2012	9/13/2012	10/4/2012	11/8/2012
Event Type	Storm	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
DISSOLVED METALS (ng/L)										
Method SW7470A										
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS										
pH (SU; EPA 150.1; SM 4500H)	**6.91**	**6.56**	**6.72**	**6.77**	**6.77**	6.93	**6.86**	**6.74**	**7.01**	**6.82**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**3.3**	1.0 U	**1.8**	**1.3**	1.0 U	1.0 U	1.0 U	**8.2**	**5.1**	1.0 U
Turbidity (NTU; EPA 180.1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PARTICLE/GRAIN SIZE (mg/L)										
Method ASTM-D3977C										
Sediment Conc. > 500 um	**5.4**	**5.3**	**7.1**	**0.4**	**2.68**	**4.72**	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 500 to 250 um	**6.1**	**7.5**	**6.2**	**0.5**	**3.78**	**3.44**	**0.32**	0.01 U	**0.73**	0.01 U
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**1.13**	0.01 U	0.01 U	0.01 U
Sediment Conc. 3.9 to 1 um	**1.1**	**0.6**	0.01 U	**4.0**	**0.22**	**0.18**	**0.27**	**8.77**	**0.25**	**0.64**
Sediment Conc. < 1 um	**1.7**	**0.8**	**0.5**	**2.8**	**1.25**	**0.62**	**0.42**	**18.14**	**16.25**	**0.96**
Previous 1 Hour Precip. (inches) (c)	0.01	0.0	0.0	0.0	0.01	0.0	0.0	0.0	0.0	0.0
Previous 12 Hours Precip. (inches) (c)	0.02	0.43	0.12	0.0	0.44	0.0	0.0	0.0	0.0	0.0

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	VS17D/VS17H/VS30D	VV27D/VV27H/VV28D	VW75B/VW75F/VW76B	VY68B/VY68D/VY69B/VY69D	WC96D/WC96H/WC97D	WG51D/WG51H/WG56D	WI40B/WI40F/WI41B	WK37D/WK37H/WK38D	WK74D/WK74H/WK81D	WP40D/WP40H/WP39D
Sample Date	11/12/2012	12/6/2012	12/16/2012	1/8/2013	2/7/2013	3/7/2013	3/19/2013	4/4/2013	4/5/2013	5/9/2013
Event Type	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PCBs (µg/L) (a)										
Method SW8082A										
Aroclor 1016	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1242	0.010 U	0.010 U	0.005 U	0.008 U	0.008 U	0.005 U	0.005 U	0.005 U	0.005 U	0.010 U
Aroclor 1248	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1254	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1260	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1221	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1232	0.010 U	0.010 U	0.008 U	0.005 U	0.005 U	0.013 U	0.010 U	0.013 U	0.005 U	0.005 U
Aroclor 1262	0.010 U	0.010 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total PCBs (b)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES (µg/L)										
Method SW8270D										
Phenol	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	NA	2.0 UJ	2.0 U	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	2.0 U	2.0 U	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	2.0 U	2.0 U	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	3.0 U	3.0 U	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	20 U	20 U	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	3.0 U	3.0 U	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Dimethylphthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	10 U	10 U	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Di-n-Butylphthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Di-n-Octyl phthalate	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	5.0 U	5.0 U	NA	NA	NA

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	VS17D/VS17H/VS30D	VV27D/VV27H/VV28D	VW75B/VW75F/VW76B	VY68B/VY68D/VY69B/VY69D	WC96D/WC96H/WC97D	WG51D/WG51H/WG56D	WI40B/WI40F/WI41B	WK37D/WK37H/WK38D	WK74D/WK74H/WK81D	WP40D/WP40H/WP39D
Sample Date	11/12/2012	12/6/2012	12/16/2012	1/8/2013	2/7/2013	3/7/2013	3/19/2013	4/4/2013	4/5/2013	5/9/2013
Event Type	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
PAHs (µg/L)										
Method SW8270D-SIM										
Naphthalene	NA	NA	NA	NA	NA	0.010 U	**0.014**	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	**0.011**	**0.019**	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	0.010 U	**0.016**	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	0.010 U	**0.055**	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	**0.016**	0.010 U	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	**0.011**	0.010 U	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	0.010 U	0.010 U	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	0.020 UJ	0.020 U	NA	NA	NA
CPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL METALS (µg/L)										
Method EPA200.8/6010B,C/7470A										
Arsenic	**0.5**	**0.5**	**0.3**	**0.5**	**0.5**	**0.5**	**0.6**	**0.5**	**0.4**	**0.6**
Cadmium	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
Copper	**2.2**	**1.2**	**1.3**	1.8	**1.0**	**0.6**	**1.0**	0.5 U	**2.0**	**0.5**
Iron	**1180**	**100**	**60**	**120**	**960**	**50**	**400**	**390**	**350**	**640**
Lead	**0.2**	0.1 U	0.1 U	**0.2**	0.1 U	0.1 U	0.1 U	0.1 U	**0.1**	0.1 U
Manganese	**371**	**424**	**156**	**143**	**510**	**69**	**622**	**767**	**133**	**833**
Mercury	0.1 U	0.1 U	0.1 U	20.0 U (d)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**0.7**	**1.1**	**0.6**	**0.6**	**0.8**	0.5 U	**1.0**	**1.1**	0.5 U	**0.9**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**36**	**11**	**10**	**14**	**17**	**13**	**7**	**5**	**10**	**6**
DISSOLVED METALS (µg/L)										
Method EPA200.8/6010B,C										
Arsenic	**0.4**	**0.5**	**0.3**	**0.4**	**0.5**	**0.2**	**0.5**	**0.5**	**0.3**	**0.6**
Cadmium	**0.1**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Copper	**1.6**	**2.3**	**1.1**	**1.5**	**0.7**	**0.6**	**0.8**	0.5 U	**1.6**	**0.8**
Iron	**50** U	50 U	50 U	50 U	**70**	50 U	**150**	**130**	**50**	**280**
Lead	**0.1**	0.1 U	0.1 U	**0.2**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Manganese	**408**	**405**	**161**	**138**	**492**	**68**	**614**	**759**	**130**	**857**
Nickel	**0.7**	**1.3**	**0.6**	1 U	**0.9**	0.5 U	**0.9**	**0.7**	0.5 U	**0.9**
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**32**	**12**	**10**	**14**	**17**	**16**	**6**	**6**	**10**	**6**

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	VS17D/VS17H/VS30D	VV27D/VV27H/VV28D	VW75B/VW75F/VW76B	VY68B/VY68D/VY69B/VY69D	WC96D/WC96H/WC97D	WG51D/WG51H/WG56D	WI40B/WI40F/WI41B	WK37D/WK37H/WK38D	WK74D/WK74H/WK81D	WP40D/WP40H/WP39D
Sample Date	11/12/2012	12/6/2012	12/16/2012	1/8/2013	2/7/2013	3/7/2013	3/19/2013	4/4/2013	4/5/2013	5/9/2013
Event Type	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
DISSOLVED METALS (ng/L)										
Method SW7470A										
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS										
pH (SU; EPA 150.1; SM 4500H)	**6.56**	**6.61**	**6.62**	**6.63**	**6.79**	**6.55**	**6.83**	**6.95**	**6.59**	**6.92**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**3.1**	1.0 U	**3.4**	1.0 U	**3.2**	1.0 U	1.0 U	1.0 U	**1.2**	**1.0**
Turbidity (NTU; EPA 180.1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.10**
PARTICLE/GRAIN SIZE (mg/L)										
Method ASTM-D3977C										
Sediment Conc. > 500 um	0.01 U	**0.52**	**0.11**	0.01 U	**0.11**	**1.11**	**6.63**	**6.19**	**3.55**	**5.72**
Sediment Conc. 500 to 250 um	0.01 U	0.01 U	**0.32**	0.01 U	0.01 U	**0.55**	**3.76**	**5.56**	**5.96**	**4.81**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.30 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.30 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.30 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 3.9 to 1 um	**3.93**	**0.06**	**0.04**	0.01 U	**1.51**	1.30 U	**0.11**	**2.37**	**0.25**	**0.66**
Sediment Conc. < 1 um	**5.87**	**0.18**	**0.08**	**0.97**	**2.57**	1.30 U	**0.28**	**6.57**	**0.60**	**1.59**
Previous 1 Hour Precip. (inches) (c)	0.01	0.01	0.03	0.02	0.00	0.00	0.04	0.00	0.00	0.00
Previous 12 Hours Precip. (inches) (c)	0.26	0.04	0.06	0.22	0.09	0.25	0.07	0.01	0.23	0.00

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	WT15C/WT15F/WT16C	WX01D/WX01H/WX02D	XA11D/XA11H/XA14D	XE07D/XE07H/XE22D	XE91D/XE91G/XE92C	XJ12D/XJ12H/XJ36D
Sample Date	6/7/2013	7/10/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013
Event Type	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab
PCBs (µg/L) (a)						
Method SW8082A						
Aroclor 1016	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1242	0.008 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1248	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1254	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1260	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1221	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aroclor 1232	0.005 U	0.018 U	0.013 U	0.005 U	0.005 U	0.005 U
Aroclor 1262	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total PCBs (b)	ND	ND	ND	ND	ND	ND
SEMIVOLATILES (µg/L)						
Method SW8270D						
Phenol	NA	NA	NA	1.0 U	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	1.0 U	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	1.0 U	NA	NA
Benzyl Alcohol	NA	NA	NA	2.0 UJ	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	1.0 U	NA	NA
2-Methylphenol	NA	NA	NA	1.0 U	NA	NA
4-Methylphenol	NA	NA	NA	2.0 U	NA	NA
Hexachloroethane	NA	NA	NA	2.0 U	NA	NA
2,4-Dimethylphenol	NA	NA	NA	3.0 U	NA	NA
Benzoic Acid	NA	NA	NA	20 U	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	1.0 U	NA	NA
Naphthalene	NA	NA	NA	**1.5**	NA	NA
Hexachlorobutadiene	NA	NA	NA	3.0 U	NA	NA
2-Methylnaphthalene	NA	NA	NA	**1.8**	NA	NA
Dimethylphthalate	NA	NA	NA	1.0 U	NA	NA
Acenaphthylene	NA	NA	NA	1.0 U	NA	NA
Acenaphthene	NA	NA	NA	1.0 U	NA	NA
Dibenzofuran	NA	NA	NA	1.0 U	NA	NA
Diethylphthalate	NA	NA	NA	1.0 U	NA	NA
Fluorene	NA	NA	NA	1.0 U	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	1.0 U	NA	NA
Hexachlorobenzene	NA	NA	NA	1.0 U	NA	NA
Pentachlorophenol	NA	NA	NA	10 U	NA	NA
Phenanthrene	NA	NA	NA	1.0 U	NA	NA
Anthracene	NA	NA	NA	1.0 U	NA	NA
Di-n-Butylphthalate	NA	NA	NA	1.0 U	NA	NA
Fluoranthene	NA	NA	NA	1.0 U	NA	NA
Pyrene	NA	NA	NA	1.0 U	NA	NA
Butylbenzylphthalate	NA	NA	NA	1.0 U	NA	NA
Benzo(a)anthracene	NA	NA	NA	1.0 U	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	3.0 U	NA	NA
Chrysene	NA	NA	NA	1.0 U	NA	NA
Di-n-Octyl phthalate	NA	NA	NA	1.0 U	NA	NA
Benzo(a)pyrene	NA	NA	NA	1.0 U	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	1.0 U	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	1.0 U	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	1.0 U	NA	NA
1-Methylnaphthalene	NA	NA	NA	**1.6**	NA	NA
Total Benzofluoranthenes	NA	NA	NA	5.0 U	NA	NA

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	WT15C/WT15F/WT16C	WX01D/WX01H/WX02D	XA11D/XA11H/XA14D	XE07D/XE07H/XE22D	XE91D/XE91G/XE92C	XJ12D/XJ12H/XJ36D
Sample Date	6/7/2013	7/10/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013
Event Type	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab
PAHs (µg/L)						
Method SW8270D-SIM						
Naphthalene	NA	NA	NA	**1.7**	NA	NA
2-Methylnaphthalene	NA	NA	NA	**1.8**	NA	NA
1-Methylnaphthalene	NA	NA	NA	**1.5**	NA	NA
Acenaphthylene	NA	NA	NA	0.010 U	NA	NA
Acenaphthene	NA	NA	NA	**0.019**	NA	NA
Fluorene	NA	NA	NA	**0.034**	NA	NA
Phenanthrene	NA	NA	NA	**0.030**	NA	NA
Anthracene	NA	NA	NA	0.010 U	NA	NA
Fluoranthene	NA	NA	NA	**0.041**	NA	NA
Pyrene	NA	NA	NA	**0.020**	NA	NA
Benzo(a)anthracene	NA	NA	NA	0.010 U	NA	NA
Chrysene	NA	NA	NA	**0.011**	NA	NA
Benzo(a)pyrene	NA	NA	NA	0.010 U	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.010 U	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	0.010 U	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	0.010 U	NA	NA
Dibenzofuran	NA	NA	NA	**0.039**	NA	NA
Total Benzofluoranthenes	NA	NA	NA	0.020 U	NA	NA
CPAH TEQ	NA	NA	NA	**0.0001**	NA	NA
TOTAL METALS (µg/L)						
Method EPA200.8/6010B,C/7470A						
Arsenic	**0.7**	**0.6**	**0.6**	**0.4**	**0.6**	**0.6**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	**0.5**	1 U	**0.7**	**0.6**	0.5 U
Copper	0.5 U	**0.9**	**0.7**	**2.3**	**0.7**	**0.6**
Iron	**2400**	**640**	**570**	**70**	**610**	**840**
Lead	0.1 U	**0.2**	0.1 U	**0.2**	0.1 U	0.1 U
Manganese	**1190**	**929**	**927**	**56**	**958**	**788**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**0.9**	**0.9**	**0.8**	**0.5**	**1.1**	**1.1**
Silver	NA	NA	NA	NA	NA	NA
Zinc	**6**	**7**	4 U	**10**	**9**	**15**
DISSOLVED METALS (µg/L)						
Method EPA200.8/6010B,C						
Arsenic	**0.5**	**0.6**	**0.5**	**0.3**	**0.5**	**0.4**
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	0.5 U	0.5 U	0.5 U	**0.5**	0.5 U	0.5 U
Copper	0.5 U	0.5 U	0.5 U	**1.8**	0.5 U	0.5 U
Iron	**480**	**120**	**180**	50 U	50 U	**90**
Lead	0.1 U	0.1 U	0.1 U	**0.1**	0.1 U	0.1 U
Manganese	**1140**	**908**	**903**	**37**	**923**	**771**
Nickel	**0.8**	**0.7**	**0.9**	**0.6**	**1.0**	**0.9**
Silver	NA	NA	NA	NA	NA	NA
Zinc	**5**	**5**	4 U	**8**	**8**	**15**

TABLE 5
EFFLUENT WHOLE WATER SAMPLING ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF	LTST-W-EFF
Laboratory Data ID	WT15C/WT15F/WT16C	WX01D/WX01H/WX02D	XA11D/XA11H/XA14D	XE07D/XE07H/XE22D	XE91D/XE91G/XE92C	XJ12D/XJ12H/XJ36D
Sample Date	6/7/2013	7/10/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013
Event Type	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab
DISSOLVED METALS (ng/L)						
Method SW7470A						
Mercury	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
CONVENTIONALS						
pH (SU; EPA 150.1; SM 4500H)	**6.77**	**6.98**	**6.88**	**6.53**	**6.85**	**7.08**
Total Suspended Solids (mg/L; EPA 160.2; SM2540D)	**1.0**	1.0 U	**1.7**	**1.5**	1.0 U	**1.2**
Turbidity (NTU; EPA 180.1)	NA	NA	NA	NA	NA	NA
PARTICLE/GRAIN SIZE (mg/L)						
Method ASTM-D3977C						
Sediment Conc. > 500 um	**14.52**	**0.63**	**0.21**	**6.75**	**0.65**	**6.82**
Sediment Conc. 500 to 250 um	**12.52**	**0.53**	**0.52**	**0.42**	**10.17**	**8.10**
Sediment Conc. 250 to 125 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 125 to 62.5 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 62.5 to 3.9 um	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sediment Conc. 3.9 to 1 um	**0.41**	**0.28**	**0.02**	0.01 U	**0.50**	**0.04**
Sediment Conc. < 1 um	**1.19**	**5.80**	**0.82**	0.01 U	**1.93**	**1.00**
Previous 1 Hour Precip. (inches) (c)	0.00	0.00	0.00	0.02	0.00	0.00
Previous 12 Hours Precip. (inches) (c)	0.00	0.00	0.00	1.23	0.00	0.00

NA = Not Analyzed.
ND = Not Detected.
Bold = Detected compound.
U = Indicates the compound was not detected at the reported concentration.

(a) Starting in December 2012, ARI evaluated PCBs in whole water between the Limit of Detection (LOD) and the Limit of Quantitation (LOQ). For these non-detect results, the reported concentration shown is the LOD (1/2 the LOQ).
(b) Total PCBs is the sum of detected aroclors or, if no aroclors are detected, is reported as non-detect (ND).
(c) Precipitation data are from the NOAA Quality Controlled Local Climatological Data for Station 24234/BFI - SEATTLE: BOEING FIELD/KING COUNTY INTERNATIONAL AIRPORT.
(d) Due to a laboratory receipt login error, total metals were analyzed by low level (ng/L); the client was notified and results were reported per client request.

TABLE 6
MH130A STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID	TW50D	TX25B	TX90G	TY96G	UA56F	UB55B	UC78I	UE10F	UE68G	UF88A	UH75K	UI57A	UK14D	UL49H	UL81E	UM18E
Filtration Start Date	11/8/2011	11/11/2011	11/16/2011	11/22/2011	12/5/2011	12/08/2011	12/27/2012	1/9/2012	1/20/2012	1/21/2012	2/6/2012	2/9/2012	2/23/2012	3/5/2012	3/8/2012	3/12/2012
Filtration End Date	11/11/2011	11/16/2011	11/17/2011	11/23/2011	12/08/2011	12/15/2011	12/28/2011	1/12/2012	1/21/2012	1/26/2012	2/9/2012	2/17/2012	2/29/2012	3/8/2012	3/12/2012	3/13/2012
Event Type	Monthly	Interim	Storm	Storm	Monthly	Interim	Storm	Monthly	Storm	Interim	Monthly	Interim	Interim	Monthly	Interim	Storm
Measured Mass in Filter																
Aroclor 1016 (µg)	0.5 UJ	NA	2.5 U	0.5 U	10 U	NA	1.0 U	2.0 U	5.0 U	NA	5.0 U	NA	NA	2.0 U	NA	2.5 U
Aroclor 1242 (µg)	0.5 UJ	NA	2.5 U	0.5 U	10 U	NA	1.0 U	2.0 U	5.0 U	NA	5.0 U	NA	NA	2.0 U	NA	2.5 U
Aroclor 1248 (µg)	5.0 UJ	NA	15 U	**6.0**	30 U	NA	25 U	50 U	62 U	NA	**100**	NA	NA	60 U	NA	50 U
Aroclor 1254 (µg)	**6.0** J	NA	**17**	**10**	**27**	NA	**35**	**59**	**63**	NA	**89**	NA	NA	**68**	NA	**64**
Aroclor 1260 (µg)	0.8 UJ	NA	2.5 U	**8.0**	10 U	NA	**13**	5.0 U	**12**	NA	5.0 U	NA	NA	**12**	NA	**14**
Aroclor 1221 (µg)	0.5 UJ	NA	2.5 U	0.5 U	10 U	NA	1.0 U	2.0 U	5.0 U	NA	5.0 U	NA	NA	2.0 U	NA	2.5 U
Aroclor 1232 (µg)	0.5 UJ	NA	2.5 U	0.5 U	10 U	NA	1.0 U	2.0 U	5.0 U	NA	5.0 U	NA	NA	2.0 U	NA	2.5 U
Aroclor 1262 (µg)	0.5 UJ	NA	2.5 U	0.5 U	10 U	NA	1.0 U	2.0 U	5.0 U	NA	5.0 U	NA	NA	2.0 U	NA	2.5 U
Total PCBs (a) (µg)	**6.0** J	NA	**17**	**24.0**	**27**	NA	**48**	**59**	**75**	NA	**189**	NA	NA	**80**	NA	**78**
Mass of Filtered Solids:																
Bag Number	76	NA	94	105	74	NA	95	96	104	NA	135	NA	NA	145	NA	150
Filter Micron Rating (µm)	1	NA	1	1	1	NA	1	1	1	NA	1	NA	NA	1	NA	1
Unused Filter Bag (grams)	142.57	NA	138.63	140.33	138.76	NA	149.81	137.46	143.94	NA	149.50	NA	NA	157.86	NA	149.10
Dried Filter Bag with Filtered Solids (grams)	157.9	NA	148.22	153.38	176.64	NA	171.06	153.17	171.19	NA	165.71	NA	NA	175.71	NA	167.40
Total Solids Filtered, Dry Weight (grams)	15.33	NA	9.59	13.05	37.88	NA	21.25	15.71	27.25	NA	16.21	NA	NA	17.85	NA	18.30
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	**0.39**	NA	**1.77**	**1.84**	**0.71**	NA	**2.26**	**3.76**	**2.75**	NA	**11.66**	NA	NA	**4.48**	NA	**4.26**
Volume of Stormwater Filtered:																
Flow Totalizer at Start of Filtration (gallons)	1,010,105	NA	1,010,775	1,011,514	1,012,698	NA	1,012,981	1,013,670	1,013,962	NA	1,016,921	NA	NA	1,018,042	NA	1,018,681
Flow Totalizer at Sample Collection (gallons)	1,010,394	NA	1,011,104	1,012,698	1,012,839	NA	1,013,670	1,013,962	1,014,442	NA	1,017,377	NA	NA	1,018,469	NA	1,019,809
Volume of Stormwater Filtered (gallons)	289	NA	329	1,184	142	NA	689	291	480	NA	457	NA	NA	426	NA	1,127
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.005**	NA	**0.014**	**0.005**	**0.050**	NA	**0.018**	**0.054**	**0.041**	NA	**0.109**	NA	NA	**0.050**	NA	**0.018**
PAHs (µg)																
Method SW8270D																
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL METALS (mg/kg)																
Method EPA200.8/6010B.C/7470A/7471A																
Arsenic	NA	30 U	NA	NA	NA	120 U	NA	NA	NA	NA	NA	80 U	NA	NA	90 U	NA
Cadmium	NA	**8**	NA	NA	NA	**6**	NA	NA	NA	NA	NA	**8**	NA	NA	**11**	NA
Chromium	NA	**63**	NA	NA	NA	**20**	NA	NA	NA	NA	NA	**62**	NA	NA	**52**	NA
Copper	NA	**124**	NA	NA	NA	**38**	NA	NA	NA	NA	NA	**183**	NA	NA	**190**	NA
Iron	NA	NA	NA	NA	NA	**370,000**	NA	NA	NA	NA	NA	**259,000**	NA	NA	**311000**	NA
Lead	NA	**130**	NA	NA	NA	50 U	NA	NA	NA	NA	NA	**90**	NA	NA	**90**	NA
Manganese	NA	NA	NA	NA	NA	**761**	NA	NA	NA	NA	NA	**537**	NA	NA	**658**	NA
Mercury	NA	**0.9**	NA	NA	NA	**0.2**	NA	NA	NA	NA	NA	**0.9**	NA	NA	**0.7**	NA
Nickel	NA	**20**	NA	NA	NA	20 U	NA	NA	NA	NA	NA	**40**	NA	NA	**20**	NA
Zinc	NA	**1140**	NA	NA	NA	**490**	NA	NA	NA	NA	NA	**920**	NA	NA	**1830**	NA

TABLE 6
MH130A STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

		LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID		TW50D	TX25B	TX90G	TY96G	UA56F	UB55B	UC78I	UE10F	UE68G	UF88A	UH75K	UI57A	UK14D	UL49H	UL81E	UM18E
Filtration Start Date		11/8/2011	11/11/2011	11/16/2011	11/22/2011	12/5/2011	12/08/2011	12/27/2012	1/9/2012	1/20/2012	1/21/2012	2/6/2012	2/9/2012	2/23/2012	3/5/2012	3/8/2012	3/12/2012
Filtration End Date		11/11/2011	11/16/2011	11/17/2011	11/23/2011	12/08/2011	12/15/2011	12/28/2011	1/12/2012	1/21/2012	1/26/2012	2/9/2012	2/17/2012	2/29/2012	3/8/2012	3/12/2012	3/13/2012
Event Type		Monthly	Interim	Storm	Storm	Monthly	Interim	Storm	Monthly	Storm	Interim	Monthly	Interim	Interim	Monthly	Interim	Storm
PARTICLE/GRAIN SIZE (percent)																	
Method PSEP-PS																	
Particle/Grain Size, Phi Scale >-1	(2,000 microns)	NA	2.7	NA	NA	NA	0.1	NA	NA	NA	0.3	NA	NA	0.1 U	NA	NA	NA
Particle/Grain Size, Phi Scale -1 to 0	(2,000-1,000 microns)	NA	8.5	NA	NA	NA	6.1	NA	NA	NA	13.8	NA	NA	10.1	NA	NA	NA
Particle/Grain Size, Phi Scale 0 to 1	(1,000-500 microns)	NA	2.1	NA	NA	NA	3.0	NA	NA	NA	7.1	NA	NA	5.7	NA	NA	NA
Particle/Grain Size, Phi Scale 1 to 2	(500-250 microns)	NA	1.1	NA	NA	NA	1.0	NA	NA	NA	8.5	NA	NA	4.3	NA	NA	NA
Particle/Grain Size, Phi Scale 2 to 3	(250-125 microns)	NA	0.8	NA	NA	NA	0.5	NA	NA	NA	6.0	NA	NA	3.7	NA	NA	NA
Particle/Grain Size, Phi Scale 3 to 4	(125-62 microns)	NA	1.1	NA	NA	NA	0.2	NA	NA	NA	4.2	NA	NA	4.7	NA	NA	NA
Particle/Grain Size, Phi Scale 4 to 5	(62.5-31.0 microns)	NA	30.9	NA	NA	NA	18.0	NA	NA	NA	5.0	NA	NA	50.5	NA	NA	NA
Particle/Grain Size, Phi Scale 5 to 6	(31.0-15.6 microns)	NA	18.1	NA	NA	NA	21.3	NA	NA	NA	30.1	NA	NA	6.1	NA	NA	NA
Particle/Grain Size, Phi Scale 6 to 7	(15.6-7.8 microns)	NA	8.4	NA	NA	NA	13.2	NA	NA	NA	7.0	NA	NA	4.1	NA	NA	NA
Particle/Grain Size, Phi Scale 7 to 8	(7.8-3.9 microns)	NA	8.9	NA	NA	NA	11.2	NA	NA	NA	8.3	NA	NA	4.7	NA	NA	NA
Particle/Grain Size, Phi Scale 8 to 9	(3.9-2.0 microns)	NA	6.6	NA	NA	NA	5.6	NA	NA	NA	4.1	NA	NA	2.7	NA	NA	NA
Particle/Grain Size, Phi Scale 9 to 10	(2.0-1.0 microns)	NA	6.7	NA	NA	NA	14.3	NA	NA	NA	1.8	NA	NA	1.9	NA	NA	NA
Particle/Grain Size, Phi Scale <10	(<1.0 micron)	NA	4.2	NA	NA	NA	5.5	NA	NA	NA	3.8	NA	NA	1.7	NA	NA	NA
Particle/Grain Size, Fines (Silt/Clay)	(<62 microns)	NA	83.8	NA	NA	NA	89.1	NA	NA	NA	60.0	NA	NA	71.5	NA	NA	NA
PRECIPITATION (b)																	
Amount During Test (inches)		0.0	0.38	0.38	2.46	0.0	0.07	0.91	0.23	0.85	1.24	0.16	0.71	0.73	0.06	1.01	0.76

TABLE 6
MH130A STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID	UN75A	UO82H	UP34B	UQ03B	US05A	UU03M	UW21A	UX77C	UZ02A	VB89I	VC63A	VF37I	VF92A	VJ50F	VK18B	VL90I	VM55A
Filtration Start Date	3/22/2012	3/31/2012	4/2/2012	4/6/2012	4/20/2012	5/7/2012	5/18/2012	6/4/2012	6/7/2012	7/9/2012	7/11/2012	8/6/2012	8/9/2012	9/10/2012	9/13/2012	10/1/2012	10/4/2012
Filtration End Date	3/23/2012	4/1/2012	4/5/2012	4/11/2012	4/27/2012	5/10/2012	5/25/2012	6/7/2012	6/15/2012	7/11/2012	7/19/2012	8/9/2012	8/16/2012	9/13/2012	9/20/2012	10/4/2012	10/9/2012
Event Type	Interim	Storm	Monthly	Interim	Interim	Monthly	Interim	Monthly	Interim	Monthly	Interim	Monthly	Interim	Monthly	Interim	Monthly	Interim
Measured Mass in Filter																	
Aroclor 1016 (µg)	NA	5.0 U	0.5 U	NA	NA	5.0 U	NA	4.0 U	NA	1.0 U	NA	1.0 U	NA	5.0 U	NA	1.0 U	NA
Aroclor 1242 (µg)	NA	5.0 U	0.5 U	NA	NA	5.0 U	NA	4.0 U	NA	1.0 U	NA	1.0 U	NA	5.0 U	NA	1.0 U	NA
Aroclor 1248 (µg)	NA	100 U	12 U	NA	NA	47 U	NA	100 U	NA	50 U	NA	100 U	NA	38 U	NA	15 U	NA
Aroclor 1254 (µg)	NA	**110**	**15**	NA	NA	**49**	NA	**120**	NA	**31**	NA	**86**	NA	**56**	NA	**26**	NA
Aroclor 1260 (µg)	NA	12 U	1.2 U	NA	NA	**5.2**	NA	10 U	NA	2.5 U	NA	6.2 U	NA	5.0 U	NA	2.2 U	NA
Aroclor 1221 (µg)	NA	5.0 U	0.5 U	NA	NA	5.0 U	NA	4.0 U	NA	1.0 U	NA	1.0 U	NA	5.0 U	NA	1.0 U	NA
Aroclor 1232 (µg)	NA	5.0 U	0.5 U	NA	NA	5.0 U	NA	4.0 U	NA	1.0 U	NA	1.0 U	NA	5.0 U	NA	1.0 U	NA
Aroclor 1262 (µg)	NA	5.0 U	0.5 U	NA	NA	5.0 U	NA	4.0 U	NA	1.0 U	NA	1.0 U	NA	5.0 U	NA	1.0 U	NA
Total PCBs (a) (µg)	NA	**110**	**15**	NA	NA	**54.2**	NA	**120**	NA	**31**	NA	**86**	NA	**56**	NA	**26**	NA
Mass of Filtered Solids:																	
Bag Number	NA	118	134	NA	NA	117	NA	146	NA	152	NA	140	NA	155	NA	163	NA
Filter Micron Rating (µm)	NA	1	1	NA	NA	1	NA	1	NA	1	NA	1	NA	1	NA	1	NA
Unused Filter Bag (grams)	NA	149.93	152.14	NA	NA	159.11	NA	155.02	NA	156.81	NA	153.94	NA	143.76	NA	137.46	NA
Dried Filter Bag with Filtered Solids (grams)	NA	167.25	173.81	NA	NA	179.41	NA	190.91	NA	175.35	NA	175.23	NA	151.99	NA	146.54	NA
Total Solids Filtered, Dry Weight (grams)	NA	17.32	21.67	NA	NA	20.30	NA	35.89	NA	18.54	NA	21.29	NA	8.23	NA	9.08	NA
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	NA	**6.35**	**0.69**	NA	NA	**2.67**	NA	**3.34**	NA	**1.67**	NA	**4.04**	NA	**6.80**	NA	**2.86**	NA
Volume of Stormwater Filtered:																	
Flow Totalizer at Start of Filtration (gallons)	NA	1,020,723	1,021,709	NA	NA	1,023,772	NA	1,024,550	NA	1,025,496	NA	1,025,919	NA	1,026,296	NA	1,026,598	NA
Flow Totalizer at Sample Collection (gallons)	NA	1,021,708	1,022,314	NA	NA	1,024,046	NA	1,024,884	NA	1,025,659	NA	1,026,076	NA	1,026,422	NA	1,026,664	NA
Volume of Stormwater Filtered (gallons)	NA	985	606	NA	NA	274	NA	335	NA	163	NA	157	NA	126	NA	66	NA
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	NA	**0.029**	**0.007**	NA	NA	**0.052**	NA	**0.095**	NA	**0.050**	NA	**0.145**	NA	**0.117**	NA	**0.104**	NA
PAHs (µg)																	
Method SW8270D																	
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL METALS (mg/kg)																	
Method EPA200.8/6010B.C/7470A/7471A																	
Arsenic	NA	NA	NA	80 U	NA	NA	100 U	NA	60 U	NA	130 U	NA	60 U	NA	120 U	NA	120 U
Cadmium	NA	NA	NA	**4**	NA	NA	**9**	NA	**13**	NA	5 U	NA	**6**	NA	**5**	NA	**17**
Chromium	NA	NA	NA	**30**	NA	NA	**60**	NA	**63**	NA	**50**	NA	**59**	NA	10 U	NA	**30**
Copper	NA	NA	NA	**128**	NA	NA	**133**	NA	**151**	NA	**96**	NA	**141**	NA	**52**	NA	**117**
Iron	NA	NA	NA	**357,000**	NA	NA	**273,000**	NA	**248,000**	NA	**338,000**	NA	**226,000**	NA	**393,000**	NA	**411,000**
Lead	NA	NA	NA	**50**	NA	NA	**80**	NA	**110**	NA	**60**	NA	**150**	NA	50 U	NA	**90**
Manganese	NA	NA	NA	**551**	NA	NA	**854**	NA	**616**	NA	**698**	NA	**660** J	NA	**1730**	NA	**5070**
Mercury	NA	NA	NA	**1.0** J	NA	NA	**10.8**	NA	**5.4**	NA	**0.8**	NA	**1.20** J	NA	**1.0**	NA	**1.5**
Nickel	NA	NA	NA	20 U	NA	NA	**30**	NA	**30**	NA	**30**	NA	**40**	NA	20 U	NA	20 U
Zinc	NA	NA	NA	**580**	NA	NA	**1420**	NA	**1350**	NA	**620**	NA	**980**	NA	**580**	NA	**2930**

TABLE 6
MH130A STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

		LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID		UN75A	UO82H	UP34B	UQ03B	US05A	UU03M	UW21A	UX77C
Filtration Start Date		3/22/2012	3/31/2012	4/2/2012	4/6/2012	4/20/2012	5/7/2012	5/18/2012	6/4/2012
Filtration End Date		3/23/2012	4/1/2012	4/5/2012	4/11/2012	4/27/2012	5/10/2012	5/25/2012	6/7/2012
Event Type		Interim	Storm	Monthly	Interim	Interim	Monthly	Interim	Monthly
PARTICLE/GRAIN SIZE (percent)									
Method PSEP-PS									
Particle/Grain Size, Phi Scale >-1	(2,000 microns)	9.2	NA	NA	NA	0.1 U	NA	0.1 U	NA
Particle/Grain Size, Phi Scale -1 to 0	(2,000-1,000 microns)	13.0	NA	NA	NA	7.5	NA	1.0	NA
Particle/Grain Size, Phi Scale 0 to 1	(1,000-500 microns)	3.7	NA	NA	NA	7.2	NA	4.0	NA
Particle/Grain Size, Phi Scale 1 to 2	(500-250 microns)	3.0	NA	NA	NA	6.5	NA	5.2	NA
Particle/Grain Size, Phi Scale 2 to 3	(250-125 microns)	2.5	NA	NA	NA	7.2	NA	6.7	NA
Particle/Grain Size, Phi Scale 3 to 4	(125-62 microns)	2.2	NA	NA	NA	7.2	NA	9.4	NA
Particle/Grain Size, Phi Scale 4 to 5	(62.5-31.0 microns)	38.0	NA	NA	NA	43.2	NA	15.2	NA
Particle/Grain Size, Phi Scale 5 to 6	(31.0-15.6 microns)	6.1	NA	NA	NA	3.3	NA	42.6	NA
Particle/Grain Size, Phi Scale 6 to 7	(15.6-7.8 microns)	4.7	NA	NA	NA	3.0	NA	2.2	NA
Particle/Grain Size, Phi Scale 7 to 8	(7.8-3.9 microns)	6.5	NA	NA	NA	4.7	NA	4.5	NA
Particle/Grain Size, Phi Scale 8 to 9	(3.9-2.0 microns)	3.1	NA	NA	NA	4.1	NA	3.2	NA
Particle/Grain Size, Phi Scale 9 to 10	(2.0-1.0 microns)	2.1	NA	NA	NA	3.5	NA	3.5	NA
Particle/Grain Size, Phi Scale <10	(<1.0 micron)	6.0	NA	NA	NA	2.7	NA	2.5	NA
Particle/Grain Size, Fines (Silt/Clay)	(<62 microns)	66.4	NA	NA	NA	64.5	NA	73.7	NA
PRECIPITATION (b)									
Amount During Test (inches)		0.35	0.50	0.29	0.08	0.78	0.01	0.73	0.94

		LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID		UZ02A	VB89I	VC63A	VF37I	VF92A	VJ50F	VK18B	VL90I	VM55A
Filtration Start Date		6/7/2012	7/9/2012	7/11/2012	8/6/2012	8/9/2012	9/10/2012	9/13/2012	10/1/2012	10/4/2012
Filtration End Date		6/15/2012	7/11/2012	7/19/2012	8/9/2012	8/16/2012	9/13/2012	9/20/2012	10/4/2012	10/9/2012
Event Type		Interim	Monthly	Interim	Monthly	Interim	Monthly	Interim	Monthly	Interim
PARTICLE/GRAIN SIZE (percent)										
Method PSEP-PS										
Particle/Grain Size, Phi Scale >-1	(2,000 microns)	0.3	NA	0.1 U	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale -1 to 0	(2,000-1,000 microns)	2.6	NA	2.5	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 0 to 1	(1,000-500 microns)	3.6	NA	3.3	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 1 to 2	(500-250 microns)	6.0	NA	3.6	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 2 to 3	(250-125 microns)	9.1	NA	4.8	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 3 to 4	(125-62 microns)	9.6	NA	5.8	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 4 to 5	(62.5-31.0 microns)	48.3	NA	8.0	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 5 to 6	(31.0-15.6 microns)	6.3	NA	15.3	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 6 to 7	(15.6-7.8 microns)	4.3	NA	7.4	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 7 to 8	(7.8-3.9 microns)	5.1	NA	13.2	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 8 to 9	(3.9-2.0 microns)	2.7	NA	10.5	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 9 to 10	(2.0-1.0 microns)	0.2	NA	16.9	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale <10	(<1.0 micron)	1.9	NA	9.0	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Fines (Silt/Clay)	(<62 microns)	68.7	NA	80.1	NA	NA	NA	NA	NA	NA
PRECIPITATION (b)										
Amount During Test (inches)		0.23	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00

TABLE 6
MH130A STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID	VR68I	VS17J/VS28A	VS17J/VS28A	VV27K	VW78A	VW75J	VZ15G	WC96J/WC96L	WG51K/WG51L	WI40J/WI40M	WK37J/WM37M	WK74J/WK74M	WP40J/WP40M	WS97D/WS97F	WX01L	XA11J/XA11L	XE07J/XE07M
Filtration Start Date	11/5/2012	11/8/2012	11/11/2012	12/3/2012	12/6/2012	12/16/2012	1/7/2013	2/4/2013	3/4/2013	3/19/2013	4/1/2013	4/5/2013	5/6/2013	6/3/2013	7/8/2013	8/5/2013	9/5/2013
Filtration End Date	11/8/2012	11/11/2012	11/12/2012	12/6/2012	12/16/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013	5/9/2013	6/6/2013	7/10/2013	8/8/2013	9/6/2013
Event Type	Monthly	Interim	Storm	Monthly	Interim	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Monthly	Storm
Measured Mass in Filter																	
Aroclor 1016 (µg)	2.5 U	NA	5.0 U	10 U	NA	2.0 U	4.0 U	2.0 U	10 U	1.0 U	0.5 U	1.0 U	2.0 U	2.0 U	1.0 U	5.0 U	5.0 U
Aroclor 1242 (µg)	2.5 U	NA	5.0 U	10 U	NA	2.0 U	4.0 U	2.0 U	10 U	1.0 U	0.5 U	1.0 U	2.0 U	2.0 U	1.0 U	5.0 U	5.0 U
Aroclor 1248 (µg)	38 U	NA	75 U	150 U	NA	62 U	100 U	80 U	150 U	25 U	**85**	**130**	60 U	60 U	35 U	62 U	140 U
Aroclor 1254 (µg)	**33**	NA	**96**	**120**	NA	**60**	**110**	**86** P	**110**	**34**	**48**	**94**	**69**	**61**	**34**	**150**	**110**
Aroclor 1260 (µg)	2.5 U	NA	**11**	20 U	NA	**11**	10 U	5.0 U	10 U	3.5 U	0.5 U	10 U	3.0 U	**8.8**	3.0 U	**24**	**29**
Aroclor 1221 (µg)	2.5 U	NA	5.0 U	10 U	NA	2.0 U	4.0 U	2.0 U	10 U	1.0 U	0.5 U	1.0 U	2.0 U	2.0 U	1.0 U	5.0 U	5.0 U
Aroclor 1232 (µg)	2.5 U	NA	5.0 U	10 U	NA	2.0 U	4.0 U	2.0 U	10 U	1.0 U	0.5 U	1.0 U	2.0 U	2.0 U	1.0 U	5.0 U	5.0 U
Aroclor 1262 (µg)	2.5 U	NA	5.0 U	10 U	NA	2.0 U	4.0 U	2.0 U	10 U	1.0 U	0.5 U	1.0 U	2.0 U	2.0 U	1.0 U	5.0 U	5.0 U
Total PCBs (a) (µg)	**33**	NA	**107**	**120**	NA	**71**	**110**	**86**	**110**	**34**	**133**	**224**	**69**	**69.8**	**34**	**174**	**139**
Mass of Filtered Solids:																	
Bag Number	165	NA	156	153	NA	198	178	174	193	183	180	175	203	201	249	245	237
Filter Micron Rating (µm)	1	NA	1	1	NA	1	1	1	1	1	1	1	1	1	1	1	1
Unused Filter Bag (grams)	143.65	NA	136.86	135.22	NA	146.66	139.53	141.73	140.01	140.75	136.41	140.47	140.50	142.21	151.11	134.80	141.78
Dried Filter Bag with Filtered Solids (grams)	149.80	NA	153.52	150.61	NA	158.2	163.20	165.96	165.17	154.41	157.68	159.64	167.00	169.43	164.07	153.83	181.04
Total Solids Filtered, Dry Weight (grams)	6.15	NA	16.66	15.39	NA	11.54	23.67	24.23	25.16	13.66	21.27	19.17	26.50	27.22	12.96	19.03	39.26
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	**5.37**	NA	**6.42**	**7.80**	NA	**6.15**	**4.65**	**3.55**	**4.37**	**2.49**	**6.25**	**11.68**	**2.60**	**2.56**	**2.62**	**9.14**	**3.54**
Volume of Stormwater Filtered:																	
Flow Totalizer at Start of Filtration (gallons)	1,026,795	NA	1,027,071	1,028,390	NA	1,030,728	1,031,443	47	423	928	1,180	1,343	1,646	1,821	1,946	2,034	2,070
Flow Totalizer at Sample Collection (gallons)	1,026,876	NA	1,027,430	1,029,676	NA	1,031,443	1,032,028	423	928	1,180	1,343	1,646	1,821	1,946	2,034	2,070	2,430
Volume of Stormwater Filtered (gallons)	80	NA	360	1,286	NA	716	585	376	505	253	163	302	175	125	89	36	360
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.109**	NA	**0.079**	**0.025**	NA	**0.026**	**0.050**	**0.060**	**0.058**	**0.036**	**0.216**	**0.196**	**0.104**	**0.148**	**0.101**	**1.284**	**0.102**
PAHs (µg)																	
Method SW8270D																	
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	5.0 U	NA	NA	NA	5.0 U
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	5.0 U	NA	NA	NA	**16**
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	**4.2**	NA	NA	5.0 U	NA	NA	NA	5.0 U
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	5.0 U	NA	NA	NA	5.0 U
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	5.0 U	NA	NA	NA	5.0 U
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	5.0 U	NA	NA	NA	5.0 U
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	**4.6**	NA	NA	5.0 U	NA	NA	NA	**23**
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	5.0 U	NA	NA	NA	5.0 U
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	**6.6**	**7.2**	NA	NA	5.0 U	NA	NA	NA	**43**
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	**7.2**	**6.2**	NA	NA	**5.2**	NA	NA	NA	**36**
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	**1.7**	NA	NA	5.0 U	NA	NA	NA	**10**
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	**4.1**	NA	NA	5.0 U	NA	NA	NA	**27**
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	**2.1**	NA	NA	5.0 U	NA	NA	NA	**14**
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	**1.8**	NA	NA	5.0 U	NA	NA	NA	**11**
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	5.0 U	NA	NA	NA	5.0 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	**3.2**	NA	NA	5.0 U	NA	NA	NA	**19**
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	5.0 U	NA	NA	NA	5.0 U
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	**5.4**	**4.9**	NA	NA	5.0 U	NA	NA	NA	**26**
cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	**0.54**	**3.0**	NA	NA	NA	NA	NA	NA	**19**
TOTAL METALS (mg/kg)																	
Method EPA200.8/6010B.C/7470A/7471A																	
Arsenic	NA	120 U	NA		80 U	NA	NA	130 U	NA	NA	80 U	60 U	NA	90 U	NA	**60**	NA
Cadmium	NA	**8**	NA		**9**	NA	NA	**11**	NA	NA	**8**	**14**	NA	**16**	NA	**11**	NA
Chromium	NA	**20**	NA		**37**	NA	NA	**50**	NA	NA	**10**	**35**	NA	**39**	NA	**37**	NA
Copper	NA	**63**	NA		**200**	NA	NA	**174**	NA	NA	**101**	**129**	NA	**186**	NA	**163**	NA
Iron	NA	**339,000**	NA		**262,000**	NA	NA	**400,000**	NA	NA	**344,000**	**197,000**	NA	**320,000**	NA	**251,000**	NA
Lead	NA	50 U	NA		**70**	NA	NA	50 U	NA	NA	30 U	**60**	NA	**80**	NA	**60**	NA
Manganese	NA	**1420**	NA		**1310**	NA	NA	**651**	NA	NA	**791**	**618**	NA	**848**	NA	**1700**	NA
Mercury	NA	**0.3**	NA		**0.7**	NA	NA	**0.6**	NA	NA	**0.4**	**0.8**	NA	**3.6**	NA	**3.3**	NA
Nickel	NA	20 U	NA		**20**	NA	NA	30 U	NA	NA	20 U	**20**	NA	**20**	NA	**20**	NA
Zinc	NA	**920**	NA		**1150**	NA	NA	**1120**	NA	NA	**400**	**1380**	NA	**2130**	NA	**1320**	NA

TABLE 6
MH130A STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID	VR68I	VS17J/VS28A	VS17J/VS28A	VV27K	VW78A	VW75J	VZ15G	WC96J/WC96L	WG51K/WG51L	WI40J/WI40M	WK37J/WM37M	WK74J/WK74M	WP40J/WP40M	WS97D/WS97F	WX01L	XA11J/XA11L	XE07J/XE07M
Filtration Start Date	11/5/2012	11/8/2012	11/11/2012	12/3/2012	12/6/2012	12/16/2012	1/7/2013	2/4/2013	3/4/2013	3/19/2013	4/1/2013	4/5/2013	5/6/2013	6/3/2013	7/8/2013	8/5/2013	9/5/2013
Filtration End Date	11/8/2012	11/11/2012	11/12/2012	12/6/2012	12/16/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013	5/9/2013	6/6/2013	7/10/2013	8/8/2013	9/6/2013
Event Type	Monthly	Interim	Storm	Monthly	Interim	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Monthly	Storm
PARTICLE/GRAIN SIZE (percent)																	
Method PSEP-PS																	
Particle/Grain Size, Phi Scale >-1 (2,000 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale -1 to 0 (2,000-1,000 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 0 to 1 (1,000-500 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 1 to 2 (500-250 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 2 to 3 (250-125 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 3 to 4 (125-62 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 4 to 5 (62.5-31.0 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 5 to 6 (31.0-15.6 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 6 to 7 (15.6-7.8 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 7 to 8 (7.8-3.9 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 8 to 9 (3.9-2.0 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 9 to 10 (2.0-1.0 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale <10 (<1.0 micron)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Fines (Silt/Clay) (<62 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PRECIPITATION (b)																	
Amount During Test (inches)	0.01	0.00	0.63	0.69	1.30	0.94	1.68	0.35	0.87	0.92	0.00	0.59	0.00	0.00	0.00	0.00	1.36

TABLE 6
MH130A STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

	LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID	XE91I/XE91L	XJ12J/XJ12M
Filtration Start Date	9/9/2013	10/7/2013
Filtration End Date	9/12/2013	10/9/2013
Event Type	Monthly	Monthly
Measured Mass in Filter		
Aroclor 1016 (µg)	0.50 U	1.0 U
Aroclor 1242 (µg)	0.50 U	1.0 U
Aroclor 1248 (µg)	25 U	25 U
Aroclor 1254 (µg)	**23**	**37**
Aroclor 1260 (µg)	2.5 U	**12**
Aroclor 1221 (µg)	0.50 U	1.0 U
Aroclor 1232 (µg)	0.50 U	1.0 U
Aroclor 1262 (µg)	0.50 U	1.0 U
Total PCBs (a) (µg)	**23**	**49**
Mass of Filtered Solids:		
Bag Number	242	235
Filter Micron Rating (µm)	1	1
Unused Filter Bag (grams)	141.85	132.75
Dried Filter Bag with Filtered Solids (grams)	137.75	155.89
Total Solids Filtered, Dry Weight (grams)	N/A (c)	23.14
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	N/A (c)	**2.12**
Volume of Stormwater Filtered:		
Flow Totalizer at Start of Filtration (gallons)	2,430	2,511
Flow Totalizer at Sample Collection (gallons)	2,508	2,652
Volume of Stormwater Filtered (gallons)	78	141
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.078**	**0.092**
PAHs (µg)		
Method SW8270D		
Naphthalene	2.5 U	NA
2-Methylnaphthalene	2.5 U	NA
1-Methylnaphthalene	**5.2**	NA
Acenaphthylene	2.5 U	NA
Acenaphthene	2.5 U	NA
Fluorene	2.5 U	NA
Phenanthrene	2.5 U	NA
Anthracene	2.5 U	NA
Fluoranthene	2.5 U	NA
Pyrene	**3.0**	NA
Benzo(a)anthracene	2.5 U	NA
Chrysene	2.5 U	NA
Benzo(a)pyrene	2.5 U	NA
Indeno(1,2,3-cd)pyrene	2.5 U	NA
Dibenz(a,h)anthracene	2.5 U	NA
Benzo(g,h,i)perylene	2.5 U	NA
Dibenzofuran	2.5 U	NA
Total Benzofluoranthenes	2.5 U	NA
cPAH TEQ	NA	NA
TOTAL METALS (mg/kg)		
Method EPA200.8/6010B.C/7470A/7471A		
Arsenic	NA	**20**
Cadmium	NA	**20.5**
Chromium	NA	**100**
Copper	NA	**201**
Iron	NA	**60,700**
Lead	NA	**197**
Manganese	NA	**522**
Mercury	NA	**1.20**
Nickel	NA	**62**
Zinc	NA	**1960**

TABLE 6
MH130A STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

		LTST-F-MH130A	LTST-F-MH130A
Laboratory Data ID		XE91I/XE91L	XJ12J/XJ12M
Filtration Start Date		9/9/2013	10/7/2013
Filtration End Date		9/12/2013	10/9/2013
Event Type		Monthly	Monthly
PARTICLE/GRAIN SIZE (percent)			
Method PSEP-PS			
Particle/Grain Size, Phi Scale >-1	(2,000 microns)	NA	NA
Particle/Grain Size, Phi Scale -1 to 0	(2,000-1,000 microns)	NA	NA
Particle/Grain Size, Phi Scale 0 to 1	(1,000-500 microns)	NA	NA
Particle/Grain Size, Phi Scale 1 to 2	(500-250 microns)	NA	NA
Particle/Grain Size, Phi Scale 2 to 3	(250-125 microns)	NA	NA
Particle/Grain Size, Phi Scale 3 to 4	(125-62 microns)	NA	NA
Particle/Grain Size, Phi Scale 4 to 5	(62.5-31.0 microns)	NA	NA
Particle/Grain Size, Phi Scale 5 to 6	(31.0-15.6 microns)	NA	NA
Particle/Grain Size, Phi Scale 6 to 7	(15.6-7.8 microns)	NA	NA
Particle/Grain Size, Phi Scale 7 to 8	(7.8-3.9 microns)	NA	NA
Particle/Grain Size, Phi Scale 8 to 9	(3.9-2.0 microns)	NA	NA
Particle/Grain Size, Phi Scale 9 to 10	(2.0-1.0 microns)	NA	NA
Particle/Grain Size, Phi Scale <10	(<1.0 micron)	NA	NA
Particle/Grain Size, Fines (Silt/Clay)	(<62 microns)	NA	NA
PRECIPITATION (b)			
Amount During Test (inches)		0.00	0.40

NA = Not Analyzed
Bold = Detected compound.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U = Indicates the compound was not detected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample limit of quantitation is an estimate.
P = The analyte was detected on both chromatographic columns but the quantified values differ by 40% RPD with no obvious chromatographic interference.
The higher of the two values is reported by the laboratory.

(a) Total PCBs is the sum of detected aroclors or, if no aroclors are detected, is reported as non-detect (ND).
(b) Precipitation data are from the NOAA Quality Controlled Local Climatological Data for Station 24234/BFI - SEATTLE: BOEING FIELD/KING COUNTY INTERNATIONAL AIRPORT.
(c) Because the filter bag mass was weighed less after filtration than before filtration, the amount of solids filtered or PCB concentration cannot be estimated.

TABLE 7
LSIV STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV
Laboratory Data ID	TW50C	TX25A	TX90F	TY96F	UA56E	UB55A	UC19G	UC78G	UE10G	UE68H	UF88B	UH75L	UI57B	UK14E
Filtration Start Date	11/8/2011	11/11/2011	11/16/2011	11/22/2011	12/5/2011	12/08/2011	12/20/2011	12/27/2011	1/9/2012	1/20/2012	1/21/2012	2/6/2012	2/9/2012	2/23/2012
Filtration End Date	11/11/11	11/16/11	11/17/2011	11/23/2011	12/08/2011	12/15/2011	12/21/2011	12/28/2011	1/12/2012	1/21/2012	1/26/2012	2/9/2012	2/17/2012	2/29/2012
Event Type	Monthly	Interim	Storm	Storm	Monthly	Interim	2nd Monthly	Storm	Monthly	Storm	Interim	Monthly	Interim	Interim
Measured Mass in Filter														
Aroclor 1016 (µg)	0.5 U	NA	0.5 U	0.5 U	0.5 UJ	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA
Aroclor 1242 (µg)	0.5 U	NA	0.5 U	0.5 U	0.6 UJ	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA
Aroclor 1248 (µg)	1.8 U	NA	**0.9**	**3.2**	0.5 UJ	NA	0.5 UJ	**0.5**	**1.1**	**2.6**	NA	**1.5**	NA	NA
Aroclor 1254 (µg)	**2.4**	NA	**1.9**	**6.4**	0.5 UJ	NA	0.5 UJ	**1.1**	**1.5**	**6.7**	NA	**1.9**	NA	NA
Aroclor 1260 (µg)	0.5 U	NA	**1.0**	**7.1**	0.5 UJ	NA	0.5 UJ	**0.7**	**0.6**	**5.9**	NA	0.5 U	NA	NA
Aroclor 1221 (µg)	0.5 U	NA	0.5 U	0.5 U	0.5 UJ	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA
Aroclor 1232 (µg)	0.5 U	NA	0.5 U	0.5 U	0.5 UJ	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA
Aroclor 1262 (µg)	0.5 U	NA	0.5 U	0.5 U	0.5 UJ	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA
Total PCBs (a) (µg)	**2.4**	NA	**3.8**	**16.7**	0.5 UJ	NA	0.5 UJ	**2.3**	**3.2**	**15.2**	NA	**3.4**	NA	NA
Mass of Filtered Solids:														
Bag Number	89	NA	85	115	71	NA	107	106	99	131	NA	119	NA	NA
Filter Micron Rating (µm)	1	NA	1	1	1	NA	1	1	1	1	NA	1	NA	NA
Unused Filter Bag (grams)	140.87	NA	126.30	141.42	146.52	NA	131.19	135.85	144.15	161.18	NA	152.85	NA	NA
Dried Filter Bag with Filtered Solids (grams)	164.16	NA	138.69	160.17	170.66	NA	180.20	146.66	159.96	194.35	NA	176.59	NA	NA
Total Solids Filtered, Dry Weight (grams)	23.29	NA	12.39	18.75	24.14	NA	49.01	10.81	15.81	33.17	NA	23.74	NA	NA
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	**0.10**	NA	**0.31**	**0.89**	**0.02**	NA	**0.01**	**0.21**	**0.20**	**0.46**	NA	**0.14**	NA	NA
Volume of Stormwater Filtered:														
Flow Totalizer at Start of Filtration (gallons)	29,485	NA	29,732	30,178	31,021	NA	31,454	31,530	31,591	31,688	NA	34,765	NA	NA
Flow Totalizer at Sample Collection (gallons)	29,631	NA	29,921	31,021	31,112	NA	31,530	31,592	31,687	31,986	NA	35,049	NA	NA
Volume of Stormwater Filtered (gallons)	146	NA	189	843	91	NA	76	62	97	299	NA	284	NA	NA
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.004**	NA	**0.005**	**0.005**	0.001 U	NA	0.002 U	**0.010**	**0.009**	**0.013**	NA	**0.003**	NA	NA
PAHs (µg)														
Method SW8270D														
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 7
LSIV STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV
Laboratory Data ID	TW50C	TX25A	TX90F	TY96F	UA56E	UB55A	UC19G	UC78G	UE10G	UE68H	UF88B	UH75L	UI57B	UK14E
Filtration Start Date	11/8/2011	11/11/2011	11/16/2011	11/22/2011	12/5/2011	12/08/2011	12/20/2011	12/27/2011	1/9/2012	1/20/2012	1/21/2012	2/6/2012	2/9/2012	2/23/2012
Filtration End Date	11/11/11	11/16/11	11/17/2011	11/23/2011	12/08/2011	12/15/2011	12/21/2011	12/28/2011	1/12/2012	1/21/2012	1/26/2012	2/9/2012	2/17/2012	2/29/2012
Event Type	Monthly	Interim	Storm	Storm	Monthly	Interim	2nd Monthly	Storm	Monthly	Storm	Interim	Monthly	Interim	Interim
TOTAL METALS (mg/kg)														
Method EPA200.8/6010B,C/7470A														
Arsenic	NA	80 U	NA	NA	NA	110 U	NA	NA	NA	NA	NA	NA	110 U	NA
Cadmium	NA	**4**	NA	NA	NA	4 U	NA	NA	NA	NA	NA	NA	**7**	NA
Chromium	NA	**52** J	NA	NA	NA	**20**	NA	NA	NA	NA	NA	NA	**40**	NA
Copper	NA	**116** J	NA	NA	NA	**22**	NA	NA	NA	NA	NA	NA	**92**	NA
Iron	NA	NA	NA	NA	NA	**354,000**	NA	NA	NA	NA	NA	NA	**335,000**	NA
Lead	NA	**90**	NA	NA	NA	40 U	NA	NA	NA	NA	NA	NA	40 U	NA
Manganese	NA	NA	NA	NA	NA	**1970**	NA	NA	NA	NA	NA	NA	**1250**	NA
Mercury	NA	0.1 U	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	NA
Nickel	NA	**20** J	NA	NA	NA	20 U	NA	NA	NA	NA	NA	NA	**30**	NA
Zinc	NA	**630** J	NA	NA	NA	**160**	NA	NA	NA	NA	NA	NA	**630**	NA
PARTICLE/GRAIN SIZE (percent)														
Method PSEP-PS														
Particle/Grain Size, Phi Scale >-1 (2,000 microns)	NA	7.8	NA	NA	NA	0.1 U	NA	NA	NA	NA	0.1	NA	NA	0.1
Particle/Grain Size, Phi Scale -1 to 0 (2,000-1,000 microns)	NA	7.2	NA	NA	NA	14.3	NA	NA	NA	NA	7.6	NA	NA	18.8
Particle/Grain Size, Phi Scale 0 to 1 (1,000-500 microns)	NA	2.3	NA	NA	NA	3.2	NA	NA	NA	NA	8.7	NA	NA	6.5
Particle/Grain Size, Phi Scale 1 to 2 (500-250 microns)	NA	1.1	NA	NA	NA	1.8	NA	NA	NA	NA	15.7	NA	NA	4.6
Particle/Grain Size, Phi Scale 2 to 3 (250-125 microns)	NA	1.0	NA	NA	NA	1.2	NA	NA	NA	NA	15.1	NA	NA	3.6
Particle/Grain Size, Phi Scale 3 to 4 (125-62 microns)	NA	0.9	NA	NA	NA	0.9	NA	NA	NA	NA	7.0	NA	NA	3.1
Particle/Grain Size, Phi Scale 4 to 5 (62.5-31.0 microns)	NA	34.7	NA	NA	NA	15.7	NA	NA	NA	NA	30.4	NA	NA	15.0
Particle/Grain Size, Phi Scale 5 to 6 (31.0-15.6 microns)	NA	15.1	NA	NA	NA	1.7	NA	NA	NA	NA	5.6	NA	NA	12.8
Particle/Grain Size, Phi Scale 6 to 7 (15.6-7.8 microns)	NA	4.3	NA	NA	NA	9.2	NA	NA	NA	NA	1.2	NA	NA	3.0
Particle/Grain Size, Phi Scale 7 to 8 (7.8-3.9 microns)	NA	7.5	NA	NA	NA	12.6	NA	NA	NA	NA	2.0	NA	NA	5.6
Particle/Grain Size, Phi Scale 8 to 9 (3.9-2.0 microns)	NA	4.4	NA	NA	NA	9.7	NA	NA	NA	NA	1.6	NA	NA	7.2
Particle/Grain Size, Phi Scale 9 to 10 (2.0-1.0 microns)	NA	5.4	NA	NA	NA	8.7	NA	NA	NA	NA	4.4	NA	NA	5.9
Particle/Grain Size, Phi Scale <10 (<1.0 micron)	NA	8.4	NA	NA	NA	20.9	NA	NA	NA	NA	0.7	NA	NA	13.8
Particle/Grain Size, Fines (Silt/Clay) (<62 microns)	NA	79.7	NA	NA	NA	78.6	NA	NA	NA	NA	45.9	NA	NA	63.4
PRECIPITATION (c)														
Amount During Test (inches)	0.0	0.38	0.38	1.99	0.0	0.07	0.0	0.91	0.23	0.85	1.24	0.16	0.71	0.73

TABLE 7
LSIV STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV
Laboratory Data ID	UL49G	UL81F	UM18F	UN75B	UO82G	UP34C	UP34D	UQ03A	UU03K	UX77A/UX77B	VB89G/VB89H	VF37G/VF37H	VJ50D/VJ50E	VL90G/VL90H
Filtration Start Date	3/5/2012	3/8/2012	3/12/2012	3/22/2012	3/31/2012	4/2/2012	4/2/2012	4/6/2012	5/7/2012	6/4/2012	7/9/2012	8/6/2012	9/10/2012	10/1/2012
Filtration End Date	3/8/2012	3/12/2012	3/13/2012	3/23/2012	4/1/2012	4/5/2012	4/5/2012	4/10/2012	5/10/2012	6/7/2012	7/11/2012	8/9/2012	9/13/2012	10/4/2012
Event Type	Monthly	Interim	Storm	Interim	Storm	Monthly	Monthly	Interim	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Measured Mass in Filter														
Aroclor 1016 (µg)	0.5 U	NA	0.5 U	NA	0.5 U	1.0 U	NA	NA	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1242 (µg)	0.5 U	NA	0.5 U	NA	0.5 U	1.0 U	NA	NA	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1248 (µg)	3.8 U	NA	**3.8**	NA	6.2 U	50 U	NA	NA	**0.9**	5.0 U	1.5 U	1.5 U	1.0 U	0.5 U
Aroclor 1254 (µg)	**7.5**	NA	**7.2**	NA	**13**	**48**	NA	NA	**1.6**	**5.7**	**1.3**	**1.5**	**1.1**	**0.8**
Aroclor 1260 (µg)	**5.7**	NA	**2.6**	NA	**3.2**	4.0 U	NA	NA	**0.5**	**2.9**	**0.3**	**0.3**	**0.6**	**0.3**
Aroclor 1221 (µg)	0.5 U	NA	0.5 U	NA	0.5 U	1.0 U	NA	NA	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1232 (µg)	0.5 U	NA	0.5 U	NA	0.5 U	1.0 U	NA	NA	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1262 (µg)	0.5 U	NA	0.5 U	NA	0.5 U	1.0 U	NA	NA	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Total PCBs (a) (µg)	**13.2**	NA	**13.6**	NA	**16.2**	**48**	NA	NA	**3**	**8.6**	**1.6**	**1.8**	**1.7**	**1.1**
Mass of Filtered Solids:														
Bag Number	143	NA	141	NA	147	139	NA	NA	149	130	136	138	161	158
Filter Micron Rating (µm)	1	NA	1	NA	1	1	NA	NA	1	1	1	1	1	1
Unused Filter Bag (grams)	156.04	NA	152.98	NA	158.56	154.60	NA	NA	156.88	154.73	155.52	146.98	136.93	141.36
Dried Filter Bag with Filtered Solids (grams)	186.21	NA	171.18	NA	190.29	174.87	NA	NA	159.29	185.71	183.45	185.15	172.14	178.87
Total Solids Filtered, Dry Weight (grams)	30.17	NA	18.20	NA	31.73	20.27	NA	NA	2.41	30.98	27.93	38.17	35.21	37.51
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	**0.44**	NA	**0.75**	NA	**0.51**	**2.37**	NA	NA	**1.24**	**0.28**	**0.06**	**0.05**	**0.05**	**0.03**
Volume of Stormwater Filtered:														
Flow Totalizer at Start of Filtration (gallons)	3,663	NA	36,209	NA	6,166	8,068	NA	NA	9,194	39,171	40,092	39,894	39,374	39,596
Flow Totalizer at Sample Collection (gallons)	3,987	NA	37,097	NA	8,068	8,952	NA	NA	9,332	39,573	40,340	39,374	39,596	39,736
Volume of Stormwater Filtered (gallons)	324	NA	889	NA	1,902	884	NA	NA	138	402	248	(b)	222	140
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.011**	NA	**0.004**	NA	**0.002**	**0.014**	NA	NA	**0.006**	**0.006**	**0.002**	(b)	**0.002**	**0.002**
PAHs (µg)														
Method SW8270D														
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 7
LSIV STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV
Laboratory Data ID	UL49G	UL81F	UM18F	UN75B	UO82G	UP34C	UP34D	UQ03A	UU03K	UX77A/UX77B	VB89G/VB89H	VF37G/VF37H	VJ50D/VJ50E	VL90G/VL90H
Filtration Start Date	3/5/2012	3/8/2012	3/12/2012	3/22/2012	3/31/2012	4/2/2012	4/2/2012	4/6/2012	5/7/2012	6/4/2012	7/9/2012	8/6/2012	9/10/2012	10/1/2012
Filtration End Date	3/8/2012	3/12/2012	3/13/2012	3/23/2012	4/1/2012	4/5/2012	4/5/2012	4/10/2012	5/10/2012	6/7/2012	7/11/2012	8/9/2012	9/13/2012	10/4/2012
Event Type	Monthly	Interim	Storm	Interim	Storm	Monthly	Monthly	Interim	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
TOTAL METALS (mg/kg)														
Method EPA200.8/6010B,C/7470A														
Arsenic	NA	90 U	NA	NA	NA	NA	90 U	NA	80 U	90 U	80 U	110 U	80 U	90 U
Cadmium	NA	**6**	NA	NA	NA	NA	4 U	NA	3 U	**7**	3 U	4 U	**5**	4 U
Chromium	NA	**46**	NA	NA	NA	NA	**42**	NA	**24**	**42**	**26**	**20**	**26**	**23**
Copper	NA	**98**	NA	NA	NA	NA	**79**	NA	**29**	**92**	**33**	**22**	**30**	**52**
Iron	NA	**325000**	NA	NA	NA	NA	**319,000**	NA	**368,000**	**251,000**	**323,000**	**297,000**	**313,000**	**357,000**
Lead	NA	40 U	NA	NA	NA	NA	40 U	NA	30 U	50	30 U	40 U	30 U	40 U
Manganese	NA	**1630**	NA	NA	NA	NA	**1210**	NA	**1850**	**1480**	**2010**	**1780**	**2000**	**2880**
Mercury	NA	0.2 U	NA	NA	NA	NA	**0.2**	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	NA	**30**	NA	NA	NA	NA	20 U	NA	20 U	20	20 U	20 U	20 U	20 U
Zinc	NA	**770**	NA	NA	NA	NA	**420**	NA	**110**	**760**	**120**	**90**	**210**	**100**
PARTICLE/GRAIN SIZE (percent)														
Method PSEP-PS														
Particle/Grain Size, Phi Scale >-1 (2,000 microns)	NA	NA	NA	0.1 U	NA	NA	NA	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA
Particle/Grain Size, Phi Scale -1 to 0 (2,000-1,000 microns)	NA	NA	NA	7.3	NA	NA	NA	7.8	1.3	10.9	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 0 to 1 (1,000-500 microns)	NA	NA	NA	5.5	NA	NA	NA	2.7	1.5	9.1	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 1 to 2 (500-250 microns)	NA	NA	NA	5.0	NA	NA	NA	3.2	1.1	6.0	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 2 to 3 (250-125 microns)	NA	NA	NA	4.2	NA	NA	NA	2.6	0.9	6.0	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 3 to 4 (125-62 microns)	NA	NA	NA	4.3	NA	NA	NA	2.2	1.0	6.8	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 4 to 5 (62.5-31.0 microns)	NA	NA	NA	12.7	NA	NA	NA	16.7	2.2	13.4	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 5 to 6 (31.0-15.6 microns)	NA	NA	NA	16.1	NA	NA	NA	17.4	20.7	13.2	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 6 to 7 (15.6-7.8 microns)	NA	NA	NA	4.9	NA	NA	NA	9.2	20.9	6.1	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 7 to 8 (7.8-3.9 microns)	NA	NA	NA	8.4	NA	NA	NA	12.8	24.5	8.7	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 8 to 9 (3.9-2.0 microns)	NA	NA	NA	7.2	NA	NA	NA	7.5	10.2	3.4	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 9 to 10 (2.0-1.0 microns)	NA	NA	NA	13.6	NA	NA	NA	9.7	8.4	6.8	NA	NA	NA	NA
Particle/Grain Size, Phi Scale <10 (<1.0 micron)	NA	NA	NA	10.7	NA	NA	NA	8.0	7.1	9.6	NA	NA	NA	NA
Particle/Grain Size, Fines (Silt/Clay) (<62 microns)	NA	NA	NA	73.6	NA	NA	NA	81.4	94.2	61.2	NA	NA	NA	NA
PRECIPITATION (c)														
Amount During Test (inches)	0.06	1.01	0.76	0.35	0.50	0.29	0.29	0.00	0.01	0.94	0.00	0.00	0.01	0.00

TABLE 7
LSIV STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV
Laboratory Data ID	VR68G/VR68H	VS17I	VV27I/VV27J	VW75I	VZ15E/VZ15F	WC96I/WC96K	WG51I/WG51J	WI40I/WI40L	WK37I/WK37L	WK74I/WK74L	WP40I/WP40L	WS97E	WX01K	XA11I/XA11K
Filtration Start Date	11/5/2012	11/11/2012	12/3/2012	12/16/2012	1/7/2013	2/4/2013	3/4/2013	3/19/2013	4/1/2013	4/5/2013	5/6/2013	6/3/2013	7/8/2013	8/5/2013
Filtration End Date	11/8/2012	11/12/2012	12/6/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013	5/9/2013	6/6/2013	7/10/2013	8/8/2013
Event Type	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Monthly
Measured Mass in Filter														
Aroclor 1016 (µg)	0.1 U	0.1 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.1 U	0.1 U	0.1 U	0.10 U
Aroclor 1242 (µg)	0.1 U	0.1 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.1 U	0.1 U	0.1 U	0.10 U
Aroclor 1248 (µg)	1.0 U	1.5 U	5.0 U	1.6 U	2.5 U	1.2 U	2.0 U	1.2 U	**1.0**	3.0 U	1.5 U	1 U	1.2 U	0.40 U
Aroclor 1254 (µg)	**1.9**	**3.5**	**17**	**3.7**	**4.6**	**2.4**	**2.0**	**1.3**	**1.6**	**6.8**	**1.9**	**0.8**	**0.8**	**0.93**
Aroclor 1260 (µg)	**0.4**	**1.5**	**7.1**	**1.6**	**1.4**	**0.8**	0.5 U	**0.6**	0.5 U	2.5 U	**0.4**	0.1 U	**0.2**	**0.47**
Aroclor 1221 (µg)	0.1 U	0.1 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.1 U	0.1 U	0.1 U	0.10 U
Aroclor 1232 (µg)	0.1 U	0.1 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.1 U	0.1 U	0.1 U	0.10 U
Aroclor 1262 (µg)	0.1 U	0.1 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.1 U	0.1 U	0.1 U	0.10 U
Total PCBs (a) (µg)	**2.3**	**5.0**	**24.1**	**5.3**	**6.0**	**3.2**	**2.0**	**1.9**	**2.6**	**6.8**	**2.3**	**0.8**	**1.0**	**1.4**
Mass of Filtered Solids:														
Bag Number	160	157	159	176	169	191	194	196	172	177	205	171	250	238
Filter Micron Rating (µm)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Unused Filter Bag (grams)	142.16	139.65	134.39	137.06	139.83	131.69	134.7	144.81	149.16	142.26	138.88	138.77	133.28	140.01
Dried Filter Bag with Filtered Solids (grams)	163.97	165.29	163.70	144.9	181.29	151.44	162.42	188.49	185.75	155.18	187.31	142.16	152.93	162.33
Total Solids Filtered, Dry Weight (grams)	21.81	25.64	29.31	7.84	41.46	19.75	27.72	43.68	36.59	12.92	48.43	3.39	19.65	22.32
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	**0.11**	**0.20**	**0.82**	**0.68**	**0.14**	**0.16**	**0.07**	**0.04**	**0.07**	**0.53**	**0.05**	**0.24**	**0.05**	**0.06**
Volume of Stormwater Filtered:														
Flow Totalizer at Start of Filtration (gallons)	37,810	38,767	42,201	45,064	45,471	16,522	16,415	16,106	16,214	16,424	16,837	17,080	17,178	16,719
Flow Totalizer at Sample Collection (gallons)	38,767	38,791	46,781	45,490	45,625	16,596	16,737	16,207	16,424	16,737	17,180	17,178	17,308	16,843
Volume of Stormwater Filtered (gallons)	957	24	4,579	427	154	75	322	101	211	313	343	98	130	124
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.001**	**0.054**	**0.001**	**0.003**	**0.010**	**0.011**	**0.002**	**0.005**	**0.003**	**0.006**	**0.002**	**0.002**	**0.002**	**0.003**
PAHs (µg)														
Method SW8270D														
Naphthalene	NA	NA	NA	NA	5.0 U	NA	2.5 U	**1.6**	NA	NA	5.0 U	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	5.0 U	NA	2.5 U	**5.9**	NA	NA	5.0 U	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	5.0 U	NA	**4.5**	**5.0**	NA	NA	5.0 U	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	5.0 U	NA	2.5 U	1.5 U	NA	NA	5.0 U	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	5.0 U	NA	2.5 U	1.5 U	NA	NA	**25**	NA	NA	NA
Fluorene	NA	NA	NA	NA	5.0 U	NA	2.5 U	**1.7**	NA	NA	5.0 U	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	**8.0**	NA	**6.7**	**9.0**	NA	NA	**5.0**	NA	NA	NA
Anthracene	NA	NA	NA	NA	5.0 U	NA	2.5 U	1.5 U	NA	NA	5.0 U	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	**25**	NA	**20**	**26**	NA	NA	5.0 U	NA	NA	NA
Pyrene	NA	NA	NA	NA	**19**	NA	**11**	**14**	NA	NA	5.0 U	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	**5.0**	NA	**2.8**	**4.2**	NA	NA	5.0 U	NA	NA	NA
Chrysene	NA	NA	NA	NA	**19**	NA	**12**	**16**	NA	NA	5.0 U	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	**8.0**	NA	**4.4**	**6.6**	NA	NA	5.0 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	**9.0**	NA	**6.0**	**9.2**	NA	NA	5.0 U	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	5.0 U	NA	2.5 U	**3.0**	NA	NA	5.0 U	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	**11**	NA	**7.3**	**11**	NA	NA	5.0 U	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	5.0 U	NA	2.5 U	1.5 U	NA	NA	5.0 U	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	**30**	NA	**17**	**26**	NA	NA	5.0 U	NA	NA	NA
cPAH TEQ	NA	NA	NA	NA	**12.6**	NA	**7.1**	**11**	NA	NA	NA	NA	NA	NA

TABLE 7
LSIV STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV
Laboratory Data ID	VR68G/VR68H	VS17I	VV27I/VV27J	VW75I	VZ15E/VZ15F	WC96I/WC96K	WG51I/WG51J	WI40I/WI40L	WK37I/WK37L	WK74I/WK74L	WP40I/WP40L	WS97E	WX01K	XA11I/XA11K
Filtration Start Date	11/5/2012	11/11/2012	12/3/2012	12/16/2012	1/7/2013	2/4/2013	3/4/2013	3/19/2013	4/1/2013	4/5/2013	5/6/2013	6/3/2013	7/8/2013	8/5/2013
Filtration End Date	11/8/2012	11/12/2012	12/6/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013	5/9/2013	6/6/2013	7/10/2013	8/8/2013
Event Type	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Monthly
TOTAL METALS (mg/kg)														
Method EPA200.8/6010B,C/7470A														
Arsenic	110 U	NA	50 U	NA	NA	60 U	NA	NA	70 U	30 U	NA	NA	NA	80 U
Cadmium	4 U	NA	**2**	NA	NA	**7**	NA	NA	**5**	**10**	NA	NA	NA	**4**
Chromium	**20**	NA	**38**	NA	NA	**39**	NA	NA	**14**	**49**	NA	NA	NA	**23**
Copper	**38**	NA	**117**	NA	NA	**95**	NA	NA	**25**	**144**	NA	NA	NA	**33**
Iron	**346,000**	NA	**246,000**	NA	NA	**229,000**	NA	NA	**272,000**	**109,000**	NA	NA	NA	**315,000**
Lead	40 U	NA	**40**	NA	NA	**50**	NA	NA	30 U	**90**	NA	NA	NA	30 U
Manganese	**2240**	NA	**1300**	NA	NA	**1370**	NA	NA	**1340**	**675**	NA	NA	NA	**2420**
Mercury	0.2 U	NA	0.3 U	NA	NA	**0.1**	NA	NA	0.1 U	**0.2**	NA	NA	NA	0.1 U
Nickel	20 U	NA	**20**	NA	NA	**20**	NA	NA	10 U	**24**	NA	NA	NA	20 U
Zinc	**150**	NA	**370**	NA	NA	**650**	NA	NA	**70**	**1000**	NA	NA	NA	**170**
PARTICLE/GRAIN SIZE (percent)														
Method PSEP-PS														
Particle/Grain Size, Phi Scale >-1 (2,000 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale -1 to 0 (2,000-1,000 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 0 to 1 (1,000-500 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 1 to 2 (500-250 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 2 to 3 (250-125 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 3 to 4 (125-62 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 4 to 5 (62.5-31.0 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 5 to 6 (31.0-15.6 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 6 to 7 (15.6-7.8 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 7 to 8 (7.8-3.9 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 8 to 9 (3.9-2.0 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale 9 to 10 (2.0-1.0 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Phi Scale <10 (<1.0 micron)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Particle/Grain Size, Fines (Silt/Clay) (<62 microns)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PRECIPITATION (c)														
Amount During Test (inches)	0.01	0.63	0.69	0.94	1.68	0.35	0.87	0.92	0.00	0.59	0.00	0.00	0.00	0.00

TABLE 7
LSIV STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV
Laboratory Data ID	XE07I/XE07L	XE91H/XE91K	XJ21I/XJ12L
Filtration Start Date	9/5/2013	9/9/2013	10/7/2013
Filtration End Date	9/6/2013	9/12/2013	10/9/2013
Event Type	Storm	Monthly	Monthly
Measured Mass in Filter			
Aroclor 1016 (µg)	0.50 U	0.50 U	0.50 U
Aroclor 1242 (µg)	0.50 U	0.50 U	0.50 U
Aroclor 1248 (µg)	2.8 U	1.2 U	2.0 U
Aroclor 1254 (µg)	**6.7**	**2.3**	**4.2**
Aroclor 1260 (µg)	**3.1**	**1.2**	**1.8**
Aroclor 1221 (µg)	0.50 U	0.50 U	0.50 U
Aroclor 1232 (µg)	0.50 U	0.50 U	0.50 U
Aroclor 1262 (µg)	0.50 U	0.50 U	0.50 U
Total PCBs (a) (µg)	**9.8**	**3.5**	**6.0**
Mass of Filtered Solids:			
Bag Number	225	211	217
Filter Micron Rating (µm)	1	1	1
Unused Filter Bag (grams)	145.03	137.30	147.12
Dried Filter Bag with Filtered Solids (grams)	199.08	167.79	179.42
Total Solids Filtered, Dry Weight (grams)	54.05	30.49	32.30
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	**0.18**	**0.11**	**0.19**
Volume of Stormwater Filtered:			
Flow Totalizer at Start of Filtration (gallons)	14,741	14,832	13,205
Flow Totalizer at Sample Collection (gallons)	14,832	15,064	13,516
Volume of Stormwater Filtered (gallons)	91	231	311
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.028**	**0.004**	**0.005**
PAHs (µg)			
Method SW8270D			
Naphthalene	**60**	**3.0**	NA
2-Methylnaphthalene	**260**	**8.2**	NA
1-Methylnaphthalene	**200**	**10**	NA
Acenaphthylene	**12**	2.5 U	NA
Acenaphthene	**7.7**	**9.6**	NA
Fluorene	**13**	2.5 U	NA
Phenanthrene	**33**	**3.8**	NA
Anthracene	5.0 U	2.5 U	NA
Fluoranthene	**93**	**5.9**	NA
Pyrene	**53**	**4.8**	NA
Benzo(a)anthracene	**11**	2.5 U	NA
Chrysene	**61**	**3.7**	NA
Benzo(a)pyrene	**20**	2.5 U	NA
Indeno(1,2,3-cd)pyrene	**25**	2.5 U	NA
Dibenz(a,h)anthracene	5.0 U	2.5 U	NA
Benzo(g,h,i)perylene	**31**	2.5 U	NA
Dibenzofuran	**13**	2.5 U	NA
Total Benzofluoranthenes	**70**	**4.6**	NA
cPAH TEQ	**31**	**0.50**	NA

TABLE 7
LSIV STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID		LTST-F-LSIV	LTST-F-LSIV	LTST-F-LSIV
Laboratory Data ID		XE07I/XE07L	XE91H/XE91K	XJ21I/XJ12L
Filtration Start Date		9/5/2013	9/9/2013	10/7/2013
Filtration End Date		9/6/2013	9/12/2013	10/9/2013
Event Type		Storm	Monthly	Monthly
TOTAL METALS (mg/kg)				
Method EPA200.8/6010B,C/7470A				
Arsenic		NA	NA	40 U
Cadmium		NA	NA	**7**
Chromium		NA	NA	**63**
Copper		NA	NA	**162**
Iron		NA	NA	**94,800**
Lead		NA	NA	**140**
Manganese		NA	NA	**868**
Mercury		NA	NA	**0.19**
Nickel		NA	NA	**35**
Zinc		NA	NA	**907**
PARTICLE/GRAIN SIZE (percent)				
Method PSEP-PS				
Particle/Grain Size, Phi Scale >-1	(2,000 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale -1 to 0	(2,000-1,000 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 0 to 1	(1,000-500 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 1 to 2	(500-250 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 2 to 3	(250-125 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 3 to 4	(125-62 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 4 to 5	(62.5-31.0 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 5 to 6	(31.0-15.6 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 6 to 7	(15.6-7.8 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 7 to 8	(7.8-3.9 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 8 to 9	(3.9-2.0 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale 9 to 10	(2.0-1.0 microns)	NA	NA	NA
Particle/Grain Size, Phi Scale <10	(<1.0 micron)	NA	NA	NA
Particle/Grain Size, Fines (Silt/Clay)	(<62 microns)	NA	NA	NA
PRECIPITATION (c)				
Amount During Test (inches)		1.36	0.00	0.40

NA = Not Analyzed
Bold = Detected compound.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U = Indicates the compound was not detected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample limit of quantitation is an estimate.

(a) Total PCBs is the sum of detected aroclors or, if no aroclors are detected, is the largest limit of quantitation.
(b) It has been observed that system vibration has intermittently caused the flow meter totalizer to move in reverse. The 8/9/2012 reading was 39,374 gallons (lower than the previous reading). Therefore, the flow volume and whole water concentration of PCBs could not be determined.
(c) Precipitation data are from the NOAA Quality Controlled Local Climatological Data for Station 24234/BFI - SEATTLE: BOEING FIELD/KING COUNTY INTERNATIONAL AIRPORT.

TABLE 8
EFFLUENT STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF
Laboratory Data ID	TW50E	TX90H	TY96H	UA56G	UC78K	UE10E	UE68I	UH75M	UL49F
Filtration Start Date	11/8/2011	11/16/2011	11/22/2011	12/5/2011	12/27/2011	1/9/2012	1/20/2012	2/6/2012	3/5/12
Filtration End Date	11/11/2011	11/17/2011	11/23/2011	12/08/2011	12/28/2011	1/12/2012	1/21/2012	2/9/2012	3/8/2012
Event Type	Monthly	Storm	Storm	Monthly	Storm	Monthly	Storm	Monthly	Monthly
Measured Mass in Filter									
Aroclor 1016 (µg)	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor 1242 (µg)	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor 1248 (µg)	1.0 U	**1.3**	**1.3**	1.2 U	2.0 U	15 U	6.2 U	**9.6**	15 U
Aroclor 1254 (µg)	**0.9**	**2.1**	**2.2**	**1.3**	**2.4**	**12**	**7.6**	**8.2**	**18**
Aroclor 1260 (µg)	0.5 U	**0.6**	**1.4** P	0.5 U	**0.9**	1.2 U	**2.7**	1.0 U	**3.5**
Aroclor 1221 (µg)	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor 1232 (µg)	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor 1262 (µg)	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total PCBs (a) (µg)	**0.9**	**4**	**4.9** P	**1.3**	**3.3**	**12**	**10.3**	**17.8**	**21.5**
Mass of Filtered Solids:									
Bag Number	88	81	79	93	92	75	151	144	148
Filter Micron Rating (µm)	1	1	1	1	1	1	1	1	1
Unused Filter Bag (grams)	126.48	131.11	132.90	138.64	132.09	152.04	151.56	157.27	152.48
Dried Filter Bag with Filtered Solids (grams)	126.31	144.78	140.60	133.23	142.17	165.33	169.18	175.81	171.54
Total Solids Filtered, Dry Weight (grams)	N/A (b)	13.67	7.70	N/A (b)	10.08	13.29	17.62	18.54	19.06
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	N/A (b)	**0.29**	**0.64**	N/A (b)	**0.33**	**0.90**	**0.58**	**0.96**	**1.13**
Volume of Stormwater Filtered:									
Flow Totalizer at Start of Filtration (gallons)	8,997	20,446	36,069	48,298	52,436	59,481	63,494	67,914	70,731
Flow Totalizer at Sample Collection (gallons)	9,375	36,068	48,297	52,429	59,475	63,491	67,912	70,732	76,765
Volume of Stormwater Filtered (gallons)	378	15,622	12,228	4,132	7,039	4,009	4,418	2,818	6,033
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.0006**	**0.0001**	**0.0001** P	**0.0001**	**0.0001**	**0.0008**	**0.0006**	**0.0017**	**0.0009**
PAHs (µg)									
Method SW8270D									
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
PRECIPITATION (c)									
Amount During Test (inches)	0.0	0.38	2.46	0.0	0.91	0.23	0.85	0.16	0.06

Sample Location ID	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF
Laboratory Data ID	UM18G	UO82I	UP34A	UU03N	UX77D	VB89J	VF37J	VL90J	VR68J
Filtration Start Date	3/12/2012	3/31/2012	4/2/2012	5/7/2012	6/4/2012	7/9/2012	8/6/2012	10/1/12	11/5/12
Filtration End Date	3/13/2012	4/1/2012	4/5/2012	5/10/2012	6/7/2012	7/11/2012	8/9/2012	10/4/2012	11/8/2012
Event Type	Storm	Storm	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Measured Mass in Filter									
Aroclor 1016 (µg)	0.5 U	5.0 U	0.5 U	0.5 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor 1242 (µg)	0.5 U	5.0 U	0.5 U	0.5 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor 1248 (µg)	7.5 U	62 U	7.5 U	5.6 U	15 U	10 U	12 U	1.2 U	10 U
Aroclor 1254 (µg)	**6.9**	**82**	**8.4**	**7.0**	**13**	**7.9**	**11**	**1.4**	**8.0**
Aroclor 1260 (µg)	**2.0**	10 U	0.8 U	**0.7** P	1.5 U	0.5 U	1.0 U	0.5 U	0.6 U
Aroclor 1221 (µg)	0.5 U	5.0 U	0.5 U	0.5 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor 1232 (µg)	0.5 U	5.0 U	0.5 U	0.5 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor 1262 (µg)	0.5 U	5.0 U	0.5 U	0.5 U	1.0 U	0.5 U	0.5 U	0.5 U	0.5 U
Total PCBs (a) (µg)	**8.9**	**82**	**8.4**	**7.7**	**13**	**7.9**	**11**	**1.4**	**8.0**
Mass of Filtered Solids:									
Bag Number	128	121	123	132	122	120	142	167	164
Filter Micron Rating (µm)	1	1	1	1	1	1	1	1	1
Unused Filter Bag (grams)	158.60	159.76	155.99	152.12	153.52	155.61	156.94	141.95	140.56
Dried Filter Bag with Filtered Solids (grams)	178.25	177.98	180.68	170.35	170.31	171.26	177.54	143.39	167.48
Total Solids Filtered, Dry Weight (grams)	19.65	18.22	24.69	18.23	16.79	15.65	20.60	1.44	26.92
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	**0.45**	**4.50**	**0.34**	**0.42**	**0.77**	**0.50**	**0.53**	**0.97**	**0.30**
Volume of Stormwater Filtered:									
Flow Totalizer at Start of Filtration (gallons)	76,764	81,002	90,276	95,759	99,927	102,867	107,127	113,620	113,906
Flow Totalizer at Sample Collection (gallons)	81,045	90,275	95,759	99,924	102,867	107,130	111,402	113,906	119,470
Volume of Stormwater Filtered (gallons)	4,280	9,273	5,483	4,165	2,940	4,263	4,275	286	5,564
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.0005**	**0.0023**	**0.0004**	**0.0005**	**0.0012**	**0.0005**	**0.0007**	**0.0013**	**0.0004**
PAHs (µg)									
Method SW8270D									
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
PRECIPITATION (c)									
Amount During Test (inches)	0.76	0.50	0.29	0.01	0.94	0.00	0.00	0.00	0.01

TABLE 8
EFFLUENT STORMWATER FILTRATION AND PCB ANALYTICAL RESULTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Sample Location ID	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF	LTST-F-EFF
Laboratory Data ID	VS17K	VV27L	VW75K	VZ15H	WC96M	WG51M/WG51N	WI40K/WI40N	WK37K	WK74K	WP40K	WS97G	WX01M	XA11M	XE07K/XE07N	XE91J	XK12K
Filtration Start Date	11/11/2012	12/3/2012	12/16/12	1/7/2013	2/4/2013	3/4/2013	3/19/2013	4/1/2013	4/5/2013	5/6/2013	6/3/2013	7/8/2013	8/5/2013	9/5/2013	9/9/2013	10/7/2013
Filtration End Date	11/12/2012	12/6/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013	5/9/2013	6/6/2013	7/10/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013
Event Type	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Storm	Monthly	Storm	Monthly	Monthly	Monthly	Monthly	Storm	Monthly	Monthly
Measured Mass in Filter																
Aroclor 1016 (µg)	0.5 U	1.0 U	2.0 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.5 U	1.0 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor 1242 (µg)	0.5 U	1.0 U	2.0 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.5 U	1.0 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor 1248 (µg)	7.5 U	15 U	13 U	12 U	7.5 U	10 U	2.5 U	**13**	**21** P	12 U	25 U	7.5 U	7.5 U	13 U	12 U	5.0 U
Aroclor 1254 (µg)	**11**	**17**	**14**	**9.2**	**8.5**	**9.2**	**2.7**	**8.5**	**15**	**12**	**12**	**8.6**	**11**	**8.3**	**10**	**6.9**
Aroclor 1260 (µg)	**1.7**	**3.1**	**5.1** P	0.8 U	0.8 U	0.5 U	0.2 U	0.5 U	2.5 U	0.8 U	1.0 U	**0.9**	1.5 U	3.3 U	1.5 U	**2.1**
Aroclor 1221 (µg)	0.5 U	1.0 U	2.0 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.5 U	1.0 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor 1232 (µg)	0.5 U	1.0 U	2.0 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.5 U	1.0 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor 1262 (µg)	0.5 U	1.0 U	2.0 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	1.0 U	0.5 U	1.0 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U
Total PCBs (a) (µg)	**12.7**	**20.1**	**19.1**	**9.2**	**8.5**	**9.2**	**2.7**	**21.5**	**36**	**12**	**12**	**9.5**	**11**	**8.3**	**10**	**9.0**
Mass of Filtered Solids:																
Bag Number	186	166	129	181	200	192	185	179	170	226	202	251	244	231	230	243
Filter Micron Rating (µm)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Unused Filter Bag (grams)	131.71	141.70	155.31	142.34	144.16	138.42	134.99	131.41	145.67	134.6	121.14	132.95	134.36	132.02	133.30	138.14
Dried Filter Bag with Filtered Solids (grams)	148.51	167.18	170.24	156.98	157.88	154.34	146.78	148.20	159.12	150.35	136.99	148.81	148.99	145.31	152.26	155.89
Total Solids Filtered, Dry Weight (grams)	16.80	25.48	14.93	14.64	13.72	15.92	11.79	16.79	13.45	15.75	15.85	15.86	14.63	13.29	18.96	17.75
Calculated Concentration of Total PCBs in Filtered Solids, Dry Weight (mg/kg)	**0.76**	**0.79**	**1.28**	**0.63**	**0.62**	**0.58**	**0.23**	**1.28**	**2.68**	**0.76**	**0.76**	**0.60**	**0.75**	**0.62**	**0.53**	**0.51**
Volume of Stormwater Filtered:																
Flow Totalizer at Start of Filtration (gallons)	119,469	153,126	210,243	224,214	386	6,663	13,112	15,063	23,257	33,492	42,446	45,963	51,230	57,817	63,822	72,359
Flow Totalizer at Sample Collection (gallons)	129,453	210,243	224,214	227,497	6,663	13,112	15,063	23,257	33,492	42,446	45,963	51,230	57,817	63,821	72,218	79,273
Volume of Stormwater Filtered (gallons)	9,984	57,116	13,971	3,283	6,277	6,449	1,951	8,194	10,234	8,955	3,517	5,267	6,587	6,004	8,396	6,913
Calculated Concentration of Total PCBs in Whole Water using flow totalizer data, (µg/L)	**0.0003**	**0.0001**	**0.0004**	**0.0007**	**0.0004**	**0.0004**	**0.0004**	**0.0007**	**0.0009**	**0.0004**	**0.0009**	**0.0005**	**0.0004**	**0.0004**	**0.0003**	**0.0003**
PAHs (µg)																
Method SW8270D																
Naphthalene	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	**28**	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	5.0 U	**3.9**	NA	NA	NA	NA	NA	NA	**120**	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	5.0 U	**5.7**	NA	NA	NA	NA	NA	NA	**73**	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
Fluorene	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	**5.2**	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	**5.0**	**3.3**	NA	NA	NA	NA	NA	NA	**11**	NA	NA
Anthracene	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	**14**	**8.4**	NA	NA	NA	NA	NA	NA	**30**	NA	NA
Pyrene	NA	NA	NA	NA	NA	**11**	**4.6**	NA	NA	NA	NA	NA	NA	**17**	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
Chrysene	NA	NA	NA	NA	NA	**13**	**5.4**	NA	NA	NA	NA	NA	NA	**18**	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	5.0 U	**1.6**	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	5.0 U	**1.9**	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	5.0 U	1.5 U	NA	NA	NA	NA	NA	NA	**5.8**	NA	NA
Total Benzofluoranthenes	NA	NA	NA	NA	NA	**15**	**5.0**	NA	NA	NA	NA	NA	NA	**12**	NA	NA
cPAH TEQ	NA	NA	NA	NA	NA	**1.63**	**0.7**	NA	NA	NA	NA	NA	NA	**1.4**	NA	NA
PRECIPITATION (c)																
Amount During Test (inches)	0.63	0.69	0.94	1.68	0.35	0.87	0.92	0.00	0.59	0.00	0.00	0.00	0.00	1.36	0.00	0.40

NA = Not Analyzed.
Bold = Detected compound.
P = The analyte was detected on both chromatographic columns but the quantified values differ by 40% RPD with no obvious chromatographic interference. The higher of the two values is reported by the laboratory.
U = Indicates the compound was not detected at the reported concentration.

(a) Total PCBs is the sum of detected aroclors or, if no aroclors are detected, is the largest limit of quantitation.
(b) Because the filter bag mass was weighed less after filtration than before filtration, the amount of solids filtered or PCB concentration cannot be estimated.
(c) Precipitation data is from the NOAA Quality Controlled Local Climatological Data for Station 24234/BFI - SEATTLE: BOEING FIELD/KING COUNTY INTERNATIONAL AIRPORT.

TABLE 9
BYPASS DURING 2012-2013 SAMPLING EVENTS
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Event	Event Begin Date	Event End Date	Precipitation during LS431 Sampling Period (in)	Approximate Start of Bypass	Approximate End of Bypass	Comments
November Monthly	11/5/2012	11/8/2012	0.01	NA	NA	No bypass occurred during sampling event.
December Monthly	12/3/2012	12/6/2012	0.68	12/4/12 00:45	12/4/12 03:05	
				12/4/12 03:43	12/4/12 04:01	
				12/4/12 04:53	12/4/12 05:10	
				12/4/12 07:00	12/4/12 07:15	
January Monthly	1/7/2013	1/10/2013	1.68	1/8/13 10:00	1/8/13 10:14	
				1/8/13 14:33	1/8/13 14:52	
				1/8/13 23:14	1/8/13 23:46	
				1/9/13 00:18	1/9/13 00:37	
				1/9/13 01:13	1/9/13 01:43	
				1/9/13 02:10	1/9/13 03:59	
				1/9/13 04:17	1/9/13 04:58	
				1/9/13 05:17	1/9/13 06:51	
				1/9/13 07:08	1/9/13 08:02	
				1/9/13 08:21	1/9/13 10:10	
				1/9/13 10:50	1/9/13 11:06	
February Monthly	2/4/2013	2/7/2013	0.35	NA	NA	No bypass occurred during sampling event.
March Monthly	3/4/2013	3/7/2013	0.87	3/6/13 14:30	3/6/13 14:46	
				3/6/13 16:00	3/6/13 16:15	
				3/6/13 18:05	3/6/13 18:22	
				3/6/13 19:13	3/6/13 19:31	
				3/6/13 22:07	3/6/13 22:21	
				3/7/13 00:46	3/7/13 01:01	
				3/7/13 02:25	3/7/13 02:43	
				3/7/13 06:31	3/7/13 06:44	
April Monthly	4/1/2013	4/4/2013	0.00	NA	NA	No bypass occurred during sampling event.
May Monthly	5/6/2013	5/9/2013	0.00	NA	NA	No bypass occurred during sampling event.
June Monthly	6/3/2013	6/7/2013	0.00	NA	NA	No bypass occurred during sampling event.
July Monthly	7/8/2013	7/10/2013	0.00	NA	NA	No bypass occurred during sampling event.
August Monthly	8/5/2013	8/8/2013	0.00	NA	NA	No bypass occurred during sampling event.
September Monthly	9/9/2013	9/13/2013	0.00	NA	NA	No bypass occurred during sampling event.
October Monthly	10/7/2013	10/9/2013	0.40	10/8/13 11:11	10/8/13 11:56	
				10/8/13 14:04	10/8/13 14:18	
Storm Events	11/11/2012	11/12/2012	0.63	11/11/12 18:24	11/11/12 18:40	
				11/11/12 19:26	11/11/12 19:45	
				11/11/12 23:06	11/11/12 23:26	
				11/11/12 23:06	11/11/12 23:26	
	12/16/2012	12/17/2012	0.94	12/16/12 15:45	12/16/12 16:11	
				12/16/12 16:26	12/16/12 17:28	
				12/16/12 18:06	12/16/12 18:25	
				12/16/12 19:06	12/16/12 20:31	
				12/16/12 21:04	12/16/12 21:21	
				12/16/12 22:33	12/16/12 22:47	
				12/16/12 23:21	12/17/12 00:05	
				12/17/12 00:27	12/17/12 00:54	
				12/17/12 01:42	12/17/12 01:59	
	3/19/2013	3/20/2013	0.92	3/19/13 21:16	3/19/13 21:33	
				3/20/13 00:06	3/20/13 00:23	
				3/20/13 00:52	3/20/13 01:29	
				3/20/13 02:09	3/20/13 02:27	
				3/20/13 05:11	3/20/13 05:40	
				3/20/13 06:04	3/20/13 06:43	
				3/20/13 07:21	3/20/13 07:42	
				3/20/13 08:10	3/20/13 08:28	
	4/5/2013	4/6/2013	0.64	4/5/13 20:24	4/5/13 20:42	
				4/6/13 01:00	4/6/13 01:16	
	9/5/2013	9/6/2013	1.36	9/5/13 23:51	9/6/13 03:40	
				9/6/13 04:39	9/6/13 04:54	

TABLE 10
MONTHLY PRECIPITATION AND FLOW VOLUMES
LONG-TERM STORMWATER TREATMENT SYSTEM
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Data Source:	KBFI Gauge	Flo-Dar data from LS431	CESF Effluent Data from Clear Water	Calculated	Transducer Data from KC Re-Route Wet Well	Transducer Data from MH130B Weir
	Precipitation (in)	Stormwater Discharge (Mgal)	Stormwater Treated (Mgal)	% Stormwater Treated	King County Re-Route Stormwater (Mgal)	MH130A Stormwater Flowing to LSIV (Mgal)
November 2012	8.75	46.39	20.29	44%	3.12	0.22
December 2012	7.81	55.85	23.76	43%	4.40	0.03
January 2013	3.35	30.82	21.23	69%	3.00	0.07
February 2013	1.65	16.95	13.61	80%	1.59	0
March 2013	2.77	22.78	17.27	76%	1.70	0
April 2013	4.39	26.47	20.21	76%	1.68	0.03
May 2013	1.45	12.45	11.28	91%	1.13	0
June 2013	0.81	9.86	9.39	95%	0.71	0
July 2013	0.00	7.31 (a)	7.31	100%	0.45	0
August 2013	0.46	8.75	7.55	86%	0.54	0.02
September 2013	5.12	26.40	15.26	58%	1.83	0.15
October 2013	1.58	13.18	10.69	81%	0.67	0.01
Yearly Total	**38.14**	**277.20**	**177.86**	64%	**20.83**	**0.53**

Note:

(a) There was zero precipitation in July 2013, and no bypass of the LTST system occurred. The Flo-Dar data indicated 7.53 Mgal was discharged. However, as 100% of the water was treated, we substituted Clear Water's data for this month.

TABLE 11
STORM DRAIN MANHOLE SOLIDS AND SEDIMENT TRAP ANALYTICAL DATA
NORTH BOEING FIELD

SPU Sample ID:		**SL4-T1**	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	SL4-T1	**SL4-T2**	SL4-T2
Boeing Manhole No.:	MH100	MH422	MH422	MH422	MH422	MH422	MH422	MH422	MH422	MH422	MH422	MH422	MH422	MH422	MH422	MH356	MH356
Lab ID:	HS89A	IK38A	JE01B	KA63E	KK75A/KL08A	KY79C	LV54A	MN63B	NI22A	OC25C	OU11B	QS17A	SQ45A	UR61B	WP79A	IK38F	JE01A
Sample Type:	Grab	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap
Date Deployed:		3/7/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	11/12/2010	4/5/2011	4/24/2012	3/7/2005	8/11/2005
Date Collected:	2/16/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	4/8/2010	4/5/2011	4/24/2012	5/13/2013	8/11/2005	3/16/2006
TOTAL METALS (mg/kg-dry)																	
(Method 6000-7000 series)																	
Arsenic	20	11	10	30	9	20	6	19	10	9 U	NA	15	NA	10 U	10	NA	NA
Copper	102	83.6	110	325	133 J	123	79.3	80.1	142	168	NA	140	NA	97.5	99.2	NA	NA
Lead	142	140	97 J	216	159	227	84	90	190	215	NA	309	NA	117	141	NA	NA
Mercury	0.2	1.10	0.93 J	8.3	3.65	2.66	1.16 J	0.43	2.64	0.33	NA	0.36	NA	0.15	0.18	NA	NA
Zinc	411	368	435	1,140	382	474	313	717	563	518	NA	554	NA	487	538	NA	NA
NWTPH-Dx (mg/kg)																	
Diesel-Range Hydrocarbons	40	230	490	NA	350	710	NA	300	99 U	71	NA	100	NA	100	NA	NA	NA
Motor Oil-Range Hydrocarbons	190	970	1,800	NA	930	3,500	NA	1,100	470	450	NA	720	NA	460	NA	NA	NA
PCBs (µg/kg)																	
(PSDDA PCB SW8082)																	
Aroclor 1016	95 U	29 U	6,200 U	21,000 U	51,000 U	87,000 U	4,700 U	3,100 U	740 U	2,200 U	250 U	160 U	390 U	96 U	46 U	21 U	210 U
Aroclor 1242	95 U	29 U	6,200 U	21,000 U	51,000 U	87,000 U	4,700 U	3,100 U	740 U	2,200 U	250 U	160 U	390 U	96 U	46 U	21 U	210 U
Aroclor 1248	95 U	29 U	41,000	110,000 U	100,000 U	240,000	12,000	3,100 U	3,700 U	4,400 U	380 U	1,600 U	970 U	110	180 U	21 U	210 U
Aroclor 1254	1,600	10,000	55,000	110,000	260,000	180,000	9,800	7,600	10,000	19,000	680	3,400	3,400	350	770	500 P	890
Aroclor 1260	380 P	1,200 U	11,000	21,000 U	51,000 U	87,000 U	4,700 U	3,100 U	990 U	2,200 U	250 U	550	690	160	260	340	570
Aroclor 1221	95 U	29 U	6,200 U	21,000 U	26,000 U	87,000 U	4,700 U	3,100 U	740 U	2,200 U	250 U	160 U	390 U	96 U	46 U	21 U	210 U
Aroclor 1232	95 U	29 U	6,200 U	21,000 U	51,000 U	87,000 U	4,700 U	3,100 U	740 U	2,200 U	250 U	160 U	390 U	96 U	46 U	21 U	210 U
Aroclor 1262	NA	NA	NA	NA	NA	NA	NA	NA	740 U	NA	NA	NA	NA	96 U	46 U	NA	NA
Aroclor 1268	NA	NA	NA	NA	NA	NA	NA	NA	740 U	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	1,980	10,000	107,000	110,000	260,000	420,000	21,800 *	7,600	10,000 *	19,000 *	680 *	3,950	4,090	620	1,030	840	1460
CONVENTIONAL PARAMETERS (%)																	
Total Solids (EPA 160.3) (%)	38.80	72.80 J	71.30 J	37.60	75.00	NA	NA	67.70	NA	49.60	NA	59.50	59.50	50.70	43.52	NA	NA
Total Organic Carbon (Plumb, 1981) (%)	6.60	4.29	7.86	NA	3.45	NA	NA	3.83	NA	3.98	NA	5.65	4.64	3.10	8	NA	NA
Reported as Dry Wt		P,S,T,M	P,S,T,M	P,S,M	P,S,T,M	P,S,T,M		P,S,T,M	M	M		P,S,T,M	P	P,S,T,M	P,S,T,M	P	P,S
Reported as As Received							P,S,M		P,S,T	P,S,T	P,S						
Not Analyzed Due to Low Sample Volume				T			T				T,M		S,T,M			S,T,M	T,M

TABLE 11
STORM DRAIN MANHOLE SOLIDS AND SEDIMENT TRAP ANALYTICAL DATA
NORTH BOEING FIELD

SPU Sample ID:	SL4-T2	SL4-T2	SL4-T2	SL4-T2	SL4-T2	SL4-T2	SL4-T2	SL4-T2	SL4-T2	SL4-T2	SL4-T2	SL4-T2	**SL4-T3**	SL4-T3	SL4-T3	SL4-T3
Boeing Manhole No.:	MH356	MH356	MH356	MH356	MH356	MH356	MH356	MH356	MH356	MH356	MH356	MH356	MH364	MH364	MH364	MH364
Lab ID:	KA63D	KK75B	KY79D	LV54B	MN63A	NI22B	OC25A	OU11A	QS17B	SQ45B	UR61C	WP79B	IK38G	JE01C	KA63A	KK75C/KL08B
Sample Type:	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap
Date Deployed:	3/16/2006	10/11/2006	1/8/2007	5/14/2007	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	11/12/2010	4/5/2011	4/24/2012	3/7/2005	8/11/2005	3/16/2006	10/11/2006
Date Collected:	10/11/2006	1/8/2007	5/14/2007	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	4/8/2010	4/5/2011	04/24/2012	5/13/2013	8/11/2005	3/16/2006	10/11/2006	1/8/2007
TOTAL METALS (mg/kg-dry)																
(Method 6000-7000 series)																
Arsenic	50 U	NA	NA	5 U	NA	NA	NA	NA	NA	NA	20 U	10 U	NA	30 U	100 U	10 U
Copper	276	NA	NA	40.9	NA	NA	NA	NA	NA	NA	249	139	NA	99	106	72.2
Lead	300	NA	NA	43	NA	NA	NA	NA	NA	NA	272	132	NA	120	100	97
Mercury	0.6	NA	NA	0.08	NA	NA	NA	NA	NA	NA	0.42	0.28	NA	0.3	0.7 U	0.09 U
Zinc	1,560	NA	NA	222	NA	NA	NA	NA	NA	NA	1,470	879	NA	448	660	293
NWTPH-Dx (mg/kg)																
Diesel-Range Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	770	NA	NA	320	NA	NA
Motor Oil-Range Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,800	NA	NA	1,200	NA	NA
PCBs (µg/kg)																
(PSDDA PCB SW8082)																
Aroclor 1016	300 U	27 U	19 U	35 U	13 U	24 U	9.9 U	34 U	79 U	26 U	340 U	47 U	20 U	160 U	78 U	49 U
Aroclor 1242	230 U	27 U	19 U	35 U	13 U	24 U	9.9 U	34 U	79 U	26 U	340 U	47 U	20 U	160 U	78 U	49 U
Aroclor 1248	300 U	13 U	19 U	35 U	19 U	24 U	9.9 U	34 U	120 U	100 U	340 U	47 U	20 U	270 U	160 U	120 U
Aroclor 1254	760	180	70	90	47	24	10	48	260	370	400	250	1,400	1,300	480	430
Aroclor 1260	470	130	58	43	38	24 U	9.9 U	34 U	200	310	350	190	380 U	510	150	140
Aroclor 1221	75 U	13 U	19 U	35 U	13 U	24 U	9.9 U	34 U	79 U	26 U	340 U	47 U	20 U	160 U	39 U	49 U
Aroclor 1232	380 U	13 U	19 U	35 U	13 U	24 U	9.9 U	34 U	79 U	26 U	340 U	47 U	20 U	310 U	160 U	49 U
Aroclor 1262	NA	NA	NA	NA	NA	24 U	NA	NA	NA	NA	340 U	47 U	NA	NA	NA	NA
Aroclor 1268	NA	NA	NA	NA	NA	24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	1230	310	128	133 *	85 *	24 *	10 *	48 *	460	680	750	440	1,400	1810	630	570
CONVENTIONAL PARAMETERS (%)																
Total Solids (EPA 160.3) (%)	8.93	NA	NA	NA	NA	NA	NA	NA	25.00	28.10	27.60	37.65	NA	13.40 J	4.93	40.80
Total Organic Carbon (Plumb, 1981) (%)	NA	NA	NA	NA	NA	NA	NA	NA	NA	16.1	17.7	8.57	NA	5.80	NA	2.38
Reported as Dry Wt	P,S,M	P,S	P						P,S	P	P,S,T,M	P,S,T,M	P	P,S,T,M	P,M	P,S,M
Reported as As Received				P,M	P	P	P,S	P								
Not Analyzed Due to Low Sample Volume	T	T,M	S,T,M	S,T	S,T,M	S,T,M	T,M	S,T,M	T,M	S,T,M			S,T,M		S,T	T

TABLE 11
STORM DRAIN MANHOLE SOLIDS AND SEDIMENT TRAP ANALYTICAL DATA
NORTH BOEING FIELD

SPU Sample ID:	SL4-T3	SL4-T3	SL4-T3	SL4-T3	SL4-T3	SL4-T3	SL4-T3	SL4-T3	SL4-T3	SL4-T3	**SL4-T4**	SL4-T4	SL4-T4	SL4-T4	SL4-T4	SL4-T4
Boeing Manhole No.:	MH364	MH364	MH364	MH364	MH364	MH364	MH364	MH364	MH364	MH364	MH221A	MH221A	MH221A	MH221A	MH221A	MH221A
Lab ID:	KY79E	LV54C	MN63D	NI22D	OC25B	OU11D	QS17C	SQ45C	UR61D	WP79C	HS89B	IK38B	JE01D	KA63B	KK75D/KL08C	KY79F
Sample Type:	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Grab	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap
Date Deployed:	1/8/2007	5/14/2007	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	11/12/2010	4/5/2011	4/24/2012		3/8/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007
Date Collected:	5/14/2007	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	4/8/2010	4/5/2011	04/24/2012	5/13/2013	2/16/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007
TOTAL METALS (mg/kg-dry)																
(Method 6000-7000 series)																
Arsenic	NA	5 U	NA	NA	NA	NA	NA	NA	70 U	50 U	12	NA	20	70	10	NA
Copper	NA	4.3	NA	NA	NA	NA	NA	NA	110	58	38.5	NA	134	271	125	NA
Lead	NA	4	NA	NA	NA	NA	NA	NA	90	50	50	NA	190	330	175	NA
Mercury	NA	0.03 U	NA	NA	NA	NA	NA	NA	0.1	0.08	0.09	NA	0.4	0.6	0.4	NA
Zinc	NA	30	NA	NA	NA	NA	NA	NA	640	393	332	NA	733	2,460	828	NA
NWTPH-Dx (mg/kg)																
Diesel-Range Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	150	NA	120	NA	580	NA	1,200	NA
Motor Oil-Range Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	540	NA	210	NA	1,800	NA	1,300	NA
PCBs (µg/kg)																
(PSDDA PCB SW8082)																
Aroclor 1016	(a)	34 U	10 U	13 U	10 U	21 U	110 U	20 U	270 U	48 U	120 U	9.8 U	95 U	94 U	96 U	160 U
Aroclor 1242	(a)	34 U	10 U	13 U	10 U	21 U	110 U	20 U	270 U	48 U	120 U	9.8 U	95 U	120 U	96 U	160 U
Aroclor 1248	(a)	34 U	20 U	13 U	10 U	21 U	110 U	99 U	270 U	48 U	120 U	9.8 U	100 U	140 U	96 U	160 U
Aroclor 1254	(a)	34 U	65	32	26	28	250	370	420	210	960	1,900 P	750	580	1,000	790
Aroclor 1260	(a)	34 U	25	13 U	10 U	21 U	110 U	180	280	110	530	850	340	360	700	800
Aroclor 1221	(a)	34 U	10 U	13 U	10 U	21 U	110 U	20 U	270 U	48 U	120 U	9.8 U	95 U	23 U	96 U	160 U
Aroclor 1232	(a)	34 U	10 U	13 U	10 U	21 U	110 U	20 U	270 U	48 U	120 U	9.8 U	95 U	94 U	96 U	160 U
Aroclor 1262	NA	NA	NA	13 U	NA	NA	NA	NA	270 U	48 U	NA	NA	NA	NA	NA	NA
Aroclor 1268	NA	NA	NA	13 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	(a)	34 * U	90 *	32 *	26 *	28 *	250	550	700	320	1490	2750	1090	940	1700	1590
CONVENTIONAL PARAMETERS (%)																
Total Solids (EPA 160.3) (%)	NA	NA	NA	NA	NA	NA	17.50	31.90	18.00	27.42	75.70	NA	41.60 J	16.2	42.30	NA
Total Organic Carbon (Plumb, 1981) (%)	NA	NA	NA	NA	NA	NA	NA	3.14	7.67	6.13	1.00	NA	5.41	NA	4.34	NA
Reported as Dry Wt	P						P,S	P	P,S,T,M	P,S,T,M		P,S	P,S,T,M	P,M	P,S,T,M	P
Reported as As Received		P,M	P,S	P	P,S	P										
Not Analyzed Due to Low Sample Volume	S,T,M	S,T	T,M	S,T,M	T,M	S,T,M	T,M	S,T,M				T,M		S,T		S,T,M

TABLE 11
STORM DRAIN MANHOLE SOLIDS AND SEDIMENT TRAP ANALYTICAL DATA
NORTH BOEING FIELD

SPU Sample ID:	SL4-T4	SL4-T4	SL4-T4	SL4-T4	SL4-T4	SL4-T4	SL4-T4	SL4-T4	SL4-T4	**SL4-T4A**	SL4-T4A	SL4-T4A	SL4-T4A	SL4-T4A	SL4-T4A	SL4-T4A
Boeing Manhole No.:	MH221A	MH221A	MH221A	MH221A	MH221A	MH221A	MH221A	MH221A	MH221A	MH229A	MH229A	MH229A	MH229A	MH229A	MH229A	MH229A
Lab ID:	LV54D	MN63E	NI22E	OC25E	OU11E	QS17D	SQ45D	UR61F	WP79E	HS89D	IK38D	JE01F	KA63G	KK75E/KL08D	KY79G	LV54E
Sample Type:	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Grab	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap
Date Deployed:	5/14/2007	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	11/12/2010	4/5/2011	4/24/2012		3/8/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007
Date Collected:	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	4/8/2010	4/5/2011	04/24/2012	5/13/2013	2/16/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007	10/29/2007
TOTAL METALS (mg/kg-dry)																
(Method 6000-7000 series)																
Arsenic	50	18	NA	NA	5.0 U	30	NA	30	20	30	16	13	20	12	NA	6
Copper	329	85.8	NA	NA	61.4	334	NA	408	365	85.5	94.3	75.2	262	76.0	NA	61.0
Lead	288	115	NA	NA	83	382	NA	399	288	155	144	116	414	121	NA	77
Mercury	0.5	0.21	NA	NA	0.11	0.37	NA	0.47	0.33	0.07	0.19	0.10	0.3	0.09	NA	0.07
Zinc	1,990	1,080	NA	NA	317	1,880	NA	1,920	1460	1,130	460	337	1,220	433	NA	309
NWTPH-Dx (mg/kg)																
Diesel-Range Hydrocarbons	NA	100	NA	NA	1,300	380	NA	540	NA	200	100	180	NA	140	NA	NA
Motor Oil-Range Hydrocarbons	NA	420	NA	NA	3,400	1,900	NA	1,700	NA	1,100	410	1,100	NA	600	NA	NA
PCBs (µg/kg)																
(PSDDA PCB SW8082)																
Aroclor 1016	45 U	75 U	30 U	50 U	82 U	70 U	28 U	400 U	47 U	140 U	9.8 U	9.9 U	81 U	9.8 U	(a)	11 U
Aroclor 1242	45 U	75 U	30 U	50 U	82 U	70 U	28 U	400 U	47 U	140 U	9.8 U	9.9 U	81 U	9.8 U	(a)	11 U
Aroclor 1248	45 U	75 U	200 U	50 U	82 U	210 U	110 U	400 U	47 U	140 U	9.8 U	9.9 U	81 U	9.8 U	(a)	22
Aroclor 1254	1,200	240	510 J	100	160	640	430	690	520	3,700	290 P	39	83	41	(a)	49
Aroclor 1260	680	200	270 J	140	180	430	340	690	290	1,900	160	75	160	62	(a)	28
Aroclor 1221	45 U	75 U	30 U	50 U	82 U	70 U	28 U	400 U	47 U	140 U	9.8 U	9.9 U	81 U	9.8 U	(a)	11 U
Aroclor 1232	45 U	75 U	30 U	50 U	82 U	70 U	28 U	400 U	47 U	140 U	9.8 U	9.9 U	81 U	9.8 U	(a)	11 U
Aroclor 1262	NA	NA	30 U	NA	NA	NA	NA	400 U	47 U	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	NA	NA	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	1,880	440 *	780 * J	240 *	340 *	1070	770	1380	810	5600	450	114	243	103	(a)	99 *
CONVENTIONAL PARAMETERS (%)																
Total Solids (EPA 160.3) (%)	NA	50.40	NA	NA	NA	28.10	29.60	24.50	26.78	66.60	47.30 J	NA	27.8	50.50	NA	NA
Total Organic Carbon (Plumb, 1981) (%)	NA	4.38	NA	NA	NA	12.1	19.3	17.6	7.46	3.88	5.35	NA	NA	4.06	NA	NA
Reported as Dry Wt	P,M	M				P,S,T,M	P	P,S,T,M	P,S,T,M		P,S,T,M	P,S,T,M	P,M	P,S,T,M	P	
Reported as As Received		P,S,T	P,S	P,S	P,S,T,M											P,M
Not Analyzed Due to Low Sample Volume	S,T		T,M	T,M			S,T,M						S,T		S,T,M	S,T

TABLE 11
STORM DRAIN MANHOLE SOLIDS AND SEDIMENT TRAP ANALYTICAL DATA
NORTH BOEING FIELD

SPU Sample ID:	SL4-T4A	SL4-T4A	SL4-T4A	SL4-T4A	SL4-T4A	SL4-T4A	SL4-T4A	SL4-T4A
Boeing Manhole No.:	MH229A	MH229A	MH229A	MH229A	MH229A	MH229A	MH229A	MH229A
Lab ID:	MN63G	NI22G	OC25G	OU11G	QS17F	SQ45G	UR61G	WP79D
Sample Type:	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap
Date Deployed:	10/29/2007	3/18/2008	7/30/2008	12/3/2008	4/6/2009	11/12/2010	4/5/2011	4/24/2012
Date Collected:	3/18/2008	7/30/2008	12/3/2008	4/6/2009	4/8/2010	4/5/2011	4/24/2012	5/13/2013
TOTAL METALS (mg/kg-dry)								
(Method 6000-7000 series)								
Arsenic	NA	NA	NA	NA	14	NA	20	20
Copper	NA	NA	NA	NA	248 J	NA	419	356
Lead	NA	NA	NA	NA	376 J	NA	506	313
Mercury	NA	NA	NA	NA	0.23	NA	0.34	0.25
Zinc	NA	NA	NA	NA	551	NA	1,430	1210
NWTPH-Dx (mg/kg)								
Diesel-Range Hydrocarbons	NA	NA	NA	NA	210	NA	250	NA
Motor Oil-Range Hydrocarbons	NA	NA	NA	NA	1,400	NA	1,200	NA
PCBs (µg/kg)								
(PSDDA PCB SW8082)								
Aroclor 1016	10 U	15 U	11 U	10 U	53 U	22 U	46 U	9.6 U
Aroclor 1242	10 U	15 U	11 U	10 U	53 U	22 U	46 U	9.6 U
Aroclor 1248	10 U	15 U	11 U	10 U	270 U	22 U	46 U	19 U
Aroclor 1254	16	28	11 U	10 U	510	67	100	80
Aroclor 1260	26	30	11 U	10 U	170	87	160	76
Aroclor 1221	10 U	15 U	11 U	10 U	53 U	22 U	46 U	9.6 U
Aroclor 1232	10 U	15 U	11 U	10 U	53 U	28 U	46 U	9.6 U
Aroclor 1262	NA	15 U	NA	NA	NA	NA	46 U	9.6 U
Aroclor 1268	NA	15 U	NA	NA	NA	NA	NA	NA
Total PCBs	42 *	58 *	11 * U	10 * U	680	154	260	156
CONVENTIONAL PARAMETERS (%)								
Total Solids (EPA 160.3) (%)	NA	NA	NA	NA	62.10	31.90	21.70	25.28
Total Organic Carbon (Plumb, 1981) (%)	NA	NA	NA	NA	9.17	10.6	17.6	10.8
Reported as Dry Wt					P,S,T,M	P	P,S,T,M	P,S,T,M
Reported as As Received	P,S	P,S	P	P,S				
Not Analyzed Due to Low Sample Volume	T,M	T,M	S,T,M	T,M		S,T,M		

SPU Sample ID:	**SL4-T5**	SL4-T5	SL4-T5	SL4-T5	SL4-T5	SL4-T5	SL4-T5	SL4-T5
Boeing Manhole No.:	MH363	MH363	MH363	MH363	MH363	MH363	MH363	MH363
Lab ID:	HS89C	IK38C	JE01E	KA63C	KK75F/KL08E	KY79B	LV54F	MN63C
Sample Type:	Grab	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap
Date Deployed:		3/7/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007	10/29/2007
Date Collected:	2/16/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007	10/29/2007	3/18/2008
TOTAL METALS (mg/kg-dry)								
(Method 6000-7000 series)								
Arsenic	8	21	20 U	40 U	10	40 U	40 U	10
Copper	45.1	148	297	640	140	251	366	257
Lead	110	109	184	310	102	210	240	186
Mercury	0.7	1.12	2.02	2.9	5.11	1.8	4.4	1.07
Zinc	272	553	717	1,370	428	751	1,120	611
NWTPH-Dx (mg/kg)								
Diesel-Range Hydrocarbons	47	390	1,200	1,200	840	580	460	1,500
Motor Oil-Range Hydrocarbons	190	1,400	4,800	5,900	3,100	3,500	2900	6,900
PCBs (µg/kg)								
(PSDDA PCB SW8082)								
Aroclor 1016	950 U	49 U	7,600 U	55,000 U	66,000 U	11,000 U	650 U	4,600 U
Aroclor 1242	950 U	49 U	7,600 U	55,000 U	66,000 U	11,000 U	650 U	4,600 U
Aroclor 1248	1,900 U	49 U	48,000	660,000 U	130,000 U	90,000	25,000	7,000 U
Aroclor 1254	7,000	24,000	54,000	800,000	200,000	93,000	37,000	16,000
Aroclor 1260	950 U	2,400 U	12,000	130,000 U	66,000 U	23,000 U	650 U	4,600 U
Aroclor 1221	480 U	49 U	7,600 U	55,000 U	66,000 U	11,000 U	650 U	4,600 U
Aroclor 1232	1,400 U	49 U	7,600 U	55,000 U	130,000 U	11,000 U	650 U	4,600 U
Aroclor 1262	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	7,000	24,000	114,000	800,000	200,000	183,000	62,000	16,000
CONVENTIONAL PARAMETERS (%)								
Total Solids (EPA 160.3) (%)	79.90	NA	54.60 J	28.80	62.70	27.10	27.10	45.00
Total Organic Carbon (Plumb, 1981) (%)	0.76	NA	7.59	11.0	4.76	8.76	9.95	11.4
Reported as Dry Wt		P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M
Reported as As Received								
Not Analyzed Due to Low Sample Volume								

TABLE 11
STORM DRAIN MANHOLE SOLIDS AND SEDIMENT TRAP ANALYTICAL DATA
NORTH BOEING FIELD

SPU Sample ID:	SL4-T5	SL4-T5	SL4-T5	SL4-T5	SL4-T5	SL4-T5	SL4-T5	**SL4-T5A**	SL4-T5A	SL4-T5A	SL4-T5A	SL4-T5A	SL4-T5A	SL4-T5A	SL4-T5A	SL4-T5A
Boeing Manhole No.:	MH363	MH363	MH363	MH363	MH363	MH363	MH363	MH178	MH178	MH178	MH178	MH178	MH178	MH178	MH178	MH178
Lab ID:	NI22C	OC25D	OU11C	QS17E	SQ45E	UR61E	WP79F	IK38E	JE01G	KA63F	KK75G/KL08F	KY79A	LV54G	MN63F	NI22F	OC25F
Sample Type:	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap
Date Deployed:	3/18/2008	7/30/2008	12/3/2008	4/6/2009	11/12/2010	4/5/2011	4/24/2012	3/8/2005	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007	10/29/2007	3/18/2008	7/30/2008
Date Collected:	7/30/2008	12/3/2008	4/6/2009	4/8/2010	4/5/2011	04/24/2012	5/13/2013	8/11/2005	3/16/2006	10/11/2006	1/8/2007	5/14/2007	10/29/2007	3/18/2008	7/30/2008	12/3/2008
TOTAL METALS (mg/kg-dry)																
(Method 6000-7000 series)																
Arsenic	20	20	20	15	20	10	20	14	20	20	7 U	20	20	7 U	10	20
Copper	328	556	764	287	560	173	289	113	541	818	103	227	359	76.9	206	316 J
Lead	199	273	275	277	151	149	263	962	233	381	100	194	486	92	172	687 J
Mercury	0.6 J	1.0	0.7	0.34	0.85	0.40	0.88	0.86	0.27	0.4	0.15	0.38	0.4	0.14	0.21	0.58 J
Zinc	933	1,510	1280	705	670	1,040	2000	220	597	945	209	464	781	201	374	691
NWTPH-Dx (mg/kg)																
Diesel-Range Hydrocarbons	220	120 J	3,900	340	470	250	NA	160	1,400	660	340	770	240	86	160	230 J
Motor Oil-Range Hydrocarbons	1,100	710 J	12,000	1,800	1,400	720	NA	570	7,500	4,800	1,600	6,800	2,300	760	900	1,600 J
PCBs (µg/kg)																
(PSDDA PCB SW8082)																
Aroclor 1016	250 U	510 U	1,100 U	94 U	400 U	240 U	93 U	9.6 U	100 U	100 U	70 U	47 U	30 U	19 U	15 U	49 U
Aroclor 1242	250 U	510 U	1,100 U	94 U	400 U	240 U	93 U	9.6 U	100 U	100 U	70 U	47 U	30 U	19 U	15 U	49 U
Aroclor 1248	1,700 U	1,000 U	1,600 U	940 U	1,200 U	850	1900 U	9.6 U	100 U	100 U	70 U	47 U	120 U	19 U	75 U	49 U
Aroclor 1254	4,200 J	3,100	2,100	2,200	3,000	2,000	7100	72	320	430	86	240	490	85	160	190 J
Aroclor 1260	500 U	510 U	1,100 U	350	610	720	940	34	330	170	70 U	150	180	36	48	120 J
Aroclor 1221	250 U	510 U	1,100 U	94 U	400 U	240 U	93 U	9.6 U	100 U	100 U	70 U	47 U	30 U	19 U	15 U	49 U
Aroclor 1232	250 U	510 U	1,100 U	94 U	400 U	240 U	93 U	9.6 U	100 U	100 U	70 U	47 U	30 U	19 U	15 U	49 U
Aroclor 1262	250 U	NA	NA	NA	NA	240 U	93 U	NA	NA	NA	NA	NA	NA	NA	15 U	NA
Aroclor 1268	250 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15 U	NA
Total PCBs	4,200 * J	3,100	2,100	2,550	3,610	3,570	8,040	106	650	600	86	390	670	121	208 *	310
CONVENTIONAL PARAMETERS (%)																
Total Solids (EPA 160.3) (%)	34.20	33.50	26.40	52.90	45.60	39.60	25.8	NA	50.80 J	39.20	69.90	45.40	40.20	74.40	40.70	49.80
Total Organic Carbon (Plumb, 1981) (%)	NA	13.1	14.6	9.84	7.46	4.46	11	NA	7.62	7.68	4.88 J	8.87	11.8	3.56	NA	13.2
Reported as Dry Wt	M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	M	P,S,T,M
Reported as As Received	P,S,T														P,S,T	
Not Analyzed Due to Low Sample Volume																

TABLE 11
STORM DRAIN MANHOLE SOLIDS AND SEDIMENT TRAP ANALYTICAL DATA
NORTH BOEING FIELD

SPU Sample ID:	SL4-T5A	SL4-T5A	SL4-T5A	SL4-T5A	SL4-T5A(2) (b)	SL4-T5A(2) (b)
Boeing Manhole No.:	MH178	MH178	MH178	MH178	KC wet well (b)	KC wet well (b)
Lab ID:	OU11F	QS17G	SQ45F	TV18A	UR61A	WP79G
Sample Type:	Sed. Trap	Sed. Trap	Sed. Trap	Sed. Trap	Grab (b)	Grab (b)
Date Deployed:	12/3/2008	4/6/2009	11/12/2010	4/5/2011	NA (b)	4/24/2012
Date Collected:	4/6/2009	4/8/2010	4/5/2011	11/3/2011	4/24/2012	5/13/2013
TOTAL METALS (mg/kg-dry)						
(Method 6000-7000 series)						
Arsenic	10 U	20	14	20	30 U	50 U
Copper	759	248	144	196	283	247
Lead	257	342	716 J	227 J	270	210
Mercury	0.42	0.31	0.21 J	0.31 J	0.2	0.28
Zinc	1000	1,380	356	555	790 J	730
NWTPH-Dx (mg/kg)						
Diesel-Range Hydrocarbons	1,600	400	190	530	480	NA
Motor Oil-Range Hydrocarbons	5,800	1,600	1,500	2,600	1,900	NA
PCBs (µg/kg)						
(PSDDA PCB SW8082)						
Aroclor 1016	68 U	67 U	20 U	48 U	48 U	49 U
Aroclor 1242	68 U	67 U	20 U	48 U	48 U	49 U
Aroclor 1248	68 U	200 U	58 U	97 U	58 U	49 U
Aroclor 1254	130	270	240	260	260	280
Aroclor 1260	68 U	170	92	110	150	110
Aroclor 1221	68 U	67 U	20 U	48 U	48 U	49 U
Aroclor 1232	68 U	67 U	20 U	48 U	48 U	49 U
Aroclor 1262	NA	NA	NA	NA	48 U	49 U
Aroclor 1268	NA	NA	NA	NA	NA	NA
Total PCBs	130	440	332	370	410	390
CONVENTIONAL PARAMETERS (%)						
Total Solids (EPA 160.3) (%)	41.70	29.50	54.90	35.70	13.7	29.46
Total Organic Carbon (Plumb, 1981) (%)	14.9	12.8	10.7	8.98	16.0	12.8
Reported as Dry Wt	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M	P,S,T,M
Reported as As Received						
Not Analyzed Due to Low Sample Volume						

U = Indicates the compound was not detected at the reported concentration.
UJ = Indicates the compound was not detected; the given limit of quantitation is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
P = Indicates the analyte was detected on both chromatographic columns, but the quantified values differ by $\geq$40% RPD with no obvious chromatographic interference.
NA = Not analyzed.
P=PCBs
S=SVOCs
T=TPH
M=Metals

(a) These samples were cross-contaminated during laboratory analysis. Due to limited sample volume, re-extraction and re-analysis could not be performed. As a result, measured PCB concentrations for these two samples are erroneous and are not shown.
(b) Location SL4-T5A was moved from MH178 to the King County bypass line wet well (installed in October 2011) and renamed SL4-T5A(2). SL4-T5A(2) does not have a bracket and Teflon container like the other sediment trap locations; SL4-T5A(2) is sampled by collecting solids from the bottom of the wet well, which collects solids behind a permanent weir. The line was put into service in October 2011, and solids have been accumulating behind the weir since that time.

Note:
The samples listed in this table were collected in coordination with Seattle Public Utilities (SPU). The 2/16/05 samples are grab samples of solids collected from the base of the manhole or catch basin. With the exception of the 2/16/05 grab samples, these sediment trap samples represent a composite of the sediment collected in the sediment trap bottles between the deployment and collection dates.

TABLE 12
STORM DRAIN SEDIMENT TRAP PCB MASS LOADING RATE
NORTH BOEING FIELD

SPU Sample ID	Boeing Manhole No.	Lab ID	Date Deployed	Date Sampled	Date of Centrigfuging	Mass of Solids after Centrifuging (g)	Rate of Solids Collection (g/day)	Total PCBs (µg/kg)	PCB Mass Loading (µg/day)
SL4-T1	MH422	OC25C	7/30/2008	12/3/2008	12/4/2008	58.34	0.46	19,000 *	8.80 *
SL4-T1	MH422	OU11B	12/3/2008	4/6/2009	4/6/2009	16.85	0.14	680 *	0.092 *
SL4-T1	MH422	QS17A	4/6/2009	4/8/2010	4/9/2010	102.50	0.28	3,950	1.10
SL4-T1	MH422	UR61B	4/5/2011 (a)	4/24/2012	4/24/2012	58.43	0.15	620	0.094
SL4-T1	MH422	WP79A	4/24/2012	5/13/2013	5/15/2013	45.09	0.12	1,030	0.121
SL4-T2	MH356	OC25A	7/30/2008	12/3/2008	12/4/2008	39.34	0.31	10 *	0.003 *
SL4-T2	MH356	OU11A	12/3/2008	4/6/2009	4/6/2009	8.05	0.06	48 *	0.003 *
SL4-T2	MH356	QS17B	4/6/2009	4/8/2010	4/9/2010	65.70	0.18	460	0.082
SL4-T2	MH356	UR61C	4/5/2011 (a)	4/24/2012	4/24/2012	107.66	0.28	750	0.210
SL4-T2	MH356	WP79B	4/24/2012	5/13/2013	5/15/2013	188.89	0.49	440	0.216
SL4-T3	MH364	OC25B	7/30/2008	12/3/2008	12/4/2008	36.91	0.29	26 *	0.008 *
SL4-T3	MH364	OU11D	12/3/2008	4/6/2009	4/6/2009	15.02	0.12	28 *	0.003 *
SL4-T3	MH364	QS17C	4/6/2009	4/8/2010	4/9/2010	92.90	0.25	250	0.063
SL4-T3	MH364	UR61D	4/5/2011 (a)	4/24/2012	4/24/2012	97.64	0.25	700	0.178
SL4-T3	MH364	WP79C	4/24/2012	5/13/2013	5/15/2013	224.83	0.59	320	0.187
SL4-T4	MH221A	OC25E	7/30/2008	12/3/2008	12/4/2008	36.00	0.29	240 *	0.069 *
SL4-T4	MH221A	OU11E	12/3/2008	4/6/2009	4/6/2009	35.14	0.28	340 *	0.096 *
SL4-T4	MH221A	QS17D	4/6/2009	4/8/2010	4/9/2010	128.20	0.35	1070	0.374
SL4-T4	MH221A	UR61F	4/5/2011 (a)	4/24/2012	4/24/2012	86.55	0.22	1380	0.310
SL4-T4	MH221A	WP79E	4/24/2012	5/13/2013	5/15/2013	83.03	0.22	810	0.175
SL4-T4A	MH229A	OC25G	7/30/2008	12/3/2008	12/4/2008	52.42	0.42	11 *U	0.005 *U
SL4-T4A	MH229A	OU11G	12/3/2008	4/6/2009	4/6/2009	32.17	0.26	10 *U	0.003 *U
SL4-T4A	MH229A	QS17F	4/6/2009	4/8/2010	4/9/2010	951.80	2.59	680	1.76
SL4-T4A	MH229A	UR61G	4/5/2011 (a)	4/24/2012	4/24/2012	71.82	0.19	260	0.049
SL4-T4A	MH229A	WP79D	4/24/2012	5/13/2013	5/15/2013	76.50	0.20	156	0.031
SL4-T5	MH363	OC25D	7/30/2008	12/3/2008	12/4/2008	146.87	1.17	3,100	3.61
SL4-T5	MH363	OU11C	12/3/2008	4/6/2009	4/6/2009	151.94	1.23	2,100	2.57
SL4-T5	MH363	QS17E	4/6/2009	4/8/2010	4/9/2010	794.20	2.16	2,550	5.52
SL4-T5	MH363	UR61E	4/5/2011 (a)	4/24/2012	4/24/2012	134.85	0.35	3,570	1.25
SL4-T5	MH363	WP79F	4/24/2012	5/13/2013	5/15/2013	79.59	0.21	8,040	1.67
SL4-T5A	MH178	OC25F	7/30/2008	12/3/2008	12/4/2008	399.40	3.17	310	0.983
SL4-T5A	MH178	OU11F	12/3/2008	4/6/2009	4/6/2009	164.48	1.33	130	0.172
SL4-T5A	MH178	QS17G	4/6/2009	4/8/2010	4/9/2010	117.60	0.32	440	0.141
SL4-T5A(2)	KC wet well	WP79G	4/24/2012	5/13/2013	5/15/2013	(b)	(b)	390	(b)

U = Indicates the compound was not detected at the given limit of quantitation.
* = Indicates PCB concentrations reported "as received," instead of by dry weight.

(a) The sediment trap samples from deployment between 4/9/2010 and 4/5/2011 were not weighed by the laboratory after centrifuging. Therefore, PCB loading could not be calculated for that timeframe.

(b) Location SL4-T5A was moved from MH178 to the King County bypass line wet well (installed in October 2011) and renamed SL4-T5A(2). SL4-T5A(2) does not have a bracket and Teflon container like the other sediment trap locations; SL4-T5A(2) is sampled by collecting solids from the bottom of the wet well. Because of the relatively unrestricted sediment trap volume at this location following the change, a loading calculation is not applicable.

TABLE 13
PCB ANALYTICAL RESULTS
CATCH BASIN FILTERED SOLID SAMPLES
NORTH BOEING FIELD

	CB113	CB147	CB159	CB224	CB225	CB252	CB253	CB254	CB255	CB256	CB257	CB259	CB260	CB364A	CB367A	CB370	CB372	CB372A	CB374
	VZ27L	VZ27A	VZ27B	VZ27M	VZ27N	VZ27D	VZ27E	VZ27F	VZ27G	VZ27H	VZ27I	VZ27C	VZ27Y	VZ27Z	VZ27J	VZ27O	VZ27P	VZ27Q	VZ27V
Filter Installation Date	4/30/2012	4/30/2012	4/30/2012	4/27/2012	4/30/2012	4/24/2012	4/24/2012	4/24/2012	4/24/2012	4/24/2012	4/24/2012	4/24/2012	3/11/2011	3/8/2011	4/27/2012	4/27/2012	4/27/2012	4/27/2012	4/30/2012
Sample Collection Date	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013
PCBs (mg/kg)																			
Method SW8082A																			
Aroclor 1016	0.33 U	1.0 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.33 U	0.93 U	0.98 U	0.95 U	0.76 U	0.33 U	0.64 U	0.21 U	0.75 U	0.74 U	0.33 U	0.33 U
Aroclor 1242	0.33 U	1.0 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.33 U	0.93 U	0.98 U	0.95 U	0.76 U	0.33 U	0.64 U	0.21 U	0.75 U	0.74 U	0.33 U	0.33 U
Aroclor 1248	0.33 U	2.5 U	**2.6**	0.32 U	0.32 U	0.32 U	0.32 U	0.33 U	0.93 U	0.98 U	0.95 U	0.76 U	0.33 U	0.64 U	0.21 U	0.75 U	0.74 U	0.33 U	0.33 U
Aroclor 1254	**1.9**	**19**	**0.94**	**1.6**	**0.69**	**0.68**	**1.2**	**1.6**	**2.0**	**1.5**	**1.9**	**6.6**	**1.9**	**4.8**	**1.1**	**2.2**	**1.5**	**2.8**	**1.0**
Aroclor 1260	**1.3**	**3.6**	**1.2**	**0.87**	**0.49**	**0.46**	**1.3** P	**0.98**	**1.4**	**1.2**	**1.2**	**1.5**	**0.65**	**1.4**	**0.98**	**1.4**	**1.0**	**1.4**	**0.84**
Aroclor 1221	0.33 U	1.0 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.33 U	0.93 U	0.98 U	0.95 U	0.76 U	0.33 U	0.64 U	0.21 U	0.75 U	0.74 U	0.33 U	0.33 U
Aroclor 1232	0.33 U	1.0 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.33 U	0.93 U	0.98 U	0.95 U	0.76 U	0.33 U	0.64 U	0.21 U	0.75 U	0.74 U	0.33 U	0.33 U
Aroclor 1262	0.33 U	1.0 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.33 U	0.93 U	0.98 U	0.95 U	0.76 U	0.33 U	0.64 U	0.21 U	0.75 U	0.74 U	0.33 U	0.33 U
Total PCBs	**3.2**	**22.6**	**4.74**	**2.47**	**1.18**	**1.14**	**2.5**	**2.58**	**3.4**	**2.7**	**3.1**	**8.1**	**2.55**	**6.2**	**2.08**	**3.6**	**2.5**	**4.2**	**1.84**

TABLE 13
PCB ANALYTICAL RESULTS
CATCH BASIN FILTERED SOLID SAMPLES
NORTH BOEING FIELD

	CB416	CB417	CB418	CB419	CB448	CB453	CB458	CB487
	VZ27R	VZ27S	VZ27T	VZ27U	VZ27K	VZ27W	VZ27X	VZ27AA
Filter Installation Date	4/30/2012	4/30/2012	4/30/2012	4/30/2012	4/27/2012	5/1/2012	4/30/2012	3/11/2011
Sample Collection Date	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013	01/10/2013
PCBs (mg/kg)								
Method SW8082A								
Aroclor 1016	0.33 U	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U	0.32 U	0.66 U
Aroclor 1242	0.33 U	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U	0.32 U	0.66 U
Aroclor 1248	0.33 U	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U	0.32 U	0.66 U
Aroclor 1254	**1.4**	**2.0**	**0.89**	**0.77**	**1.5**	**1.8**	**0.43**	**4.2**
Aroclor 1260	**0.54**	**0.6**	**0.39**	0.49 U	**0.58**	**0.66**	**0.43**	**1.2**
Aroclor 1221	0.33 U	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U	0.32 U	0.66 U
Aroclor 1232	0.33 U	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U	0.32 U	0.66 U
Aroclor 1262	0.33 U	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U	0.32 U	0.66 U
Total PCBs	**1.94**	**2.6**	**1.28**	**0.77**	**2.08**	**2.46**	**0.86**	**5.4**

U = Indicates the compound was not detected at the reported concentration.
P = The analyte was detected on both chromatographic columns but the quantified values differ by 40% RPD with no obvious chromatographic interference. The higher of the two values is reported by the laboratory.
Bold = Detected compound.

APPENDIX A

Year 2 Monitoring (November 1, 2012 through October 31, 2013) and FWAAC Results and Recommendations for NBF LTST System

Year 2 Monitoring (November 1, 2012 through October 31, 2013) and Flow-Weighted Average Annual Concentration (FWAAC) Results and Recommendations for North Boeing Field (NBF) Long-Term Stormwater Treatment (LTST) System

March 7, 2014

Prepared for

The Boeing Company, Seattle, Washington
Landau Associates, Edmonds, Washington

Prepared Jointly by

NBF Stormwater Expert Panel
Geosyntec Consultants

Memorandum

Date: 7 March 2014

To: Karen Keeley, USEPA

Copies to: Carl Bach, The Boeing Company; and Joe Kalmar, Landau Associates

From: Jon Jones, Michael Stenstrom, and Robert Pitt, NBF Stormwater Expert Panel; jointly with Geosyntec Consultants

Subject: Year 2 Monitoring (November 1, 2012 through October 31, 2013) and Flow-Weighted Average Annual Concentration (FWAAC) Results and Recommendations for North Boeing Field (NBF) Long-Term Stormwater Treatment (LTST) System

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INTRODUCTION

To protect against sediment recontamination due to PCBs in Slip 4, a Long-Term Stormwater Treatment (LTST) system was installed at the North Boeing Field (NBF) site. The NBF Stormwater Expert Panel (Panel)[1], along with Geosyntec Consultants[2], established a loading-based yearly average Interim Goal (IG) for the LTST system of 0.018 μg/L total PCBs for stormwater discharging to Slip 4 (NBF Stormwater Expert Panel and Geosyntec, 2011).

After it was determined that the previous IG of 100 μg total PCBs per kg solids (100 ppb) (SAIC, 2010) was not capable of accounting for changes in the NBF storm drain mass solids loading to Slip 4, a static mass balance analysis approach was proposed. This revised mass balance approach uses water quality and flow data from a number of monitoring points in the NBF storm drain system to yield a Flow-Weighted Average Annual Concentration (FWAAC) of PCBs in the water discharging to Slip 4. The FWAAC calculation methodology is described in

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[1] Jonathan Jones, P.E., D.WRE; Michael Stenstrom, Ph.D., P.E., and Robert Pitt, Ph.D., P.E.

[2] Rita Kampalath, Ph.D., and Brandon Steets, P.E.

detail in the “Amended Monitoring Approach Recommendations for North Boeing Field Long-Term Stormwater Treatment System” memo (Geosyntec, 2012). This mass balance approach was approved by EPA in January 2012.

A monitoring approach was proposed to collect data for the FWAAC and was ultimately incorporated into the NBF LTST Sampling and Analysis Plan (SAP) (Landau Associates, 2011) and the Revised Final SAP (Landau Associates, 2012a). Water quality sampling and flow measurement locations were proposed at the Lift Station Inlet Vault (LSIV), the Chitosan-Enhanced Sand Filtration (CESF) system effluent, the North Lateral re-route influent to the Lift Station, and at the Lift Station (LS431) Point of Compliance (POC), as shown in Figure 1. This monitoring plan was approved by EPA on April 10, 2012.

As described in the SAP, the objectives of the field sampling were to gather data to:

1. Assess the LTST system for compliance with the proposed FWAAC IG;
2. Confirm that the data used and the assumptions made to arrive at the proposed FWAAC IG are reasonably conservative and descriptive of site conditions;
3. Confirm that treating non-detect (ND) results as zero (0) concentration values is appropriate; and
4. Accurately characterize the off-site flow from the King County North Lateral Re-route in order to evaluate this load contribution to the Lift Station and LTST system.

Year 1 monitoring (November 2011 through October 2012) was completed, and the Year 1 data, FWAAC, assumptions, and recommendations were summarized in Appendix A of the “Annual Performance Evaluation Report for Long-Term Stormwater Treatment (2011 – 2012) for North Boeing Field” (Landau Associates, 2013b). This document was approved by EPA on March 28, 2013 and the reported data and analyses confirmed the previously defined mass balance approach.

The fourth objective listed above was met during Year 1, as the overall PCBs load to the LTST from the King County North Lateral was not considered to be a large contributor to the total PCBs load. The maximum concentration of PCBs within the King County North Lateral was 0.015 μg/L and PCBs were non-detected (limit of quantitation (LOQ) = 0.010 μg/L) for five out of seven monthly events and two out of four storm events. Due to the detected values being below the FWAAC IG and the overall success of the LTST system in meeting the IG, the Year 1 results indicated that diverting re-routed King County North lateral stormwater around the LTST system is not necessary at this time (Landau Associates, 2013b). As a result, sampling at the King County North Lateral was not conducted during Year 2.

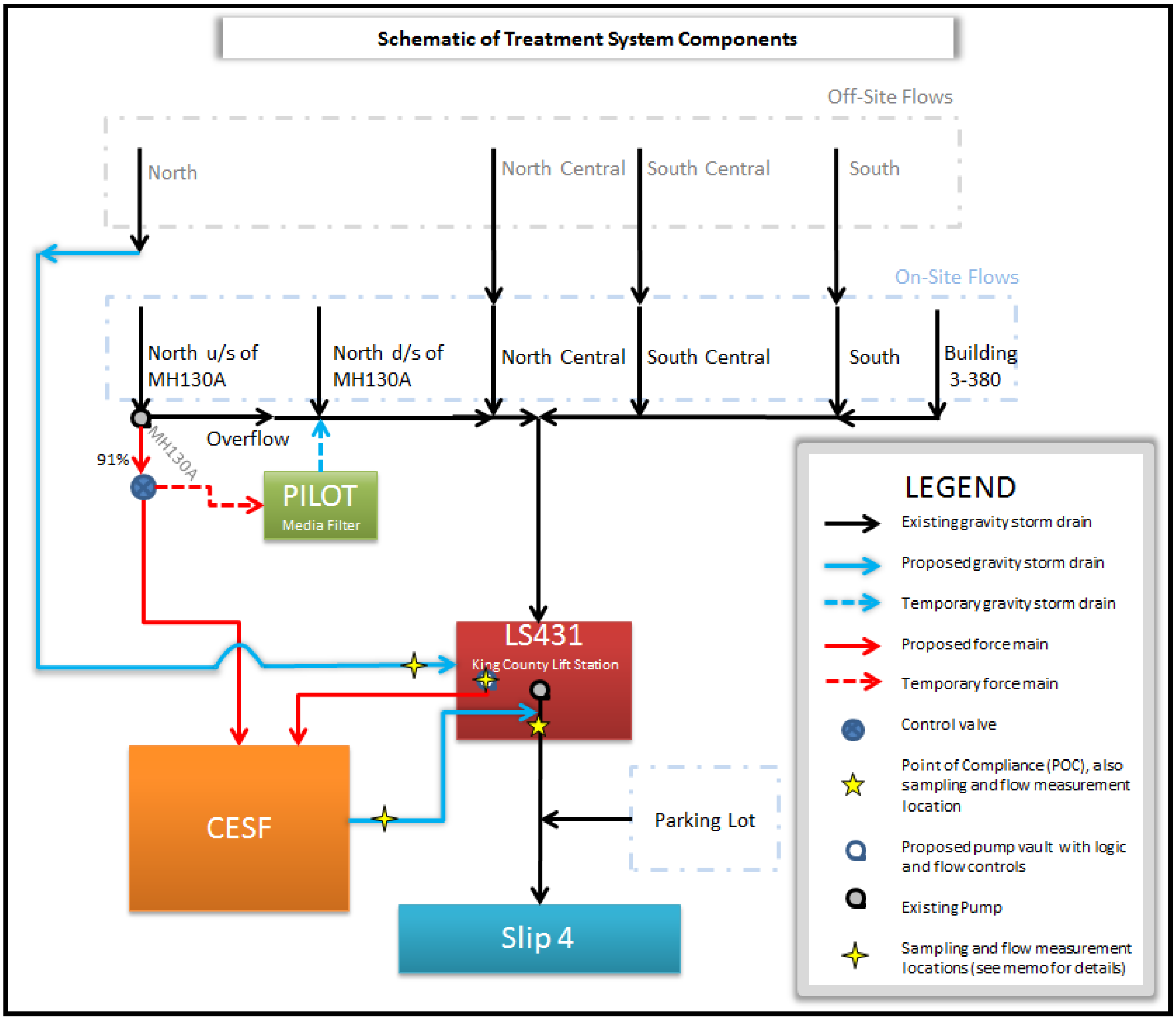

Figure 1. Schematic of flows to Slip 4 taken from Removal Action Work Plan (RAWP) Addendum (Geosyntec, 2011)

PURPOSE AND ORGANIZATION

The purpose of this memo is to address the three objectives described above (the fourth objective has been addressed earlier and will not be discussed in this report) using the second year of data collected (November 2012 to October 2013) at NBF. This memo also describes all assumptions made in order to perform the associated analyses.

The following is an outline of the sections within this memo:

- **Year 2 Data and FWAAC Calculations:** The raw data and calculations/methodology performed as well as the results are presented.
- **Most Sensitive Assumptions:** The assumptions included in this analysis are presented.
- **Discussion and Recommendations:** The results are compared to the monitoring objectives and recommendations are presented if needed for future monitoring.
- **Conclusion:** A summary of the results, discussion, and future actions is presented.

YEAR 2 DATA AND FWAAC CALCULATIONS

Using flow data at the LS431 discharge and whole water quality sampling[3] results, the FWAAC for total PCBs in water being discharged to Slip 4 was calculated to be between 0.009 μg/L (assuming ND results are zero) and 0.013 μg/L [assuming ND results are equal to the Limit of Detection (LOD)[4]]. The EPA-approved methodology for calculating the FWAAC specifies that all NDs are assumed to be equal to zero for reporting purposes, and the resulting value of 0.009 μg/L is below the 0.018 μg/L Interim Goal. It should be noted, however, that when the FWAAC is calculated setting ND results equal to the LOD, the result is still below the IG. Filtered solids and total suspended solids (TSS) data were not used to estimate PCB water concentrations below LODs for ND samples, because of the potential error in this method. Using filtered solids data along with TSS data to determine the concentration of PCBs in water is dependent on the effectiveness of solids capture by the lab (for TSS) and by the field sampler (for the filtered solids samples), and may be more uncertain than a direct measurement. Because of this

[3] Whole water quality samples refers to either grab or composite water samples, including all particulate or dissolved fractions contained therein.

[4] The LOD for PCBs in water was assumed to be 0.005 μg/L, which is half of the target limit of quantification (LOQ) (Analytical Resources, 2011). The laboratory has reported PCBs in whole water down to the LOD since December 2012.

uncertainty, the calculated PCB concentrations in water using filtered solids data and TSS were not used in the calculation for compliance with the IG, but were used to verify the assumption that ND results can be treated as zero (to assess objective #3). If the ND results are replaced with concentrations calculated from filtered solids and TSS data in the FWAAC calculation, the result is a FWAAC value of 0.013 µg/L. Therefore, the ND assumption does not affect the outcome of FWAAC compliance. These calculations are described in more detail below.

Table 1 compares the predicted, observed, and calculated estimates of stormwater capture by the LTST system as a percent of total runoff volume from the drainage area.

Table 1: Predicted, Observed, and Calculated Values

	Long-Term Predicted[1]	Year 2 Observed[2]	Year 2 Calculated[3]
Precipitation (inches)	36	37	N/A
Total Discharge to Slip 4 (million gallons)[4]	350	280	N/A
Total Treated Stormwater (million gallons)[5]	N/A	180	200
% Stormwater Treated	59%	64%	70%

Notes:
1. Based on long-term continuous simulation of flow conditions using EPA's Stormwater Management Model (SWMM) (Geosyntec, 2011).
2. Year 2 observed values are taken from the Landau Associates September 2013 quarterly progress report and October 2013 data provided separately by Landau Associates, which includes treated flow monitoring data recorded by the CESF system from November 2012 to October 2013 (Landau Associates, 2013a).
3. Year 2 calculated values are the result of calculations performed by Geosyntec using LS431 flow meter data provided by Landau Associates between November 2012 and October 2013.
4. Total Discharge to Slip 4 includes stormwater (liquids and dissolved particles) in the form of baseflow, storm event runoff, snow melt runoff and drainage, as well as all solids that enter the storm drainage system.
5. The discrepancy between Year 2 observed 'total treated stormwater' and Year 2 calculated 'total treated stormwater' shown in Table 1 is due to the use of two different sources of flow data (Clear Water data and calculated data).

To calculate the FWAAC using whole water samples, recorded flow (summarized in Tables 2 and 3) and water quality data (summarized in Tables 4 through 7) from the Landau Associates quarterly progress reports (Landau Associates, 2013a) were collected and synthesized to develop the total flow volumes and average total PCB concentrations for Year 2. The observed total treated results come from the Landau Associates progress reports, which rely on field measurements from their subcontractor, Clear Water (CW), at the effluent of the CESF (reported in 15-minute increments). The calculated total treated results rely on evaluating the portion of the Flo Dar data, provided by Landau Associates for total flow at the LS431 POC, that is below

1500 gpm (the capacity of the CESF). The CW data are not provided in a format consistent with the FWAAC methodology; however, an approximate calculation using these data was performed for consistency. The observed and calculated results are being compared to test the assumption that all flow below 1500 gpm is treated and because of the difficulty in calibrating the flow measurement equipment. The results using both data sources are shown in Table 8 and explained further below. Additionally, the spreadsheet that contains all these raw data along with the FWAAC calculation is attached to this submittal as a separate document.

Table 2: Year 2 Observed and Calculated Monthly Flow Volumes using Only Flo Dar Data (Observed data shown in italics; see following text for flow designation explanations)[5]

Date	Total Flow from Flo Dar (million gallons)	Treated Flow (million gallons)	Untreated Flow (million gallons)	Baseflow (million gallons)	Storm Sampled Flow (million gallons)	Storm Sampled Total PCB Load (µg)[6]	Storm Treated flow (million gallons)	Storm untreated flow (million gallons)
Nov-12	*46*	24	23	18	1.3	0.0 – 24,000	4.7	22
Dec-12	*56*	27	29	22	6.8	0.0 – 130,000	4.2	23
Jan-13	*31*	25	5.9	24	6.6	0.0 – 130,000	0.20	0.28
Feb-13	*17*	15	1.6	15	0.0	0.0	0.44	1.6
Mar-13	*23*	19	3.4	18	4.2	0.0 – 80,000	0.21	0.002
Apr-13	*26*	21	5.2	20	0.61	0.0 – 11,000	0.72	4.7
May-13	*12*	12	0.76	12	0.0	0 .0	0.12	0.76
Jun-13	*10*	10	0.34	9.5	0.0	0.0	0.054	0.34
Jul-13	*7.5*	7.5	0.0	7.5	0.0	0.0	0.0	0.0
Aug-13	*8.8*	7.9	0.88	7.7	0.0	0.0	0.18	0.88
Sep-13	*26*	15	11	13	4.5	260,000	1.3	7.2
Oct-13	*13*	12	1.4	11	0.89	50,000	0.33	0.63
Total	*280*	200	82	180	25	310,000 – 680,000	12	61

[5] Providing all data used in the FWAAC calculation is not possible within this memorandum because the full calculation requires analyzing the data for sampled loads during individual time steps. Therefore, this table represents a summary of the monthly totals that resulted from the full calculation.

[6] If the whole water Total PCB sample result was ND, a range is presented that represents treating the ND result as zero (lower bound) and treating the ND result as the LOD (upper bound).

Table 3: Year 2 Observed and Calculated Monthly Flow Volumes using Flo Dar Data and CW Data for Treated Flow (CW replacement shown shaded blue and observed data shown in italics; see following text for flow designation explanations) [7]

Date	Total Flow from Flo Dar (million gallons)	Treated Flow (million gallons)	Untreated Flow (million gallons)	Baseflow (million gallons)[9]	Storm Sampled Flow (million gallons)	Storm Sampled Total PCB Load (µg)	Storm Treated flow (million gallons) [8]	Storm untreated flow (million gallons)
Nov-12	*46*	20	26	20	1.3	0.0 – 24,000	0.0	25
Dec-12	*56*	24	32	24	6.8	0.0 – 130,000	0.0	25
Jan-13	*31*	21	9.6	21	6.6	0.0 – 130,000	0.0	3.0
Feb-13	*17*	14	3.3	14	0.0	0.0	0.00	3.3
Mar-13	*23*	17	5.5	17	4.2	0.0 – 80,000	0.00	1.4
Apr-13	*26*	20	6.3	20	0.61	0.0 – 11,000	0.00	5.7
May-13	*12*	11	1.16	11	0.0	0 .0	0.00	1.2
Jun-13	*10*	9.4	0.47	9.4	0.0	0.0	0.00	0.47
Jul-13	7.3	7.3	0.0	7.3	0.0	0.0	0.0	0.0
Aug-13	*8.8*	7.6	1.20	7.6	0.0	0.0	0.00	1.2
Sep-13	*26*	15	11	15	4.5	260,000	0.0	6.6
Oct-13	*13*	11	2.5	11	0.89	50,000	0.00	1.6
Total	*280*	180	99	180	25	310,000 – 680,000	0	75

[7] Providing all data used in the FWAAC calculation is not possible within this memorandum because the full calculation requires analyzing the data for sampled loads during individual time steps. Therefore, this table represents a summary of the monthly totals that resulted from the full calculation.

[8] The CW volume data do not discern between baseflow and storm treated flow, which is required to perform the FWAAC calculations according to the established methodology. The average concentration of PCBs in baseflow and storm treated flow is equal and therefore distinguishing between these two flow designations will not affect the final result. The CW "treated flow" is assumed to be entirely baseflow for calculation purposes.

Table 4. Year 2 Whole Water Sampling Results at the LS431 (Results shown in italics represent routine sampling that occurred during a wet-weather event with bypass of the LTST system; these results were categorized as "storm samples" for calculation purposes.)

	11/8/2012	11/12/2012	12/6/2012	12/17/2012	1/10/2013	2/7/2013	3/7/2013	3/20/2013	4/4/2013	4/6/2013	5/8/2013	6/6/2013	7/9/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013	Average
Total PCBs (µg/L) (routine sample)	<0.005					<0.005			<0.005		<0.005	<0.005	<0.005	<0.005		<0.005		< 0.005
Total PCBs (µg/L) (storm sample)		<0.005	**<0.005**	<0.005	**<0.005**		**<0.005**	<0.005		<0.005					0.015		*0.015*	< 0.0072

Table 5. Year 2 Whole Water Sampling Results from MH130A

	11/8/2012	11/12/2012	12/6/2012	12/16/2012	1/8/2013	2/7/2013	3/7/2013	3/19/2013	4/4/2013	4/5/2013	5/9/2013	6/7/2013	7/10/2013	8/8/2013	9/6/2013	9/12/2013	10/9/2013	Average
Total PCBs (µg/L) (routine sample)	0.079		0.090		0.052	0.054	0.034		0.11		0.13	0.14	0.089	0.31		0.12	0.29	**0.12**
Total PCBs (µg/L) (storm sample)		0.030		0.041				0.30		0.044					0.043			**0.092**

Table 6. Year 2 Whole Water Sampling Results at the LSIV (Results shown in italics represent routine sampling that occurred during a wet-weather event with bypass of the LTST system; these results were categorized as "storm samples" for calculation purposes.)

	11/11/2012	**12/6/2012**	**12/17/2012**	**2/7/2013**	**3/7/2013**	**3/20/2013**	**4/4/2013**	**4/6/2013**	**5/9/2013**	**6/7/2013**	**7/10/2013**	**8/8/2013**	**9/6/2013**	**9/12/2013**	**10/8/2013**	**Average**
Total PCBs (µg/L) (routine sample)		0.010		<0.005			<0.005		<0.005	<0.005	<0.005	<0.005		<0.005		**<0.006**
Total PCBs (µg/L) (storm sample)	0.014		<0.005		*0.015*	0.014		0.014					0.030		*0.18*	**<0.039**

Table 7. Year 2 Whole Water Sampling Results from the CESF Effluent

	11/8/2012	**11/12/2012**	**12/6/2012**	**12/16/2012**	**1/8/2013**	**2/7/2013**	**3/7/2013**	**3/19/2013**	**4/4/2013**	**4/5/2013**	**5/9/2013**	**6/7/2013**	**7/10/2013**	**8/8/2013**	**9/6/2013**	**9/12/2013**	**10/9/2013**	**Average**
Total PCBs (µg/L) (routine sample)	<0.005		<0.005		<0.005	<0.005	<0.005		<0.005		<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	**<0.005**
Total PCBs (µg/L) (storm sample)		<0.005		<0.005				<0.005		<0.005					<0.005			**<0.005**

Table 8: Year 2 PCB Loading Calculation Parameters using Whole Water Samples (ND results assumed equal to the LOD)

	Average Total PCB Concentrations [Range] (µg/L)	Flow Volume (million Liters) [Flo Dar data]	Flow Volume (million Liters) [CW data][9]	Total PCB Load (g) [Flo Dar data]	Total PCB Load (g) [CW data]
Baseflow	<0.005 [<0.005]	677	673	<3.4	<3.4
Storm Sampled	-	94	94	<0.68	<0.68
Storm Treated	<0.005 [<0.005]	47	-	<0.24	-
Storm Untreated	<0.039 [<0.005 - 0.18]	232	282	<9.1	<11
Total	-	1,050	1,050	<13	<15

To better illustrate the flow allocation as shown in Table 8, Figure 2 represents the annual distribution of flows to Slip 4 using only Flo Dar data. Figure 2 shows "treated flow" as the summation of baseflow and "storm treated" flow, untreated flow, and storm sampled flow as a combination of treated and untreated wet-weather flow during a sampling event (due to the methodology assumptions, this flow could not be distributed between treated and untreated flow). In addition, Figure 3 displays a sample of recorded flow at the LS431 POC with the appropriate flow designations shaded. The legend also explains how the concentrations were used with each flow designation and the following discussion explains this relationship in greater detail.

[9] The CW volume data do not discern between baseflow and storm treated flow, which is required to perform the FWAAC calculations according to the established methodology. The average concentration of PCBs in baseflow and storm treated flow is equal and therefore distinguishing between these two flow designations will not affect the final result. The CW "treated flow" is assumed to be entirely baseflow for calculation purposes.

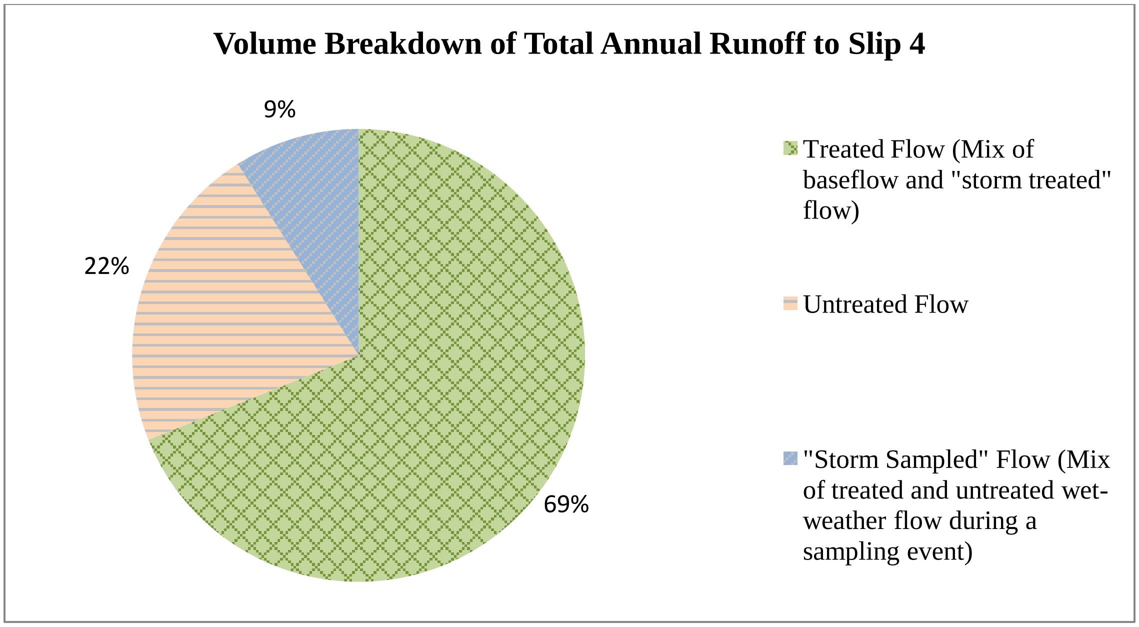

Figure 2. Annual Flow Volume Comparison (see following text for flow designation explanations)

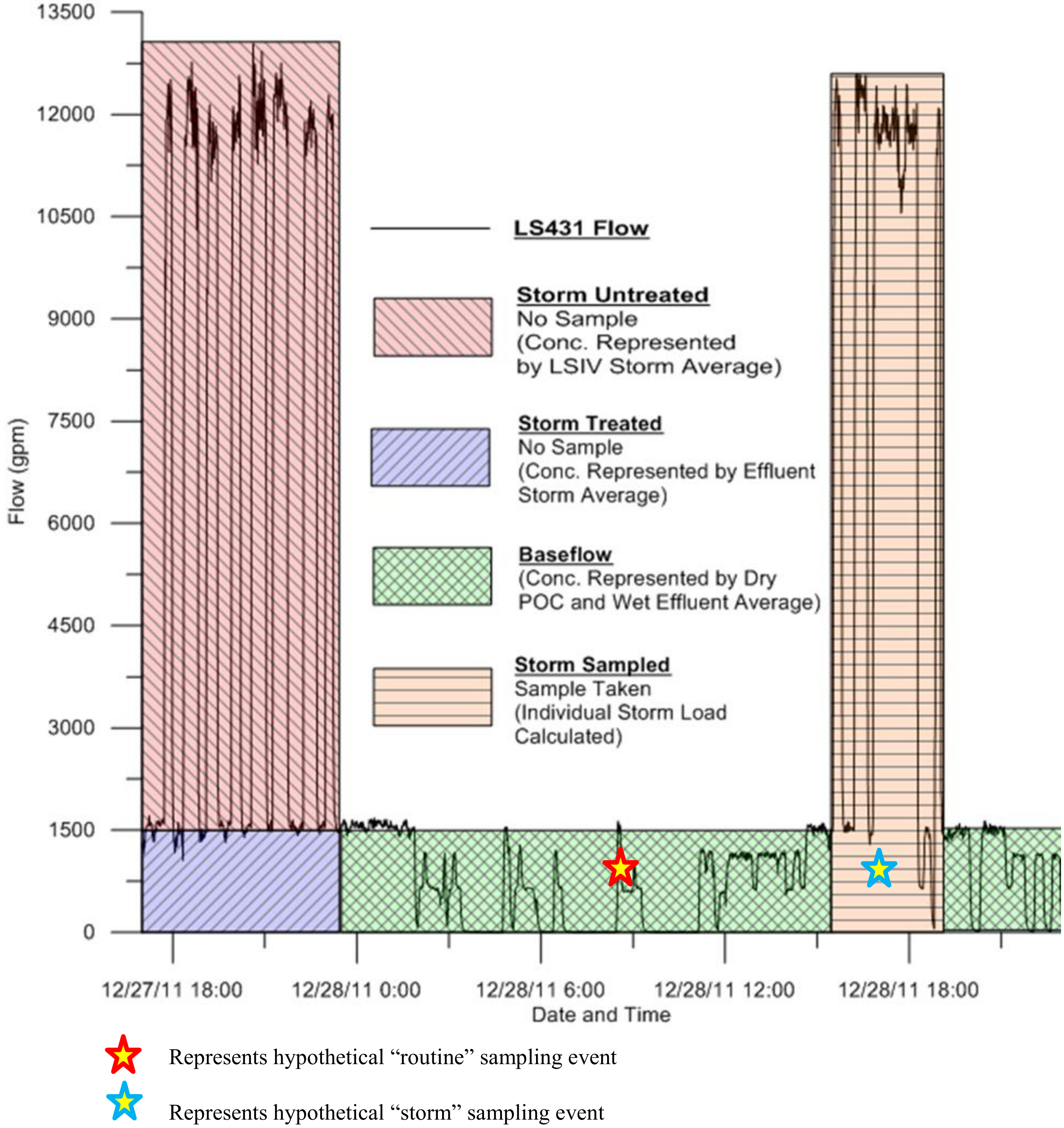

Figure 3. Observed Flow at the LS431 POC with Flow Designations for the representative time period only (for the purpose of assigning observed PCB concentrations to calculated volume bins in order to calculate the FWAAC)

- **Baseflow**. This represents the PCB load to Slip 4 associated with the volume completely treated by the LTST during dry weather events. The baseflow average total PCB concentration was calculated by averaging the water quality sampling results from the POC during dry weather without any bypass, or, during routine sampling events, from the CESF effluent. Due to the absence of effluent flow measurements with comparable time steps, the baseflow volumes were calculated by summing the recorded flow data that were less than or equal to 1500 gpm (the capacity of the CESF system).

- **"Storm Sampled**." This represents the PCB load to Slip 4 for storms that were sampled. The storm sampled average total PCB concentration was not used, because each storm sampled was treated as a separate event. The storm sampled flow volumes were calculated by summing the total value of all recorded flow data that exceeded 1500 gpm and coincided with a water quality sampling event. During such an event, the entire volume (above and below 1500 gpm) was used in the summation. The storm sampled load was calculated based on the sampled PCB concentration and coinciding storm volume for each event and then summed for the entire year.

- **"Storm Treated**." This represents the PCB load to Slip 4 for the treated flow (less than 1500 gpm) during an unsampled storm event. The storm treated average total PCB concentration was calculated by averaging the water quality sampling results at the CESF effluent during wet weather events. The storm treated flow volumes were calculated by summing 1500 gpm (the capacity of the CESF system) of each recorded flow during a wet weather event in which a water quality sample was not taken (i.e., 1500 gpm from each flow measurement during an un-sampled storm was summed throughout Year 2).

- **"Storm Untreated**." This represents the PCB load to Slip 4 for the untreated flow (greater than 1500 gpm) during an unsampled storm event. The storm untreated average total PCB concentration was calculated by averaging the water quality sampling results at the LSIV during wet weather. The storm untreated flow volumes were calculated by summing the flow in excess of 1500 gpm of each recorded flow during a wet weather event in which a water quality sample was not taken (i.e., the portion of flow that exceeded 1500 gpm from each flow measurement during an unsampled storm was summed throughout Year 2).

The Year 2 loads were calculated by multiplying the Year 2 average total PCB concentrations by the Year 2 flow volumes (including appropriate unit conversion) for baseflow, storm treated, and storm untreated loads separately. The storm sampled load was calculated as the sum of the individual loads from each recorded event throughout Year 2 (determined by multiplying the individual event flow volume by the concentration). The total Year 2 PCB load from the site shown in Table 8 was calculated to be <13 grams using Flo Dar data and <15 grams using CW data.

To further confirm the reported FWAAC value given the uncertainty due to samples with ND results, another ND substitution approach was applied to these samples of total PCB concentrations in water. The PCB concentrations for these samples were estimated using PCB concentrations on filtered solids samples (i.e., ug of total PCBs per g of filtered solids) and TSS concentrations in water (i.e., mg of TSS per L water), the product of which are estimated PCB concentrations in water (i.e., ug of total PCBs per L of water). The concentrations calculated using total PCB filtered solids data and the resulting loads using these concentrations are shown in Table 9.

Table 9: Estimated PCB Loads by Water Volume Type using Filtered Solids and TSS Data. The same results calculated assuming whole water ND results are equal to zero and equal to the LOD are provided for comparison.

	Year 2 Average Total PCB Concentrations (µg/L) (filtered solids and TSS data)	Year 2 Total PCB Load (g) (filtered solids and TSS data)	Total Whole Water PCB Load (g) [Flo Dar data] (ND = 0)	Total Whole Water PCB Load (g) [Flo Dar data] (ND = LOD)
Baseflow	0.00084	0.57	0	<3.4
Storm Sampled	-	0.59	0.31	<0.68
Storm Treated	0.0022	0.13	0	<0.24
Storm Untreated	0.041	12	8.9	<9.1
Total	-	13	9.2	<13

The loads in Table 9 were calculated using the same methodology previously described (multiplying average concentration by total flow volume, except for the storm sampled load that relies on the summation of individual event loads). The volumes used to calculate the loads using PCB filtered solids are the same as those used in the whole water calculation (Table 8). The total Year 2 PCB load from the site shown in Table 9 was calculated, using filtered solids and TSS data, to be 13 grams (this PCB load using filtered solids and TSS data is within 41% of the PCB load estimated assuming ND = 0).

For both scenarios (using whole water samples and filtered solids), the FWAAC was calculated by dividing the sum of all Year 2 loads by the sum of all Year 2 flow volumes. These results are presented in Table 10.

Table 10: Year 2 FWAAC Results

	Interim Goal	**Discharge to Slip 4 (Assuming ND = 0) [Flo Dar data]**	**Discharge to Slip 4 (Assuming ND = LOD) [Flo Dar data]**	**Discharge to Slip 4 (Using Filtered Solids and TSS Data to Estimate Whole Water PCB Concentrations in ND Samples)**
FWAAC (total PCBs)	0.018 µg/L	0.009 µg/L	0.013 µg/L	0.013 µg/L

MOST SENSITIVE ASSUMPTIONS

The following represent the most sensitive assumptions (i.e., in terms of potentially impacting the calculated FWAAC result) used in the calculations to obtain the 'Year 2 Calculated' results in Table 1:

- The flow was assumed to be treated if under 1500 gpm and during large events, the flow under 1500 gpm was assumed to be treated and the excess over 1500 gpm was assumed to be untreated, resulting in a blend of fully treated low flow volumes and untreated excess flows during large storms;
- Testing the ND assumption required filtered solids data for each sampled site. Because LS431 filtered solids data were not available, the storm sampled load for this site was calculated as follows:

  $Storm\ Sampled\ Load =$
  $(Baseflow\ x\ Effluent\ PCB\ Conc.) + (Overflow\ x\ LSIV\ PCB\ Conc.)$; and

- Since Effluent PCB samples and LSIV PCB samples were sometimes taken one day apart, the date of the LSIV sample was assumed for both to perform the calculation for the storm sampled load.

DISCUSSION AND RECOMMENDATIONS

Year 2 monitoring results are discussed by program objective, as described in this memo's introduction.

Objective #1: Assess the LTST system for compliance with the proposed FWAAC IG

The calculated FWAAC (using the EPA-approved calculation methodology) at the POC over the reporting period (November 2012 to October 2013) for comparison with the FWAAC IG is 0.009 µg/L Total PCBs (assuming that ND results are equal to zero). For additional comparison, the FWAAC was calculated to be 0.013 µg/L Total PCBs assuming that ND results are equal to the LOD. This result is also below the IG of 0.018 µg/L total PCBs. Based on the estimated PCB load to the LTST, between 53% and 64% has been captured and is prevented from being discharged to Slip 4.

Objective #2: Confirm that the data used and the assumptions made to arrive at the proposed FWAAC IG were reasonably conservative and descriptive of site conditions

- **Observed vs. predicted discharge volume.** In Table 1, the 2013 total annual observed discharge volume to Slip 4 (277 million gallons) was less than the long-term average predicted value (352 million gallons), despite observed precipitation of 38.14 inches, which was 6 percent more than the long-term average predicted value (36 inches). Therefore, the annual discharge volume assumption that was used to set the FWAAC IG was conservative. The total discharged flow will continue to be monitored and due to the year 1 and 2 results, the Storm Water Management model (SWMM) will not be recalibrated at this time. The benefit of recalibrating the model will be reevaluated after an additional year of monitoring.

- **Observed vs. predicted treatment rate.** Table 1 also shows that the observed and calculated 2013 percent stormwater treated (64% and 70%, respectively) are higher than the long-term average predicted value (59%). Therefore, the percent treated assumption used to set the FWAAC IG was conservative.

- **Flow data corrections.** Landau Associates performed calibrations of the flow monitoring equipment (Flo-Dar flow sensor) at the discharge location to Slip 4. However, due to the wide variation in flow rates, the final calibration was performed based on lower flows and a correction factor was incorporated for higher flows. This difficulty in calibration is one of the reasons multiple estimates of flow from different sources were reported (e.g., predicted, observed, and calculated total treated stormwater flows and the total discharge to Slip 4). Landau Associates plans to recalibrate the Flo-Dar meter at the POC under high flow conditions when and if adequate precipitation occurs. Assuming re-calibration occurs, the data will be compared after an additional year of monitoring to determine the need for any additional adjustments to the Flo-Dar meter.

- **Additional Assumptions.** While the results suggest that the LTST treatment capacity assumptions made to arrive at the proposed FWAAC IG were reasonably conservative and descriptive of site conditions, additional assumptions, such as the assumption that bedload solids constitute a very small percentage of the total transported solids mass in the storm drain system, cannot be verified at this time. Expected bedload at the POC is expected to be small for several reasons, including the very flat stormdrain network profile (i.e., velocities are low, minimizing shear stresses that would foster bedload transport, with some sections of pipe possibly even being net depositional due to backwater), most or all of the upstream bedload being captured in the LSIV, and discharge samples at the POC being very well mixed because of the upstream pumps (from the LSIV and LTST).

Objective #3: Confirm that treating ND values as zero is appropriate

The calculated FWAAC using filtered solids data in conjunction with TSS data to estimate whole water samples that had ND results (FWAAC = 0.013 μg/L total PCBs) is higher than the FWAAC calculated assuming ND results are zero (0.009 μg/L total PCBs). However, the difference between these two estimates is small compared to the established IG (0.018 μg/L total PCBs), and therefore this assumption is assumed to be adequate. In addition, the FWAAC calculated assuming ND results are equal to the LOD (0.013 μg/L) is still below the IG. These findings indicate that the range of possible FWAAC results is still below the FWAAC IG, even when assuming that ND results are close to the LOD (0.005 μg/L). This is consistent with the Year 1 finding. This assumption will be reevaluated again next year.

CONCLUSION

The monitoring carried out in Year 2 (November 2012 to October 2013) at NBF was successful in obtaining data to evaluate the three monitoring program objectives:

1. The LTST system was in compliance with the FWAAC IG of 0.018 μg/L total PCBs.
2. Verifiable assumptions were confirmed to be reasonably conservative by evaluating the available predicted, observed, and calculated data.

3. Sensitivity analyses also confirmed that using zero as a surrogate for ND results does not result in a calculated FWAAC that is significantly different, in comparison to the IG, than if calculating the FWAAC assuming ND results are equal to the LOD or by replacing ND results with PCB concentrations calculated from PCB filtered solids and TSS data.

Further sensitivity analyses concluded that recalibration of the SWMM model is not recommended at this time, however future recalibration of the flow monitoring equipment is anticipated and results from this calibration will be analyzed after an additional year of monitoring.

These conclusions are consistent with those from Year 1. **Therefore, 2 years of data further solidify these findings that the LTST is meeting the FWAAC IG and the discharge quantity and quality characterizations assumed in developing the FWAAC IG are appropriate in representing Site conditions.**

These monitoring objectives will be reevaluated during the following year.

REFERENCES

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* * * * *

APPENDIX B

LTST 2014 Sampling and Analysis Plan Addendum

Sampling and Analysis Plan Addendum
2014 Long-Term Stormwater Treatment
North Boeing Field
Seattle, Washington

March 7, 2014

Prepared for

The Boeing Company
Seattle, Washington

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TITLE AND APPROVAL SHEET

SAMPLING AND ANALYSIS PLAN ADDENDUM
2014 LONG-TERM STORMWATER TREATMENT

NORTH BOEING FIELD, SEATTLE, WASHINGTON

Quality Assurance Project Plan Approvals

EPA Project Manager:	Karen Keeley		Date:
EPA QA Manager:	Ginna Grepo-Grove		Date:
Boeing Project Manager:	Carl Bach	Carl Bach	Date: 3/7/2014
Landau Associates Project Manager:	Joe Kalmar	Joe Kalmar	Date: 3/7/2014
Landau Associates Task Manager:	Martin Valeri	Martin Valeri	Date: 3/7/14
Landau Associates Project QA Coordinator:	Anne Halvorsen	Anne Halvorsen	Date: 3-7-14
Analytical Resources, Inc. Project Manager:	Kelly Bottem	Kelly Bottem	Date: 3/7/14
Analytical Resources, Inc. QA Manager:	Dave Mitchell	David R Mitchell	Date: 3/7/14

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ATTACHMENTS

LIST OF ABBREVIATIONS AND ACRONYMS

µg/L	Micrograms per Liter
ARI	Analytical Resources, Inc.
Boeing	The Boeing Company
CESF	Chitosan-Enhanced Sand Filtration
EAA	Early Action Area
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
FWAAC	Flow-Weighted Average Annual Concentration
GTSP	Georgetown Steam Plant
KCBYP	Re-routed North Lateral Storm Drain Pipe from King County
LDW	Lower Duwamish Waterway
LOD	Limit of Detection
LOQ	Limit of Quantitation
LSIV	Lift Station Inlet Vault
LTST	Long-Term Stormwater Treatment
MBPS	Media Bed Pilot Study
NBF	North Boeing Field
NPDES	National Pollutant Discharge Elimination System
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
POC	Point of Compliance
PSD	Particle Size Distribution
PSEP	Puget Sound Estuary Protocols
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SIM	Selected Ion Monitoring
SU	Standard Units
SVOCs	Semivolatile Organic Compounds
TOC	Total Organic Carbon
TSS	Total Suspended Solids

1.0 INTRODUCTION

This document presents modifications to the stormwater monitoring program for operation of the long-term stormwater treatment (LTST) system at the North Boeing Field (NBF) site in Seattle, Washington (Figure 1), beginning 2014. This document is to be used as an addendum to the existing sampling and analysis plan (SAP; Landau Associates 2012) for monitoring the third year of LTST operation, from November 1, 2013 to October 31, 2014, and will replace the 2012-2013 SAP Addendum (Appendix B; Landau Associates 2013), which will no longer be followed. The LTST system, which consists primarily of a chitosan-enhanced sand filtration (CESF) system to remove total suspended solids (TSS) and associated polychlorinated biphenyls (PCBs) from stormwater, was installed as part of a removal action conducted by The Boeing Company (Boeing) at NBF to control contaminant discharges from the NBF site to the Slip 4 Early Action Area (EAA) of the Lower Duwamish Waterway (LDW) Superfund Site.

The primary purpose of the NBF stormwater monitoring program is to determine if the LTST system is meeting the following interim goals at the point of compliance (POC):

- Water discharged to Slip 4 must be below the Aquatic Life – Marine/Chronic water quality standard of 0.030 micrograms per liter (µg/L) total PCBs.
- A flow-weighted average annual concentration (FWAAC) for total PCBs in water of 0.018 µg/L.

The latter is referred to as the alternative interim goal, which was approved by the U.S. Environmental Protection Agency (EPA) in place of an interim goal for solids (EPA 2011). Another goal of the monitoring program is to collect data to support the NBF – Georgetown Steam Plant (GTSP) Remedial Investigation (RI)/Feasibility Study (FS) being conducted by the Washington State Department of Ecology (Ecology). The following samples are proposed for continued collection in 2014 in support of the Ecology RI/FS: whole water at LS431, MH130A, and the Lift Station Inlet Vault (LSIV) for analysis of semivolatile organic compounds (SVOCs); polycyclic aromatic hydrocarbons (PAHs); and metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc).

Performance monitoring has been conducted for the first 2 years of LTST system operation, between November 1, 2011 and October 31, 2013. The modifications to the SAP presented in this document are a result of evaluations of data and methodologies from the first 2 years of LTST operation and monitoring, and consideration of additional monitoring requested by Ecology for their NBF – GTSP RI/FS beginning in 2013. This document does not restate information in the existing SAP, but describes changes for the 2014 monitoring program. The existing SAP and this SAP addendum are to be used when conducting LTST monitoring activities at NBF.

2.0 FIELD SAMPLING PLAN

Changes to the monitoring program from the SAP (Landau Associates 2012) are described in the sections below. Aspects of the monitoring program that are not discussed in this Field Sampling Plan will remain as they are described in the SAP. Similar to previous years, sampling will take place from November (2013) through October (2014), and Boeing will present any proposed modifications to the stormwater monitoring program to EPA for 2015 after the 2013-2014 monitoring is complete and the data have been evaluated.

As described in the 2011-2012 annual LTST performance evaluation report (Landau Associates 2013), Boeing decided in early 2012 that, due to logistical difficulties, Eurofins Lancaster Environmental Laboratories, located in Lancaster, Pennsylvania, would not be used for LTST-related stormwater sample analysis for this project. All laboratory analysis described in the SAP and this SAP addendum will be conducted by Analytical Resources, Inc (ARI), located in Tukwila, Washington.

As requested by Ecology (Ecology 2012), Boeing requested that ARI report whole water PCB concentrations down to the ARI Limit of Detection (LOD), which is ½ the target Limit of Quantitation (LOQ), starting in December 2012. Unless the LOQ is elevated, the LOD would be 0.005 µg/L. This lower reporting level will continue in the 2013-2014 monitoring program. Any data reported below the target LOQ (0.010 µg/L) is approximate and will be J-flagged. Quality control criteria for PCBs analysis in aqueous samples at ARI are included as Attachment 1.

The SAP (Landau Associates 2012) states that each cooler (containing samples) will be secured with a signed custody seal when submitted to the laboratory. However, it is unnecessary to secure a cooler with a custody seal when samples are submitted directly to the laboratory and the laboratory accepts custody of the samples directly from the sampler. Starting in 2014, custody seals will only be used when the samples are not actively in the custody of either sampling team or laboratory personnel (e.g., if the cooler is left in an unstaffed drop area).

A 2014 sampling and analysis summary is presented in Table 1. Analytical methods and target LOQs for 2014 are presented in Table 2. Information on sample containers, preservatives, and holding time requirements for 2014 is presented in Table 3.

2.1 SAMPLING LOCATIONS

Samples will continue to be collected from the lift station (LS431) monitoring POC; the LTST system influent (MH130A and LSIV) and effluent; the LTST weir tanks, storage tanks, and sand filters, as necessary; and the sediment traps. The Media Bed Pilot Study (MBPS) and associated sampling were completed in March 2012 and the equipment was removed from the site later that year; there are no plans to continue with additional media bed testing. NBF stormwater-related sampling locations are shown on Figures 2 and 3.

2.2 LIFT STATION (LS431) SAMPLING

Routine sampling events of approximately 3-day duration were previously conducted on a monthly basis. As the only three detections of PCBs in LS431 whole water (out of a total of 36 sampling events in the 2 years of LTST operation) occurred during intense and/or large volume precipitation events, it is clear that PCBs concentrations in stormwater discharging to Slip 4 are highest when the LTST system is bypassed (and, more specifically, when stormwater in the north lateral storm drain overflows past the MH130A pump and the MH130B weir), which only occurs during relatively intense precipitation. Therefore, the 2013-2014 sampling program will continue to target five storm events of 0.5 inches or greater precipitation in a 24-hour period. The results of the routine 3-day sampling events have shown that, with the exception of one event (October 2013) where there was particularly intense precipitation, the 3-day events are significantly less likely to result in detectable or elevated concentrations of PCBs in stormwater discharge. However, routine 3-day sampling events are proposed to continue, but at a reduced frequency of quarterly rather than monthly starting in January 2014, as there is still value in these events to document effective CESF treatment system operation. Quarterly routine events will be conducted during the first month of each calendar quarter (i.e., January, April, July, and October).

Continuing with changes implemented for the 2012-2013 monitoring program, to provide data for compliance monitoring for the National Pollutant Discharge Elimination System (NPDES) stormwater permit at NBF (covered under Ecology's Industrial Stormwater General Permit, No. WAR000226), LS431 samples will be analyzed for turbidity using EPA Method 180.1, and quarterly for pH using a calibrated field meter or pH paper with a resolution not greater than ± 0.5 standard units (SU). A visual observation of the LS431 stormwater sample for oil sheen will also be made, in accordance with permit conditions. Analyzing for pH in the laboratory, as was performed during the 2012-2013 monitoring program, will be discontinued. Total copper and total zinc are the other parameters that must be analyzed in stormwater samples and compared to benchmark values on a quarterly basis in order to meet the permit conditions. Total copper and zinc are already included as part of the routine metals sampling established in the LTST SAP.

Because of LTST operational challenges by dissolved iron and iron-related bacteria growth (e.g., precipitation in monitoring instrumentation and additional sludge volume accumulation in the backflush tank) that are associated with groundwater infiltration into the storm drain lines, LS431 samples will also continue to be analyzed for total and dissolved iron and manganese using EPA Method 6010.

Analysis for particle size distribution (PSD) was performed for whole water samples during the first 2 years of LTST operation. Because of the very low concentration of TSS in NBF stormwater (especially treated stormwater effluent), the analytical results have indicated poor analytical precision in the amount of solids when summing the particle distribution ranges and comparing that result to the analytical measurement of TSS. This lack of precision can be observed by comparing the PSD data to the TSS data in the whole water samples from MH130A, LSIV, and treatment system effluent (Tables 3, 4, and 5, respectively, in this annual report). Due to the apparent lack of analytical precision at the low TSS concentrations, and because there are now 2 full years of monthly event and storm event whole water PSD data, there are no identified beneficial uses in collecting additional whole water PSD data. Therefore, we propose to discontinue whole water PSD analysis for 2014. PSD analysis will continue for the sediment trap samples (discussed below in Section 2.4), where the greater mass of solids in the sample likely results in greater analytical precision.

2.3 LONG-TERM STORMWATER TREATMENT SYSTEM SAMPLING

A number of changes to monitoring at the LTST system that were implemented in 2013 will continue in 2014, and a number of new changes will be implemented for 2014. Given the 2 full years of routine monthly sampling of the LTST system and the consistent performance of the LTST system in removing PCBs to below detectable levels, we propose to continue to conduct routine sampling at the LTST system concurrent with LS431 sampling at a reduced frequency of quarterly (during the first month of each calendar quarter) rather than monthly starting in January 2014. Additional changes from the original SAP are discussed in the following sections.

2.3.1 MH130A Whole Water

To provide requested data for the RI being conducted by Ecology at NBF and the GTSP, whole water samples from MH130A will be collected and analyzed for SVOCs by EPA Method 8270D and PAHs using EPA Selected Ion Monitoring (SIM) Method 8270D. Sampling for SVOCs and PAHs in whole water will be conducted during alternating (i.e., every other) routine quarterly sampling events and alternating storm events in 2014. TSS analysis will continue to be conducted during each routine quarterly event and storm event.

MH130A whole water samples will be analyzed for turbidity using EPA Method 180.1 and for total and dissolved iron and manganese using EPA Method 6010 (in addition to the other metals analysis currently described in the SAP). Monitoring for pH, as was performed during the 2012-2013 monitoring program, will be discontinued. For the reasons discussed above in Section 2.2, PSD analysis for whole water samples will be discontinued.

2.3.2 MH130A Filtered Solids

Filtered solids samples will no longer be analyzed for PSD. This change was made in June 2012 and approved by EPA.

To provide requested data for the RI being conducted by Ecology at NBF and the GTSP, filter bag samples from MH130A have previously been collected and analyzed for PAHs using EPA Method 8270D and metals using EPA Methods 6010 and 7471. Since LTST operation began, a total of five MH130A filtered solids samples have been analyzed for PAHs, and 19 samples have been analyzed for metals. While the changes proposed in this SAP addendum are under review, it is anticipated that between November 1, 2013 and January 1, 2014 an additional two MH130A filtered solids samples will be collected and analyzed for both PAHs and metals. For PAHs, Ecology requested only two to three samples be analyzed for PAHs and, by January 1, 2014, up to seven samples will have been collected and analyzed. We propose to discontinue filtered solids sampling for PAHs and metals at MH130A based on the large amount of data already collected, and because whole water analysis for PAHs and metals (proposed to continue at MH130A) provides more accurate data due to the ability of the filter bags to allow dissolved constituents and/or fine particulate to pass through. We propose collection and analysis of MH130A filtered solids to continue in 2014 for PCBs only.

2.3.3 LSIV Whole Water

For LSIV water samples, because the ISCO autosampler is enabled by the liquid level actuator only when the CESF system is being bypassed, some routine sampling events are likely to result in no collection of a LSIV sample. This occurred for multiple monthly sampling events during the 2011-2012 sampling year. Although a goal of LSIV stormwater sampling is to collect a sample that is representative of water that bypasses the CESF system, another goal is to have adequate LTST system influent water quality data in order to compare to the treated effluent water quality and be able to assess CESF system treatment performance. Therefore, if it is not possible to collect a flow-weighted LSIV sample during a sampling event due to insufficient bypass occurring, then a grab sample of LSIV water will be collected and submitted to the laboratory. A tee and additional sampling port valve were installed at the LSIV sample location so that LSIV sample water can be directed to either the ISCO or out of the new sample port for a grab sample. Logistically, this sampling procedure means waiting until the end of a routine sampling event to determine if a flow-weighted sample of bypass water can be collected, prior to collecting a LSIV grab sample.

To provide requested data for the RI being conducted by Ecology at NBF and the GTSP, all routine and storm event whole water samples from LSIV will be analyzed for SVOCs by EPA Method

8270D and PAHs using EPA SIM Method 8270D. LSIV whole water samples will be analyzed for turbidity using EPA Method 180.1 and for total and dissolved iron and manganese using EPA Method 6010 (in addition to the other metals analysis currently described in the SAP). Monitoring for pH, as was performed during the 2012-2013 monitoring program, will be discontinued. For the reasons discussed above in Section 2.2, PSD analysis for whole water samples will be discontinued.

2.3.4 LSIV Filtered Solids

Filtered solids samples will no longer be analyzed for PSD. This change was made in June 2012 and approved by EPA.

To provide requested data for the RI being conducted by Ecology at NBF and the GTSP, filter bag samples from LSIV have previously been collected and analyzed for PAHs using EPA Method 8270D and metals using EPA Methods 6010 and 7471. Since LTST operation began, a total of six LSIV filtered solids samples have been analyzed for PAHs, and 18 samples have been analyzed for metals. While the changes proposed in this SAP addendum are under review, it is anticipated that between November 1, 2013 and January 1, 2014 an additional two LSIV filtered solids samples will be collected and analyzed for both PAHs and metals. For PAHs, Ecology requested only three to five samples be analyzed for PAHs and, by January 1, 2014, up to eight samples will have been collected and analyzed. We propose to discontinue filtered solids sampling for PAHs and metals at LSIV based on the large amount of data already collected, and because whole water analysis for PAHs and metals (proposed to continue at LSIV) provides more accurate data due to the ability of the filter bags to allow dissolved constituents and/or fine particulate to pass through. We propose collection and analysis of LSIV filtered solids to continue in 2014 for PCBs only.

2.3.5 Effluent Whole Water

As described above, we propose to conduct routine sampling at the LTST effluent quarterly instead of monthly. However, to monitor the efficacy of the CESF system and to be able to respond in a timely manner to any treatment system problems that might arise, samples of LTST system effluent water will be collected monthly during the months when no quarterly sample is collected, and analyzed for PCBs. These additional grab samples will be collected during the first week of the month. If a storm sampling event is completed during the first week of the month, the additional LTST effluent water sampling would not be necessary and will not be repeated for that month.

Two years of LTST system effluent whole water samples were collected and analyzed for TSS using Method SM2540D and pH using EPA Method 150.1. The LTST system has shown consistent results regarding these parameters, therefore, further analysis of TSS and pH is not warranted. We propose to discontinue whole water analysis of TSS and pH in LTST system effluent. Also, for the reasons discussed above in Section 2.2, PSD analysis for whole water samples will be discontinued.

To provide requested data for the RI being conducted by Ecology at NBF and the GTSP, whole water samples from the LTST system effluent have previously been collected and analyzed for SVOCs by EPA Method 8270D; PAHs using EPA SIM Method 8270D; and total and dissolved metals using EPA Methods 200.8, 7470, and 6010. Since LTST operation began, a total of four LTST effluent water samples have been analyzed for SVOCs and PAHs (Ecology requested at least three samples be analyzed for SVOCs). Since this data request has been filled, we propose to discontinue whole water sampling for SVOCs and PAHs at the LTST system effluent. Since LTST operation began, a total of 32 samples have been analyzed for total and dissolved metals. We propose to discontinue whole water sampling for metals at the LTST system effluent based on the large amount of data already collected and because the LTST system has shown consistent results regarding removal of metals. We propose collection and analysis of LTST system effluent whole water to continue in 2014 for PCBs only.

2.3.6 EFFLUENT FILTERED SOLIDS

To provide information for the RI being conducted by Ecology at NBF and the GTSP, filter bag samples from the LTST effluent have previously been collected and analyzed for PAHs using EPA Method 8270D. A total of three LTST system effluent filtered solids samples have been analyzed for PAHs (Ecology requested three to five samples). Since this data request has been filled, we propose to discontinue filtered solids sampling for PAHs at the LTST system effluent. We propose collection and analysis of LTST system effluent filtered solids to continue in 2014 for PCBs only. It was demonstrated during the first year of LTST monitoring that filtered solids sampling for metals at the LTST effluent location cannot be performed following the same planned procedure as at the LSIV and MH130A locations because the filter does not collect a sufficient mass of solids that can be scraped from the bag to provide the needed mass for laboratory analysis. Whole bag extraction, similar to what the laboratory does for PCB analysis in filtered solids, is not possible in any form at ARI that would produce reliable, representative data for metals. Therefore, we do not propose to collect filtered solids samples for metals at this location. We maintain that whole water laboratory data for total and dissolved metals, for which we have 2 full years of data, provides more accurate data for metals in the LTST effluent.

2.4 SEDIMENT TRAPS

The applicable method for measuring total organic carbon (TOC) in solids has changed from Plumb 1981 to Puget Sound Estuary Protocols (PSEP) 1986.

2.5 WEIR TANK, STORAGE TANK, AND SANDFILTER MEDIA SAMPLING

When monitoring for depth of sludge in the weir and storage tanks, the existing SAP indicates that, when the solids level at the bottom of the tank is greater than 12 inches for the inlet weir tank or storage tanks, or 24 inches for the backflush settling tank, the solids will be sampled for waste characterization and solids will be cleaned out from the tank. An allowance was made to modify these solids depths that trigger cleanout and, during the first year of operation, it was determined that a deeper blanket of solids could accumulate without negative effects to treatment system operation or performance. A deeper sludge blanket can also promote sludge thickening and limit the volume of water that needs to be removed and processed. Therefore, the solids levels will be allowed to reach up to 3 ft for the inlet weir tank and storage tanks and 5 ft for the backflush settling tank prior to cleanout.

Sampling of the solids from the weir tanks and storage tanks and of the sandfilter media does not need to take place each time solids are to be disposed. Previous analytical results from the solids can be used to properly profile the waste if no significant difference in water quality is expected. Sampling and analysis of solids for waste characterization will occur if requested by the disposal facility or as necessary for Boeing to maintain sufficient waste profile information.

For sample collection of weir and storage tank solids, the existing SAP states that a new clean sample jar is to be affixed to the sample pole at each new location. However, the grab samples of solids from a tank are combined and homogenized, so the use of separate clean jars is unnecessary. One new clean sample jar for multiple grabs (in a discrete tank for a discrete sampling event) is sufficient.

2.6 RE-ROUTED KING COUNTY STORMWATER

At the start of LTST operation, Ecology had requested additional sampling of the re-routed King County north lateral stormwater (KCBYP), including filtered solids for PCBs, PAHs, and metals with concurrent whole water sampling for TSS and SVOCs.

The offsite stormwater from the north lateral was rerouted to allow improved capture and preferential treatment of onsite stormwater that drains to MH130A. However, the KCBYP line connects into the LSIV just the same as other NBF storm drain laterals (north central, south central, and south laterals, plus the onsite portion of the north lateral), and this stormwater continues to be treated at the LTST system. There are no current plans to bypass this stormwater from treatment; this stormwater is no different than the other sources of stormwater to LSIV, and there seems to be no useful reason to perform additional sampling at KCBYP beyond the sampling that will continue to be performed at LSIV.

The KCBYP has already been extensively monitored, including seven routine monthly sampling events and four storm sampling events in the first year of LTST operation. Analyses included PCBs, SVOCs, PAHs, total metals, dissolved metals, TSS, and particle size distribution. There continues to be a sediment trap monitoring point for the KCBYP line, location SL4-T5A(2), where solids sample collection will continue to be performed for PCBs, SVOCs, PAHs, metals, petroleum hydrocarbons (NWTPH-Dx), TOC, percent total solids, and PSD on an annual basis, in conjunction with the annual sediment trap sampling event. Therefore, no additional whole water or filtered solids sampling is planned for KCBYP beyond the original 2011-2012 monitoring year.

3.0 QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP) portion of the existing SAP (Landau Associates 2012) was reviewed to determine whether there were any additional items that needed to be revised or updated, especially related to the request that ARI report whole water PCB concentrations down to the ARI LOD. The only change to the QAPP is as follows (additions in *italics*, deletions in ~~strikethrough~~):

> All stormwater and *filtered* solids data will be verified and validated to determine the results are acceptable and meet the quality objectives described in Section 3.1...A Stage 2A validation, as defined in EPA's Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (EPA 2009), will be conducted *for all data associated with stormwater discharge; data collected for waste characterization (e.g., residual tank solids, used sand filter media) will not be Stage 2A validated*.~~for all of the data~~.

Future data validation reports will include a reference to this final SAP addendum.

4.0 DATA ANALYSIS AND REPORTING

It is not anticipated that the reduction in frequency of routine sampling events will have a significant effect on the FWAAC. However, year-to-date data will be used to regularly calculate an estimated FWAAC during the third year of LTST system operation. If the estimated FWAAC varies significantly from past conditions, or conditions are encountered that vary significantly from typically observed conditions in the first 2 years of LTST system operation, then the monitoring frequency may be increased to verify that there is not an unexpected change in site conditions or LTST system performance. EPA would be informed of any changes in monitoring frequency, and the additional generated data would be provided to EPA in the appropriate reports.

Based on steady operation and performance of the LTST system during the first year of LTST operation and monitoring, and considering that the FWAAC for PCBs at LS431 was well below the established criterion of 0.018 µg/L (calculated to be 0.0011 µg/L), detailed progress reports with stormwater analytical data tables and data validation reports have been provided to EPA quarterly instead of monthly during the 2012-2013 monitoring year. Brief (approximately one page) progress reports have been provided to EPA for the months in which a quarterly report is not submitted. EPA approved this modification to progress report procedures on January 8, 2013. Quarterly and monthly reports will continue to be submitted on the 5th day of the following month (or the first subsequent work day if the 5th day of the month falls on a weekend or holiday).

An annual LTST performance evaluation report will be prepared for the 2013-2014 LTST monitoring year. A draft version of this report will be submitted by Boeing to EPA by December 5, 2014 for review. Based on results collected during the 2013-2014 LTST monitoring year, there may be a recommendation to change the number of sampling events, sampling locations, or sampling parameters for the fourth year of LTST monitoring. EPA may request a meeting to discuss the results presented in the annual performance evaluation and any recommended modifications to the stormwater monitoring program for 2014. A final version of the annual LTST performance evaluation report will be submitted by Boeing to EPA within 14 working days following receipt of written comments from EPA.

A schedule of report submittals for the 2013-2014 monitoring year is included as Table 4.

* * * * * * *

This document has been prepared under the supervision and direction of the following key staff.

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Principal

JAK/MCV/tam

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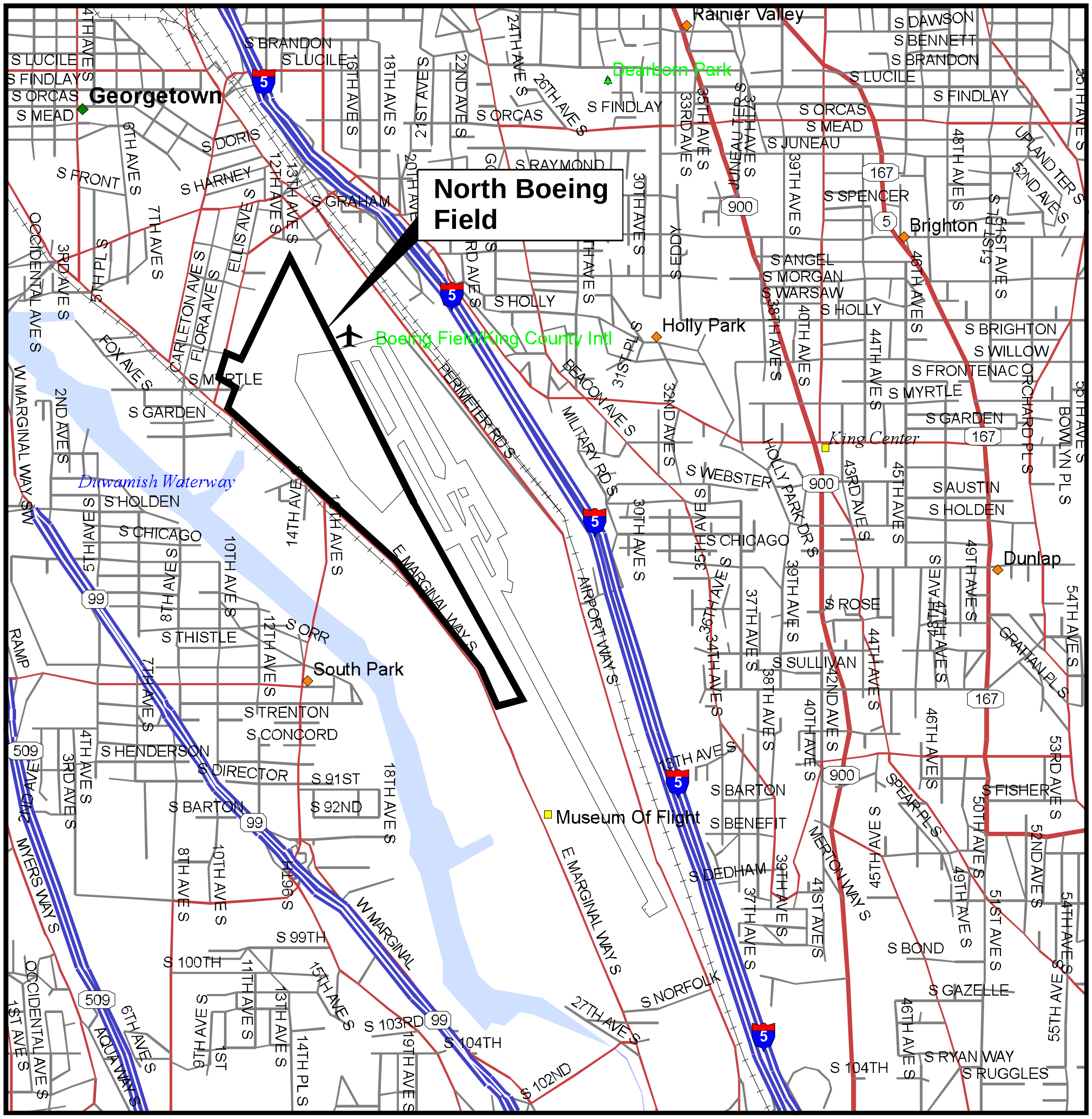


Map from DeLorme Street Atlas USA, 2002

0 ½ 1

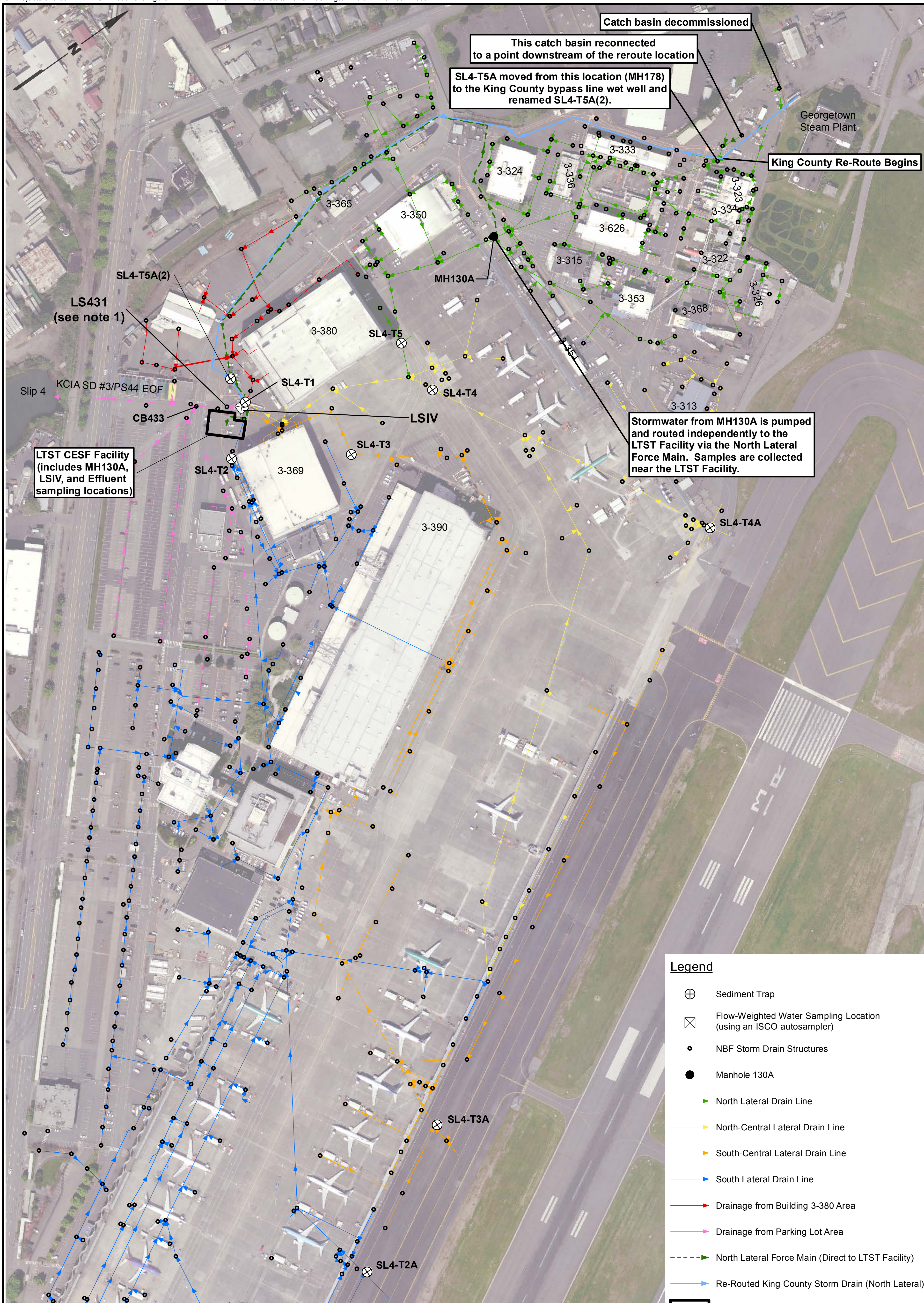
Scale in Miles

Flume Realignment| V:\025\082\089\SD Structure & Surface Solids Investigation\Figure 1.cdr 8/29/2009

LANDAU ASSOCIATES

North Boeing Field Seattle, Washington	**Vicinity Map**	Figure 1

G:\Projects\025\082\214\LTST Treatment\Figure 2.mxd 12/4/2013 NAD 1983 StatePlane Washington North FIPS 4601 Feet



Notes:

1. LS431 is the Point of Compliance (POC).
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

LTST = Long-Term Stormwater Treatment

CESF = Chitosan - Enhanced Sand Filtration

LSIV = Lift Station Inlet Vault

Storm Drain System Data Source: SAIC

0 250 500

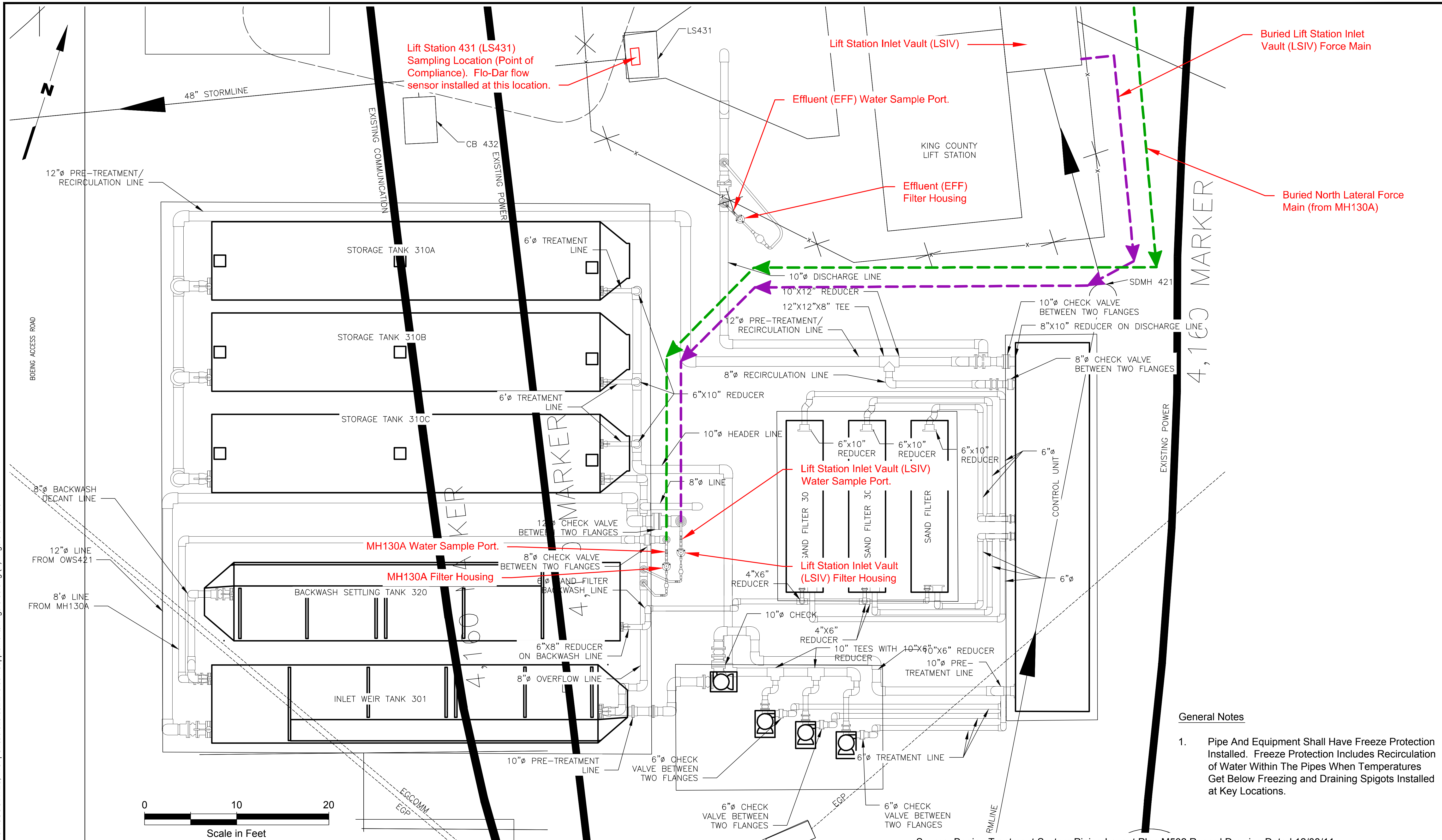
Scale in Feet

LANDAU ASSOCIATES

North Boeing Field
Seattle, Washington

Storm Drain System and LTST Sampling Locations

Figure 2



General Notes

1. Pipe And Equipment Shall Have Freeze Protection Installed. Freeze Protection Includes Recirculation of Water Within The Pipes When Temperatures Get Below Freezing and Draining Spigots Installed at Key Locations.

Source: Boeing Treatment System Piping Layout Plan M502 Record Drawing Dated 12/08/11

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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North Boeing Field
Seattle, Washington

LTST Sampling Locations

Figure 3

TABLE 1
2014 LONG-TERM REMOVAL ACTION SAMPLING AND ANALYSIS SUMMARY
NORTH BOEING FIELD - SEATTLE, WASHINGTON

Location	Sample Type	Sample Media	Frequency (a)	Parameters	Analytical Methods
Lift Station (LS431) (Compliance Monitoring Point)	Whole Water (flow-weighted composite)	Stormwater (b)	Quarterly routine sampling in 2014; Five additional 24-hour storm events of ≥0.5 inch precipitation, November 1, 2013 - October 31, 2014	PCBs	EPA Method 8082
				TSS	SM 2540D
				Total/Dissolved Metals (c,d)	EPA Methods 200.8; 7470 for Hg; 6010 for Fe, Mn
				SVOCs (c)	EPA Method 8270D
				PAHs (c)	EPA SIM Method 8270D
				Turbidity	EPA Method 180.1
	Whole Water (grab)		Quarterly routine sampling in 2014	pH	Meter or pH paper
Long-Term Stormwater Treatment System	Whole Water Influent from Lift Station Inlet Vault: Flow-weighted composite of treatment system bypass (preferred) or grab (if insufficient bypass occurs for flow-weighted sample collection)	Stormwater (b)	Quarterly routine sampling (e) in 2014; Five additional 24-hour storm events (e) of ≥0.5 inch precipitation, November 1, 2013 - October 31, 2014	PCBs	EPA Method 8082
				TSS	SM 2540D
				Total/Dissolved Metals (c,d)	EPA Methods 200.8; 7470 for Hg; 6010 for Fe, Mn
				SVOCs (c)	EPA Method 8270D
				PAHs (c)	EPA SIM Method 8270D
				Turbidity	EPA Method 180.1 / meter
	Whole Water Influent from MH130A (grab)	Stormwater (b)	Quarterly routine sampling (e) in 2014; Five additional 24-hour storm events (e) of ≥0.5 inch precipitation, November 1, 2013 - October 31, 2014	PCBs	EPA Method 8082
				TSS	SM 2540D
				Total/Dissolved Metals (d)	EPA Methods 200.8; 7470 for Hg; 6010 for Fe, Mn
				Turbidity	EPA Method 180.1 / meter
			Alternating quarterly events (e) in 2014; Alternating 24-hour storm events (e) of ≥0.5 inch precipitation, November 1, 2013 - October 31, 2014	SVOCs	EPA Method 8270D
				PAHs	EPA SIM Method 8270D
	Whole Water Effluent (grab)	Stormwater (b)	Five 24-hour storm events (e) of ≥0.5 inch precipitation, November 1, 2013 - October 31, 2014; and monthly sampling (e) in 2014	PCBs	EPA Method 8082
	Whole Water Effluent (grab) (f)	Stormwater (b)	Twice monthly (g)	Residual Chitosan	Ecology approved procedure (h)
	Filtered Solids Influent from Lift Station Inlet Vault	Stormwater Solids	Quarterly routine sampling (e) in 2014; Five additional 24-hr storm events (e) of ≥0.5 inch precipitation, November 1, 2013 - October 31, 2014	PCBs	EPA Method 8082
	Filtered Solids Influent from MH130A	Stormwater Solids	Quarterly routine sampling (e) in 2014; Five additional 24-hr storm events (e) of ≥0.5 inch precipitation, November 1, 2013 - October 31, 2014	PCBs	EPA Method 8082
	Filtered Solids Effluent	Stormwater Solids	Quarterly routine events (e) in 2013; Five additional 24-hr storm events (e) of ≥0.5 inch precipitation, November 1, 2013 - October 31, 2014	PCBs	EPA Method 8082
Sediment Traps [SL4-T1, SL4-T2, SL4-T3, SL4-T4, SL4-T4A, SL4-T5, SL4-T5A(2) (i)] (SL4-T5A moved from MH178 to King County bypass line wet well)	Annual Composite, Homogenized	Stormwater Solids	Annually (j)	PCBs	PSDDA Method 8082
				SVOCs	PSDDA SVOCS SW8270D
				Total Metals	Method 6000-7000
				NWTPH-Dx	NWTPH-Dx (with acid silica gel cleanup)
				Total Organic Carbon	PSEP 1986
				Percent Total Solids	EPA 160.3 (modified for solids)
				PSD	PSEP-PS (k)
Weir and Storage Tanks, Sand Filter Media	Composite from 3 or More Grab Samples from Tank or Filter Vessel (grab locations to result in both horizontal and vertical compositing)	Settled Solids	As Needed (l)	PCBs	EPA Method 8082
				SVOCs	EPA Method 8270D
				Metals	TCLP and/or Method 6000-7000
				Petroleum Hydrocarbons	NWTPH-Dx and NWTPH-Gx

TABLE 1
2014 LONG-TERM REMOVAL ACTION SAMPLING AND ANALYSIS SUMMARY
NORTH BOEING FIELD - SEATTLE, WASHINGTON

PCBs = polycholorinated biphenyls	TCLP = toxicity characteristic leaching procedure	EPA = U.S. Environmental Protection Agency	Fe = Iron
TSS = total suspended solids	LTST = long-term stormwater treatment	NBF = North Boeing Field	Mn = Manganese
PSD = particle size distribution	STST = short-term stormwater treatment	GTSP = Georgetown Steam Plant	Hg = Mercury
TOC = total organic carbon	CESF = chitosan-enhanced sand filtration	PAHs = polycyclic aromatic hydrocarbons	µm = micrometer
SIM = selected ion monitoring	PSDDA = Puget Sound Dredged Disposal Analysis	SVOCs = semivolatile organic compounds	
PSEP = Puget Sound Estuary Protocols	TAPE = Technology Assessment Protocol	NWTPH-Dx = Total Petroleum Hydrocarbons Diesel Range	
O&M = operation and maintenance	Ecology = Washington State Department of Ecology	NWTPH-Gx = Total Petroleum Hydrocarbons Gasoline Range	

(a) Monitoring plan beginning November 2013. All sampling and analysis will be performed by Boeing/Landau Associates and Boeing's contract laboratory, unless otherwise noted. Sampling frequency for all analyses is to be determined for sampling starting January 2014. Boeing will propose to EPA a sampling frequency and sampling parameters based on the results from the November 2013 - October 2014 sampling events.
(b) Stormwater is defined as all liquids, including any particles dissolved therein, in the form of base flow, stormwater runoff, snow melt runoff, and drainage, as well as all solids that enter the storm drain system.
(c) If sufficient volume is available, LS431 whole water samples will be analyzed for total and dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc); SVOCs; and PAHs to support Ecology's NBF-GTSP remedial investigation activities.
(d) Metals list for water and filtered solids samples is arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and zinc.
(e) LTST system influent/effluent sampling events will be performed concurrent with lift station (LS431) sampling events unless no LS431 sample is being collected.
(f) Whole water effluent grab samples for Residual Chitosan testing will be collected from the treatment facility effluent sample port by Clear Water Compliance Services.
(g) Residual chitosan was never detected in twice monthly effluent samples from the LTST facility in the first year of monitoring, or in weekly effluent samples from the STST facility. There is extremely low probability of chitosan being able to pass through the sand filters.
(h) Per CESF system O&M Manual, Ecology approves procedures for residual chitosan testing for each chitosan distributor. Testing will be conducted in accordance with distributor's approved procedures.
(i) Location SL4-T5A(2) does not have a bracket and Teflon container like other sediment trap locations; SL4-T5A(2) will be sampled by collecting solids from the bottom of the wet well, which collects solids behind a permanent weir.
(j) Depending on the quantity of solids collected in the sediment traps, the laboratory may not be able to analyze all parameters. Laboratory will weigh and report total mass of solids collected per sample location. Analysis of parameters will be prioritized in the order listed. Sediment trap sampling will continue indefinitely until such time that additional data collection is no longer needed to support source control efforts.
(k) Particle size distribution for sediment trap solids samples will be conducted using PSEP method. When low volumes of sample are collected, particle size distribution will be accomplished using sedigraph for material less than 62.5 µm.
(l) The thickness of accumulated solids (sludge) in the weir tanks will be checked at least once per month to determine if solids should be removed. Prior to solids removal, a composite sample of the solids will be collected and analyzed for waste characterization purposes. Composite sampling may also be done for used sand filter media prior to disposal. Waste characterization may not be necessary if appropriate prior waste characterization data is available, but would be necessary if contaminant concentrations in the LTST influent change significantly. Sampling and analysis for waste characterization will occur if requested by the disposal facility.

TABLE 2
REVISED ANALYTICAL METHODS AND TARGET LIMITS OF QUANTITATION
LONG-TERM STORMWATER TREATMENT SAMPLING
NORTH BOEING FIELD - SEATTLE, WASHINGTON

		Target Limits of Quantitation (b)			
		Water	Filtered Solids	Unfiltered Solids	
	Analytical			Sediment Traps	Residual Solids
Analyte	Method (a)	ARI LOQ (c)	ARI LOQ (c)	ARI LOQ (c)	ARI LOQ (c)
PCBs					
Aroclor 1016	EPA Method 8082 (d)	0.01 µg/L	0.5 µg	10 µg/kg	33 µg/kg
Aroclor 1221	EPA Method 8082 (d)	0.01 µg/L	0.5 µg	10 µg/kg	33 µg/kg
Aroclor 1232	EPA Method 8082 (d)	0.01 µg/L	0.5 µg	10 µg/kg	33 µg/kg
Aroclor 1242	EPA Method 8082 (d)	0.01 µg/L	0.5 µg	10 µg/kg	33 µg/kg
Aroclor 1248	EPA Method 8082 (d)	0.01 µg/L	0.5 µg	10 µg/kg	33 µg/kg
Aroclor 1254	EPA Method 8082 (d)	0.01 µg/L	0.5 µg	10 µg/kg	33 µg/kg
Aroclor 1260	EPA Method 8082 (d)	0.01 µg/L	0.5 µg	10 µg/kg	33 µg/kg
Aroclor 1262	EPA Method 8082 (d)	0.01 µg/L	0.5 µg	--	--
CONVENTIONALS					
Total Organic Carbon	PSEP 1986	--	--	0.02 percent	--
Total Suspended Solids	SM 2540	1 mg/L	--	--	--
Turbidity	EPA Method 180.1	0.05 NTU	--	--	--
TOTAL PETROLEUM HYDROCARBONS					
Diesel Range	NWTPH-Dx (e,f)	--	--	5.0 mg/kg	5.0 mg/kg
Gasoline Range	NWTPH-Gx (e)	--	--	--	5.0 mg/kg
Motor Oil Range	NWTPH-Dx (e,f)	--	--	10.0 mg/kg	10.0 mg/kg
METALS					
Arsenic	EPA Method 200.8/6010	0.5 µg/L	--	5.0 mg/kg	5.0 mg/kg
Barium	EPA Method 200.8/6010	--	--	--	0.3 mg/kg
Cadmium	EPA Method 200.8/6010	0.1 µg/L	--	--	0.2 mg/kg
Chromium	EPA Method 200.8/6010	0.5 µg/L	--	--	0.5 mg/kg
Copper	EPA Method 200.8/6010	0.5 µg/L	--	0.2 mg/kg	--
Iron	EPA Method 6010	50 µg/L	--	--	--
Lead	EPA Method 200.8/6010	0.1 µg/L	--	2.0 mg/kg	2.0 mg/kg
Manganese	EPA Method 6010	1 µg/L	--	--	--
Mercury (total)	EPA Method 7470/7471	0.1 µg/L	--	0.025 mg/kg	0.025 mg/kg
Mercury (dissovled)	EPA Method 7470/7471	0.02 µg/L	--	--	--
Nickel	EPA Method 200.8/6010	0.5 µg/L	--	--	--
Selenium	EPA Method 200.8/6010	--	--	--	5.0 mg/kg
Silver	EPA Method 200.8/6010	--	--	--	0.3 mg/kg
Zinc	EPA Method 200.8/6010	4.0 µg/L	--	1.0 mg/kg	--
TCLP METALS					
Arsenic	EPA Method 1311/6010	--	--	--	0.2 mg/L
Barium	EPA Method 1311/6010	--	--	--	0.2 mg/L
Cadmium	EPA Method 1311/6010	--	--	--	0.01 mg/L
Chromium	EPA Method 1311/6010	--	--	--	0.02 mg/L
Lead	EPA Method 1311/6010	--	--	--	0.1 mg/L
Mercury	EPA Method 1311/7471	--	--	--	0.0002 mg/L
Selenium	EPA Method 1311/6010	--	--	--	0.2 mg/L
Silver	EPA Method 1311/6010	--	--	--	0.02 mg/L
SEMIVOLATILES					
Phenol	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
Bis-(2-Chloroethyl) Ether	SW 8270D	--	--	--	67 µg/kg
2-Chlorophenol	SW 8270D	--	--	--	67 µg/kg
1,3-Dichlorobenzene	SW 8270D (g)	--	--	20 µg/kg	67 µg/kg
1,4-Dichlorobenzene	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
Benzyl Alcohol	SW 8270D (g)	5.0 µg/L	--	20 µg/kg	330 µg/kg
1,2-Dichlorobenzene	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
2-Methylphenol	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
2,2'-Oxybis(1-Chloropropane)	SW 8270D	--	--	--	67 µg/kg
4-Methylphenol	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
N-Nitroso-Di-N-Propylamine	SW 8270D	--	--	--	67 µg/kg
Hexachloroethane	SW 8270D (g)	--	--	20 µg/kg	67 µg/kg
Nitrobenzene	SW 8270D	--	--	--	67 µg/kg
Isophorone	SW 8270D	--	--	--	67 µg/kg
2-Nitrophenol	SW 8270D	--	--	--	67 µg/kg
2,4-Dimethylphenol	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
Benzoic Acid	SW 8270D (g)	10.0 µg/L	--	100 µg/kg	670 µg/kg
bis(2-Chloroethoxy) Methane	SW 8270D	--	--	--	67 µg/kg
2,4-Dichlorophenol	SW 8270D	--	--	--	330 µg/kg

TABLE 2
REVISED ANALYTICAL METHODS AND TARGET LIMITS OF QUANTITATION
LONG-TERM STORMWATER TREATMENT SAMPLING
NORTH BOEING FIELD - SEATTLE, WASHINGTON

		Target Limits of Quantitation (b)			
		Water	Filtered Solids	Unfiltered Solids	
	Analytical			Sediment Traps	Residual Solids
Analyte	Method (a)	ARI LOQ (c)	ARI LOQ (c)	ARI LOQ (c)	ARI LOQ (c)
SEMIVOLATILES (continued)					
1,2,4-Trichlorobenzene	SW 8270D (g)	1.0 µg/L	--	100 µg/kg	67 µg/kg
Naphthalene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
4-Chloroaniline	SW 8270D	--	--	--	330 µg/kg
Hexachlorobutadiene	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
4-Chloro-3-methylphenol	SW 8270D	--	--	--	330 µg/kg
1-Methylnaphthalene	SW 8270D (g)	--	--	20 µg/kg	67 µg/kg
2-Methylnaphthalene	SW 8270D (g,h)	0.01 µg/L	--	100 µg/kg	67 µg/kg
Hexachlorocyclopentadiene	SW 8270D	--	--	--	330 µg/kg
2,4,6-Trichlorophenol	SW 8270D	--	--	--	330 µg/kg
2,4,5-Trichlorophenol	SW 8270D	--	--	--	330 µg/kg
2-Chloronaphthalene	SW 8270D	--	--	--	67 µg/kg
2-Nitroaniline	SW 8270D	--	--	--	330 µg/kg
Dimethylphthalate	SW 8270D (g)	1.0 µg/L	--	100 µg/kg	67 µg/kg
Acenaphthylene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
3-Nitroaniline	SW 8270D	--	--	--	330 µg/kg
Acenaphthene	SW 8270D (g,h)	0.01 µg/L	--	100 µg/kg	67 µg/kg
2,4-Dinitrophenol	SW 8270D	--	--	--	670 µg/kg
4-Nitrophenol	SW 8270D	--	--	--	330 µg/kg
Dibenzofuran	SW 8270D (g,h)	0.01 µg/L	--	100 µg/kg	67 µg/kg
2,6-Dinitrotoluene	SW 8270D	--	--	--	330 µg/kg
2,4-Dinitrotoluene	SW 8270D	--	--	--	330 µg/kg
Diethylphthalate	SW 8270D (g)	1.0 µg/L	--	100 µg/kg	67 µg/kg
4-Chlorophenyl-phenylether	SW 8270D	--	--	--	67 µg/kg
Fluorene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
4-Nitroaniline	SW 8270D	--	--	--	330 µg/kg
4,6-Dinitro-2-Methylphenol	SW 8270D	--	--	--	670 µg/kg
N-Nitrosodiphenylamine	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
4-Bromophenyl-phenylether	SW 8270D	--	--	--	67 µg/kg
Hexachlorobenzene	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
Pentachlorophenol	SW 8270D (g)	5.0 µg/L	--	20 µg/kg	330 µg/kg
Phenanthrene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
Carbazole	SW 8270D	--	--	--	67 µg/kg
Anthracene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
Di-n-Butylphthalate	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
Fluoranthene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
Pyrene	SW 8270D (g,h)	0.01 µg/L	--	100 µg/kg	67 µg/kg
Butylbenzylphthalate	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
3,3'-Dichlorobenzidine	SW 8270D	--	--	--	330 µg/kg
Benzo(a)anthracene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
bis(2-Ethylhexyl)phthalate	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
Chrysene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
Total benzofluoranthenes	SW 8270D (g,h)	0.02 µg/L	--	20 µg/kg	67 µg/kg
Benzo(b)fluoranthene	SW 8270D (g,h)	--	--	--	--
Benzo(k)fluoranthene	SW 8270D (g,h)	--	--	--	--
Di-n-Octyl phthalate	SW 8270D (g)	1.0 µg/L	--	20 µg/kg	67 µg/kg
Benzo(a)pyrene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
Indeno(1,2,3-cd)pyrene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
Dibenz(a,h)anthracene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg
Benzo(g,h,i)perylene	SW 8270D (g,h)	0.01 µg/L	--	20 µg/kg	67 µg/kg

ARI = Analytical Resources, Inc.
LOD = Limit of Detection
LOQ = Limit of Quantitation
NTU = Nephelometric Turbidity Units
SM = Standard Method
SU = Standard Units

NWTPH-Dx = Total Petroleum Hydrocarbons Diesel Range
NWTPH-Gx = Total Petroleum Hydrocarbons Gasoline Range
SIM - Select Ion Monitoring
PCBs - polychlorinated biphenyls
PSDDA = Puget Sound Dredged Disposal Analysis
PSEP = Puget Sound Estuary Protocols

µg/L = micrograms per liter
µg/kg = micrograms per kilogram
mg/L = milligrams per liter
mg/kg = milligrams per kilogram

(a) Analytical methods are from SW-846 (EPA 1986) and updates unless otherwise noted.
(b) LOQ goals are based on current laboratory data. Instances may arise where high sample concentrations, nonhomogeneity of samples, total solids (percent of sample that is solids), or matrix interferences, preclude achieving the desired LOQs.
(c) ARI reporting will be based on the lowest standard on the calibration curve. ARI will report whole water PCB concentrations down to the LOD (½ the target LOQ), and any data below the LOQ will be J-flagged.
(d) Sediment trap solids will be analyzed by PSDDA Method 8082.
(e) Methods NWTPH-Dx and NWTPH-Gx as described in *Analytical Methods for Petroleum Hydrocarbons,* Washington State Department of Ecology, Publication ECY97-602, June 1997 (Ecology 1997)
(f) For NWTPH-Dx analyses, an acid silica gel cleanup will be performed for sediment trap solids, but not for residual solids.
(g) Sediment trap samples will be analyzed by PSDDA Method 8270D.
(h) Water samples will be analyzed by SW 8270D SIM.

TABLE 3
REVISED SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIME REQUIREMENTS
LONG-TERM STORMWATER TREATMENT SAMPLING
NORTH BOEING FIELD - SEATTLE, WASHINGTON

	Analytical	LS431 and LTST LSIV Whole Water Composite Samples				LTST Facility Whole Water MH130A/LSIV/Effluent Grab Samples				LTST Facility Influent/Effluent Filtered Solids			
Analyte	Method	Volume Required	Container	Preservation	Holding Time	Volume Required	Container	Preservation	Holding Time	Volume Required	Container	Preservation	Holding Time
PCBs	EPA 8082/ PSDAA 8082	2L		Store cool at 6^{o}C	7 days to extraction, 40 days to analysis	2L	Two 1L Amber Glass	Store cool at 6^{o}C	7 days to extraction, 40 days to analysis	N/A (2)	Filter Bag	Store cool at 6^{o}C	14 days to extraction, 40 days to analysis
TSS	SM 2540 D-97	1L		Store cool at 6^{o}C	7 days	1L	1L HDPE	Store cool at 6^{o}C	7 Days	--	--	--	--
Total and Dissolved Metals	EPA 200.8		5-gallon glass carboy							--	--	--	--
Total and Dissolved Mercury	EPA 7470	1L		Store cool at 6°C, Nitric Acid in lab	6 months (28 days for Hg) after filtering for dissolved metals and preservation in lab	1L	Two 500 mL Polyethylene	Store cool at 6^{o}C, Nitric Acid in field (Total) and lab (Dissolved)	6 months (28 days for Hg) after collection (total) or after filtering for dissolved metals and preservation in lab (dissolved)	--	--	--	--
Total and Dissolved Iron and Manganese	EPA 6010									--	--	--	--
Particle Size Distribution	PSEP-PS	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs	EPA 8270D / PSDDA SW8270D	1L		Store cool at 6^{o}C	7 days to extraction, 40 days to analysis	1L	Two 500 mL Amber Glass	Store cool at 6^{o}C	7 days	--	--	--	--
PAHs	EPA 8270D SIM / EPA 8270D	1L	5-gallon glass carboy	Store cool at 6^{o}C	7 days to extraction, 40 days to analysis	1L	Two 500 mL Amber Glass	Store cool at 6^{o}C	7 days	--	--	--	--
Turbidity	EPA 180.1 / meter	500 mL		Store cool at 6^{o}C	48 hours	500 mL	500mL HDPE	Store cool at 6^{o}C	48 hours	--	--	--	--
Diesel-range and motor-oil range petroleum hydrocarbons	NWTPH-Dx	--	--	--	--	--	--	--	--	--	--	--	--
Gasoline-Range Petroleum Hydrocarbons	NWTPH-Gx	--	--	--	--	--	--	--	--	--	--	--	--
Metals	EPA 6010	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	EPA 7471	--	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	PSEP 1986	--	--	--	--	--	--	--	--	--	--	--	--
TCLP Metals	EPA 6010/7470	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 3
REVISED SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIME REQUIREMENTS
LONG-TERM STORMWATER TREATMENT SAMPLING
NORTH BOEING FIELD - SEATTLE, WASHINGTON

		Sediment Traps				Weir Tank, Backflush Tank, and Sand Filtration Units Residual Solids			
Analyte	Analytical Method	Volume Required	Container	Preservation	Holding Time	Volume Required	Container	Preservation	Holding Time
PCBs	EPA 8082/ PSDAA 8082	8 oz. (3)	Teflon Bottle or WMG	Store cool at 6°C	14 days to extraction, 40 days to analysis	8 oz.	8 oz. WMG	Store cool at 6°C	14 days to extraction, 40 days to analysis
TSS	SM 2540 D-97	--	--	--	--	--	--	--	--
Total and Dissolved Metals	EPA 200.8	--	--	--	--	--	--	--	--
Total and Dissolved Mercury	EPA 7470	--	--	--	--	--	--	--	--
Total and Dissolved Iron and Manganese	EPA 6010	--	--	--	--	--	--	--	--
Particle Size Distribution	PSEP-PS	8 oz. (3)	Teflon Bottle or WMG	Store cool at 6°C	7 days	--	--	--	--
SVOCs	EPA 8270D / PSDDA SW8270D	8 oz. (3)	Teflon Bottle or WMG	Store cool at 6°C	14 days	8 oz.	8 oz. WMG	Store cool at 6°C	14 days
PAHs	EPA 8270D SIM / EPA 8270D	--	--	--	--	--	--	--	--
Turbidity	EPA 180.1 / meter	--	--	--	--	--	--	--	--
Diesel-range and motor-oil range petroleum hydrocarbons	NWTPH-Dx	8 oz. (3)	Teflon Bottle or WMG	Store cool at 6°C	14 days to extraction, 40 days to analysis	8 oz.	8 oz. WMG	Store cool at 6°C	14 days to extraction, 40 days to analysis
Gasoline-Range Petroleum Hydrocarbons	NWTPH-Gx	--	--	--	--	2 oz.	2 oz. WMGS (1)	Store cool at 6°C	14 days to extraction, 40 days to analysis
Metals	EPA 6010	4 oz. (3)	Teflon Bottle or WMG	Store cool at 6°C	6 months	--	--	--	--
Mercury	EPA 7471		Teflon Bottle or WMG	Store cool at 6°C	28 days	--	--	--	--
Total Organic Carbon	PSEP 1986	4 oz. (3)	Teflon Bottle or WMG	Store cool at 4°C	14 days to extraction, 40 days to analysis	--	--	--	--
TCLP Metals	EPA 6010/7470	--	--	--	--	8 oz	8 oz. WMG	Store cool at 6°C	28/180 days to TCLP extraction, 28/180 days to analysis (Hg/all other metals)

PCBs = polychlorinated biphenyls
TSS = total suspended solids
SVOCs = semivolatile organic compounds
PAHs = polycyclic aromatic hydrocarbons
Hg = mercury
TCLP = Toxicity Characteristic Leachate Procedure
N/A = not applicable
HDPE = High Density Polypropylene
WMG = wide mouth glass jar
WMGS = wide mouth glass jar with septa lid
AG = amber glass boston round bottle
oz. = ounce
C = Centrigrade
LTST - Long-Term Stormwater Treatment
PSDDA = Puget Sound Dredged Disposal Analysis
PSEP = Puget Sound Estuary Protocols
EPA = U.S. Environmental Protection Agency
NWTPH-Dx = Total Petroleum Hydrocarbons Diesel Range
NWTPH-Gx = Total Petroleum Hydrocarbons Gasoline Range
ml - milliliter

Notes:

1. No headspace.
2. The entire filter bag (filter material and collected material) is analyzed, regardless of the volume of solids collected in the bag.
3. Amount of settled solids collected in Teflon bottle is not anticipated to meet required sample volumes. Laboratory will pre-screen samples and cut back on volumes required based on pre-screens. Analysis is prioritized due to limited volume.

TABLE 4
2014 REPORT SUBMITTAL SCHEDULE
LONG-TERM STORMWATER TREATMENT
NORTH BOEING FIELD, SEATTLE, WASHINGTON

Report	Due Date (submittal to EPA)
January 2014 Monthly Progress Report	February 5, 2014
February 2014 Monthly Progress Report	March 5, 2014
1st Quarter 2014 Progress Report	April 7, 2014
April 2014 Monthly Progress Report	May 5, 2014
May 2014 Monthly Progress Report	June 5, 2014
2nd Quarter 2014 Progress Report	July 7, 2014
July 2014 Monthly Progress Report	August 5, 2014
August 2014 Monthly Progress Report	September 5, 2014
3rd Quarter 2014 Progress Report	October 6, 2014
October 2014 Monthly Progress Report	November 5, 2014
Annual LTST Performance Evaluation Report (draft)	December 5, 2014
November 2014 Monthly Progress Report	December 5, 2014
4th Quarter 2014 Progress Report	January 5, 2015
Annual LTST Performance Evaluation Report (final)	14 working days following receipt of written comments from EPA

LTST - Long-Term Stormwater Treatment

EPA = U.S. Environmental Protection Agency

ATTACHMENT 1

Quality Control Criteria for Analysis of Aqueous and Tissue Samples for Aroclors (Polychlorinated Biphenyls – PCB) EPA Method 8082B

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Quality Control Criteria for Analysis of Aqueous and Tissue Samples for Aroclors (Polychlorinated Biphenyls – PCB) EPA Method 8082B

Analysis Code	Extraction	DL[1]	LOD[1]	LOQ[1]	Analyte	Spike Recovery Control Limits (%) [2,3]			RPD[4]
						LCS	MB/LCS Surrogate	Sample Surrogate	
Aqueous Samples (Separatory Funnel Extraction – EPA Method 3510C)									
PCBWSI 01-3018F	500 to 5 mL	0.130 µg/L	0.5 µg/L	1 µg/L	Aroclor 1016	45 – 121	--	--	≤ 40
		0.147 µg/L	0.5 µg/L	1 µg/L	Aroclor 1260	54 – 129	--	--	
		--	--	--	TCMX	--	40 – 118	38 – 118	
		--	--	--	DCBP	--	41 – 111	29 – 118	
PCBWSM 02-3021F	500 to 1 mL	0.0175 µg/L	0.05 µg/L	0.1 µg/L	Aroclor 1016	36 – **100**	--	--	≤ 40
		0.0174 µg/L	0.05 µg/L	0.1 µg/L	Aroclor 1260	41 – 113	--	--	
		--	--	--	TCMX	--	29 – **100**	25 – **100**	
		--	--	--	DCBP	--	39 – 116	**10** – 128	
PCBWLS	1000 to 0.5 mL[5]	0.00248 µg/L	0.005 µg/L	0.01 µg/L	Aroclor 1016	44 – 117	--	--	≤ 40
		0.00276 µg/L	0.005 µg/L	0.01 µg/L	Aroclor 1260	46 – 131	--	--	
		--	--	--	TCMX	--	31 – **100**	21 – **100**	
		--	--	--	DCBP	--	32 – 108	19 – 111	
TCLP Extract (Separatory Funnel Extraction – EPA Method 3510C)									
PCBWST	100 to 10 mL	0.130 µg/L [8]	5 µg/L	10 µg/L	Aroclor 1016	30 – 160	--	--	≤ 40
		0.147 µg/L [8]	5 µg/L	10 µg/L	Aroclor 1260	30 – 160	--	--	
		--	--	--	TCMX	--	30 – 160	30 – 160	
		--	--	--	DCBP	--	30 – 160	30 – 160	
Tissue Samples (Tissuemizer / Blender Extraction – EPA Method 3550C Modified) – Concentrations in µg/kg as received (wet weight)									
PCBUZI 09-3029F	10 g to 5 mL	2.92 µg/kg [6]	25 µg/kg	50 µg/kg	Aroclor 1016	30 – 160			≤ 40
		3.91 µg/kg [6]	25 µg/kg	50 µg/kg	Aroclor 1260	30 – 160			
		--	--	--	TCMX		30 – 160	30 – 160	
		--	--	--	DCBP		30 – 160	30 – 160	
PCBUZM 10-3027F	25 g to 5 mL	2.37 µg/kg [7]	10 µg/kg	20 µg/kg	Aroclor 1016	30 – 160			≤ 40
		1.06 µg/kg [7]	10 µg/kg	20 µg/kg	Aroclor 1260	30 – 160			
		--	--	--	TCMX		30 – 160	30 – 160	
		--	--	--	DCBP		30 – 160	30 – 160	
PCBUZL 11-3030F	25 g to 1 mL	2.37 [7] µg/kg	2 µg/kg	4 µg/kg	Aroclor 1016	30 – 160			≤ 40
		1.06 [7] µg/kg	2 µg/kg	4 µg/kg	Aroclor 1260	30 – 160			
		--	--	--	TCMX		30 – 160	30 – 160	
		--	--	--	DCBP		30 – 160	30 – 160	

(1) Detection Limit (DL), Limit of Detection (LOD) & Limit of Quantitation (LOQ) are defined in ARI SOP 1018S.
(2) Highlighted control limits (**bold font**) are adjusted from the calculated values to reflect that ARI does not use control limits < 10 for the lower limit or < 100 for the upper limit.
(3) 30 – 160 are default limits used when there is insufficient data to calculate historic control limits
(4) Acceptance criteria for the relative percent difference (RPD) between analytes in replicate analyzes. If C_O and C_D are the concentrations of the original and duplicate respectively then

$$RPD = \frac{|C_O - C_D|}{\frac{C_O + C_D}{2}} x100$$

(5) Low level extraction solvent is hexane instead of Methylene Chloride.
(6) LOD Study SM10
(7) MDL Study QZ25
(8) Based on PCBWSI until sufficient TCLP data is collected to calculate LOD.