Lower Duwamish Waterway

Groundwater Sampling for PCB Congeners and Aroclors

Data Report

FINAL

Prepared for

Toxics Cleanup Program
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Table of Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

EcoChem	EcoChem, Inc.
Ecology	Washington State Department of Ecology
EDD	electronic data deliverable
EIM	Environmental Information Management
EMF	Electronics Manufacturing Facility
EMPC	estimated maximum possible concentration
EPA	U.S. Environmental Protection Agency
HRGC	high-resolution gas chromatography
HRMS	high-resolution mass spectrometry
IDW	investigation-derived waste
KCIA	King County International Airport
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDW	Lower Duwamish Waterway
µg/L	micrograms per liter
mg/L	milligrams per liter
mL/min	milliliters per minute
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Model Toxics Control Act
OPR	ongoing precision and recovery
PCB	polychlorinated biphenyl
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RPD	relative percent difference
SAP	sampling and analysis plan
SDG	sample delivery group
SM	Standard Method
TCP	Toxics Cleanup Program
TDS	total dissolved solids
TSS	total suspended solids
TEF	toxic equivalency factor
TEQ	toxic equivalent
Vista	Vista Analytical Laboratory
WA DOT	Washington State Department of Transportation

1.0 Introduction

The Lower Duwamish Waterway (LDW) Superfund Site is an approximately 5-mile portion of the Duwamish River, which flows into Elliott Bay in Puget Sound, Seattle, Washington. The Washington State Department of Ecology (Ecology) is the lead agency for source control at the LDW site, as defined in the U.S. Environmental Protection Agency (EPA) *Record of Decision, Lower Duwamish Waterway Superfund Site* (EPA 2014a).

Ecology's Toxics Cleanup Program (TCP) currently administers Model Toxics Control Act (MTCA) Agreed Orders for remedial investigations, feasibility studies, and cleanup action plans for several cleanup sites adjacent to and near the LDW. Some sites may be sources of polychlorinated biphenyls (PCBs) to LDW surface water and sediments through the discharge of groundwater. PCB concentrations in groundwater discharging to surface water and sediments must meet a very low compliance standard to demonstrate protection of surface water and sediments. Current analytical methods for PCB Aroclors (EPA Method 8082) cannot measure low-enough levels to determine if PCB concentrations in groundwater are protective of surface water and sediments. Analysis of groundwater samples for PCB congeners using EPA Method 1668 is consistent with the recently issued TCP *Implementation Memorandum #12: When to Use EPA Method 1668 for PCB Congener Analyses* (Ecology 2015) and will allow for more accurate use and evaluation of data.

During data compilation efforts for the *Green-Duwamish River Watershed PCB Congener Study: Phase 1*, completed by Leidos (2016a) under a separate work assignment, no groundwater data for PCB congeners were identified. The *Green-Duwamish River Watershed PCB Congener Study: Phase 2 – Source Evaluation* recommended that groundwater data for PCB congeners be collected; these data could help to identify previously unknown types of sources and potentially reveal evidence of microbial dechlorination of PCBs (Leidos and Rodenburg 2017). Data collected as part of the current sampling task will help to fill this data gap. In addition, collection of concurrent PCB congener and Aroclor data in groundwater and surface water will provide information needed for source tracing and fingerprinting (pattern) analysis and will aid Ecology in assessing whether EPA Method 1668 is an appropriate method for analyzing samples collected at MTCA cleanup sites.

1.1 Purpose and Objectives

The primary objective of this sampling and analysis effort was to gather PCB congener and Aroclor data from groundwater within the LDW basin. The sampled properties were selected to collect groundwater from a widely distributed area in the LDW basin, which could be readily accessed by Ecology. Groundwater samples were collected from 17 properties and concurrently analyzed for PCB congeners and Aroclors. Samples were collected from existing wells at properties located within the LDW basin that are currently undergoing environmental investigations or cleanups (Figure 1-1). Surface water samples from the LDW were also collected at five of these properties which are located adjacent to the LDW. These surface water samples were collected in the vicinity of the most downgradient well at each property.

Sample analytical results may be used for the following purposes:

- Fill data gaps for PCB congeners in groundwater, as recommended during data compilation and source evaluation phases of the *Green-Duwamish River Watershed PCB Congener Study* (Leidos 2016a, Leidos and Rodenburg 2017).
- Allow more accurate use and evaluation of PCB data by collecting both congener and Aroclor data from multiple locations with a wide expected range of concentrations within the LDW basin and at individual properties.
- Determine whether there is correlation between total PCB congeners and Aroclors in the data set.
- Provide information on local urban background levels of PCB congeners in groundwater.
- Provide additional information for source tracing and fingerprinting (pattern) analysis.

1.2 Document Organization

Section 1.0 introduces the report. Section 2.0 describes field activities and sample collection methods and information. Analytical methods, results, and a summary of the data validation report are presented in Section 3.0. References are listed in Section 4.0.

2.0 Groundwater and Surface Water Sampling

This section summarizes the field sampling activities performed during this investigation. The proposed methods for sample collection, processing, identification, and documentation are described in detail in the *LDW Groundwater Sampling for PCB Congeners and Aroclors, Sampling and Analysis Plan and Quality Assurance Project Plan* (herein referred to as the Project Sampling and Analysis Plan/Quality Assurance Project Plan [SAP/QAPP]; Leidos 2017).

The following steps were taken to select the sampling locations.

- Ecology provided a list of properties in the LDW basin where groundwater samples could potentially be collected.
- Leidos reviewed property-specific groundwater data and aquifer information to identify potential sampling locations and tidally influenced areas.
- A list was created of preferred and alternate monitoring wells to sample and potential locations for surface water samples.
- A site walk was conducted at each property, with a property representative, to determine the following:
  - Verify that preferred and alternate monitoring wells were accessible and not damaged, and record any equipment downhole (tubing or pumps); based on this process, wells were added or removed, and the list was finalized.
  - Assess the feasibility of collecting surface water samples (if applicable) at the shore, and determine the most suitable sample collection method.
  - Identify an area at each property to store drums containing investigation-derived waste (IDW) consisting of groundwater and decontamination water.
  - Determine the sampling schedule and other logistics.
- An LDW tidal evaluation was conducted to determine the days and times most appropriate to collect samples during low tidal conditions in daylight hours.

Further information on the above process is provided in Section 2.1. Following this process, groundwater samples were collected from existing, accessible monitoring wells installed at each of the selected properties. In addition, surface water samples were collected at five properties adjacent to the LDW where access was available.

2.1 Sampling Locations

Seventeen properties were selected for sampling (presented in Figure 1-1 and listed in Section 2.2). Ten of these properties are located immediately adjacent to the LDW (referred to as adjacent properties) and seven of these properties are regionally upgradient from the LDW (referred to as inland properties). Nine of the 10 adjacent properties are Agreed Order sites administered by Ecology.[1] Three of the seven inland properties are Agreed Order sites

[1] Ecology is currently negotiating a new Agreed Order for the Jorgensen Forge site. The prior Agreed Order for the site was in place from 2007 to 2014.

administered by Ecology. The remaining four properties include Boeing's former Electronics Manufacturing Facility (EMF) at the King County International Airport (KCIA), the 80 S Hudson Street property, the Gray Line of Seattle property, and the Washington State Department of Transportation (WA DOT) Spokane Street property.

Monitoring wells used in this investigation were selected based on location, screen depth, accessibility, and prior concentrations of PCB Aroclors. For consistency, preferred and alternate wells targeted the shallow water table aquifer at each property.

Three groundwater monitoring wells were selected for sampling at each adjacent property: (1) a downgradient well, (2) a well located generally in the central area of the property, and (3) a well located generally in the upgradient portion of the property. At the adjacent properties, the downgradient well is also a near-shore well that typically is within the tidally influenced zone of the shallow aquifer. Central and upgradient wells that are within this aquifer were selected to ensure that data are comparable at individual properties and across the LDW basin. Wells were not targeted relative to specific local source areas on the properties (e.g., not immediately upgradient or downgradient of hot spots). One to three wells were sampled at each inland property (Figure 2-1).

Many properties have aquifers delineated into two or three depth zones, which may include a localized perched zone. Some locations have wells identified as partially screening a combination of two zones. For example, at the South Park Landfill property, a number of wells are identified as being screened within a combined perched zone and water table aquifer, including the upgradient well that was selected for sampling. However, the two available downgradient wells are screened slightly deeper in the water table aquifer, without a perched water component.

At two of the LDW inland properties, one monitoring well at each property was selected for sampling as a regional upgradient well because the wells appear to be located upgradient of any identified PCB contamination in the LDW corridor. One of these locations is on the west side of the LDW (upgradient of the South Park Landfill), and one is located on the east side of the LDW (upgradient of EMF at KCIA). For EMF, this upgradient well was the only well sampled at this property.

Monitoring wells for sampling were further selected by evaluating previous analytical data for PCB Aroclors in groundwater, although PCBs have not been analyzed at all properties. In this study, one goal was to select wells with a range of PCB Aroclor concentrations in groundwater across the property. To meet this objective, Leidos reviewed past sampling results and selected wells with samples that previously showed detections of PCBs (commonly including those with higher concentrations) and wells where PCBs had not been previously detected. This selection process seemed to provide the best likelihood of yielding a range of PCB congener concentrations in groundwater.

Leidos also identified alternate monitoring well locations at the properties, in case preferred wells proved unsuitable for sampling during the site walk or sampling phase of this investigation. A list of the preferred and alternate wells, along with property maps for each location, were presented in the Project SAP/QAPP. Section 2.5 lists the wells sampled during the field activities that had not been identified as preferred wells and other deviations from the Project SAP/QAPP.

During the well selection and planning process, the tidal impact at all sampling wells was evaluated to determine which wells appear to be significantly or negligibly impacted by tidal action. This involved reviewing field and laboratory measurements of previous groundwater samples (specific conductance, salinity, chloride, and total dissolved solids [TDS]), evaluating tidal studies where they have been performed (tidal amplitude and tidal lag at each well), and distance from the wells to the shoreline.

Surface water sampling was initially planned for all LDW adjacent properties. However, during and following the site walks, it was learned that access to the river shoreline was possible at only five adjacent properties where surface water sampling could be performed safely. All groundwater and surface water sample locations are shown on Figure 2-1 and on property maps provided in Appendix A.

2.2 Sample Collection and Handling Methods

This section describes the types and numbers of samples and the methodology for sample collection, identification, processing, equipment decontamination, and waste handling during sampling events. The list of target parameters, analytical methods by which all parameters were analyzed, method holding times, containers, and preservatives are included in the Project SAP/QAPP. The analytical methods used in this investigation are summarized in Section 3.1.

In this investigation, the following types of water samples were collected:

- Primary samples of groundwater and surface water.
- Filtered samples of groundwater and surface water.
- Field duplicate samples of groundwater and surface water.
- Equipment rinse samples for groundwater and surface water sampling activities.
- Source water blank samples for groundwater and surface water sampling activities.
- Waste disposal characterization samples of IDW water in drums.

Table 2-1 lists the number of samples for each sample type, environmental medium, and analytical parameter.

Five groundwater samples and one surface water sample were filtered in the laboratory to compare the PCB analytical results between filtered and unfiltered sample pairs. This was performed to give an indication of how suspended solids (turbidity) may impact the measured PCB concentrations in these water samples. Samples were selected for filtering based on an attempt to include locations with a range of turbidity and PCB concentrations. The laboratories conducted the filtering using 1-micron microfiber, binder-free, borosilicate glass filters. Prior to use, the laboratory heated the filters to 400 degrees Celsius in an oven to ensure that the glass filters were free of contamination prior to the filtration process.

Two groundwater samples and one surface water sample were collected as field duplicates to determine the precision and representativeness of PCB results by comparison to primary environmental samples. The field duplicates were collected in the same manner as the primary samples, and filling of bottles was sequential for each parameter.

Four equipment rinse samples were collected during the field activities to evaluate the potential for contaminated equipment to impact the samples with low levels of PCBs. All equipment rinse samples used laboratory-supplied reagent-grade water and were collected through both silicone and copper tubing sample collection materials using the peristaltic pump. Tubing was decontaminated prior to collecting the equipment rinse sample in the same manner as before collecting the environmental samples. Equipment rinse samples were analyzed for PCB congeners and Aroclors. In the data validation process, individual equipment rinse sample results were applied to pertinent groundwater and surface water samples based on the timing of collection.

Two source water blank samples were collected to provide data on PCBs potentially present in the laboratory-supplied water used for equipment rinses and for final decontamination rinsing. These samples were collected by pouring laboratory-supplied reagent-grade water directly into sampling jars and then analyzing for PCB congeners and Aroclors. One source water blank sample was collected near the beginning of the field investigation, and one sample was collected near the end of the field investigation.

For properties that required IDW drum pickup and disposal, water samples were collected from each drum after being filled. These samples represented a composite of all wells sampled at each property. These IDW samples were collected to assist in the waste profiles for pickup of each drum.

To derive unique sample identifiers for all samples, abbreviations were developed for each property, sample location, and sample type. Sample identifiers were defined by their property abbreviation, location identifier, date, and sample designator (the latter for field duplicates and filter splits), as shown below. A listing of individual samples, their collection dates/times, chemical analyses, and tidal information is included in Table 2-1.

Property Name	Abbreviation
LDW Adjacent Properties	
8801 Site/PACCAR	8801
Boeing Isaacson/Thompson	BIT
Crowley Marine Services	CMS
Douglas Management Dock	DMD
Duwamish Marine Center	DMC
Duwamish Shipyard	DS
Glacier Northwest	GNW
Industrial Container Services	ICS
Jorgensen Forge	JF
North Terminal 115	NT115
LDW Inland Properties	
80 S Hudson Street	SHS
Gray Line of Seattle	GLS
Electronics Manufacturing Facility	EMF
North Boeing Field	NBF
South Park Landfill	SPL
WA DOT Spokane Street	DOT
Whitehead Tyee	WT
Quality Assurance Samples	
Leidos Equipment Rinse	LER-ER-
Leidos Source Water Blank	LSB-SB-

Property Name	Abbreviation
Field Duplicate Sample	-D
Filtered Sample	-F
IDW Sample	-IDW-
Surface Water Sample	-SW-

Sample Type	Facility or Type Abbreviation	Location Identifier	Sample Collection Date	Sample Designator
Groundwater	DMC	MW-8	20170313	--
Groundwater, Filtered	SPL	MW-32	20170320	F
Surface Water	GNW	SW-1	20170321	--
Surface Water, Duplicate	CMS	SW-1	20170316	D
Equipment Rinse	LER	ER-1	20170406	--
Source Water Blank	LSB	SB-1	20170315	--

Note: Sample identifiers were developed by stringing together the characters from the four right columns (for example, SPL-MW-32-20170320-F). Entries in the table above are examples.

2.2.1 Groundwater Samples

At most sample locations, monitoring wells contained dedicated pump tubing that had been left in the well following previous sampling events. The types of tubing (and pumps at one site) that were present in each well are recorded in Table 2-2. The tubing was removed prior to water level monitoring and sampling for most of the wells, either during the site walks or immediately prior to sampling. No evaluation was performed on the impact to analytical results of tubing presence, type, or removal date.

Prior to groundwater sampling, water levels were measured at each well. Static water level measurements were made using a decontaminated electronic water level and measured to the nearest 0.01 foot below the well casing. All field measurements were entered into a bound logbook or field forms. Groundwater samples were collected using a low-flow peristaltic pump.

In a November 2016 Technical Memorandum, Leidos documented the potential for PCB contamination associated with sampling equipment tubing materials (Leidos 2016b). To minimize the potential for new tubing materials to contaminate the groundwater samples with PCB congeners at low levels, platinum-cured silicone tubing was used through the peristaltic pump. To further avoid the use of polyethylene or Teflon tubing (or other synthetic material), which may also release PCBs into the sample at low concentrations, thin-walled flexible copper tubing (0.25-inch outside diameter) was used down the well and attached directly to the silicone tubing. New tubing was used at each monitoring well and was rinsed with laboratory-grade purified water before use. Purging of groundwater wells also allowed the sample tubing to be purged with sample water.

During the low-flow purging process, care was taken to minimize drawdown of the water column in the well casing. Low-flow pumping rates were used to ensure minimal drawdown of the water level, with rates between 145 and 350 milliliters per minute (mL/min) across all sampled properties. Purging was considered complete when the field indicator parameters had stabilized for three successive readings, per the Project SAP/QAPP (Leidos 2017):

- pH ±0.1 standard units,

- temperature ±1 degree Celsius,
- specific conductance ±5 percent,
- oxidation-reduction potential ±15 millivolts,
- dissolved oxygen ±10 percent (for >0.5 milligrams per liter [mg/L]), and
- turbidity ±10 percent and a goal of <50 nephelometric turbidity units.

Turbidity, in particular, was carefully monitored in an attempt to obtain reasonably low turbidity values in all water samples. Water quality field instrumentation appropriate for the measurement of the above parameters was utilized (YSI 556 water quality meter and Hach 2100Q turbidity meter). Instrument calibration was performed on a daily basis. Final field measurements during purging at each sampling location, along with well information, are provided in Table 2-3.

Sampling activities for tidally influenced wells were conducted at or following low tide to increase the likelihood of collecting groundwater samples with minimal amounts of brackish river water that may have intruded the aquifer. This timing is important in the tidally impacted portion of each LDW adjacent property.

Wells that appeared to have a significant (non-negligible) tidal impact were sampled at low tide and during the interval following low tide in the LDW (Table 2-1). Tidally influenced wells were sampled beginning around the time of low tide in the LDW. At each adjacent property, the well closest to the shoreline was sampled first, based on typical tidal lag results from tidal surveys, followed successively by the tidally influenced wells farther inland. Wells that appeared to have a negligible tidal impact were sampled at any time during the day. The time windows of specific low-tide sampling events were selected based on the LDW tide reaching lower-than-average low tide for the months of February and March 2017 (+2.75 feet mean lower low water). Low tides that did not reach down to this level did not qualify as a low-tide sampling event. Sampling times were also selected based on fieldwork being conducted during the weekday and during normal daytime working hours for each facility.

2.2.2 Surface Water Samples

Surface water samples were collected from five LDW adjacent properties. Sample locations are shown on Figure 2-1 and on the property maps provided in Appendix A.

Surface water samples were collected from the shore or dock in shallow water, generally near the same time as the downgradient well sampling. Similar methods and materials as for groundwater sampling were followed for use of the peristaltic pump in sampling surface water. The inlet tubing for the pump was placed in the lower half of the water column at each location, far enough above the bottom layer to avoid entraining sediment into the sample. Low-flow pumping rates (between 275 and 540 mL/min) were used. Field parameters were also measured for surface water collection (Table 2-3).

2.3 Field Documentation

Documentation necessary to meet quality assurance (QA) objectives for this project included field notes and field forms, sample container labels, and chain-of-custody forms. The field documentation describes all sampling activities, sampling personnel, and weather conditions (Appendix B) and it records all modifications, decisions, and/or corrective actions to the study

design and procedures identified in the Project SAP/QAPP (Leidos 2017). Section 2.5 summarizes the deviations from the Project SAP/QAPP.

2.4 Waste Disposal and Handling Procedures

IDW generated during the field activities included purge water, decontamination fluids, personal protective equipment, and miscellaneous solid waste generated during sample collection activities.

The following waste handling procedures were used during the field activities:

- Final waste determinations are based on knowledge of where and how the waste was generated and analytical results from the sampling locations. Wherever possible, testing results from analytical samples collected as part of the sampling program were used to make waste determinations. Twelve samples were analyzed for Resource Conservation and Recovery Act metals in addition to the PCB analyses to develop a waste profile meeting the requirements of the IDW disposal company. These data were supplemented by the most recent analytical results available for each well from Ecology's Environmental Information Management (EIM) database.
- Potentially contaminated groundwater and decontamination fluid were stored at each property in a high-density polyethylene 30-gallon drum.
- Containers of IDW generated during field activities were labeled and dated with information appropriate for accurate tracking and identification of the containers and their contents. IDW containers were labeled as 'Pending Analysis' until the results of analytical testing were received. None of the IDW was designated as hazardous waste.
- Non-hazardous solid wastes that may be generated during field sampling activities, including gloves, foil, paper, plastic bags, disposable sampling equipment and other miscellaneous types of debris, were placed in plastic garbage bags for disposal in approved municipal waste receptacles.

2.5 Deviations from the Project SAP/QAPP

Samples were collected in accordance with the Project SAP/QAPP (Leidos 2017) when possible; however, some changes were required based on field conditions identified during the site walks, during pre-field planning, or on the day of sampling. These changes resulted from access considerations, the condition of monitoring wells, timing of the tidal cycle window, and changes requested by Ecology following completion of the final Project SAP/QAPP. The following deviations from the Project SAP/QAPP occurred during groundwater and surface water sampling activities:

- At Duwamish Shipyard, upgradient well DSIP2-17 was replaced by alternate well DSIP2-19 during the site walk due to access considerations.
- At North Terminal 115, upgradient well MW-1 was replaced by MW-20 during the site walk due to access considerations.
- At Industrial Container Services, a fourth well (DOF-MW8) was not sampled due to time constraints in the tidal window, with the prior approval of Ecology.

- At Duwamish Marine Center, downgradient well MW2 was replaced by MW-16 during the site walk due to access considerations.
- At Jorgensen Forge, downgradient wells MW-52 and MW-54 were replaced with a single well, MW-51. Central well MW-31 was replaced with well MW-48. These changes were made during the site walk due to access considerations.
- At Boeing Isaacson/Thompson, downgradient well I-203 was replaced by alternate well MW-10 during the site walk due to access considerations.
- At the South Park Landfill, due to access limitations, three wells instead of four were sampled: well MW-12 replaced well KMW-08 as the upgradient well, wells KMW-04 and KMW-05 in the central area were not sampled, and alternate well MW-31 was added as the most downgradient well.
- At Whitehead Tyee, upgradient well WT-MW-109 was replaced by well WT-MW-110 during the site walk due to access considerations.
- Three inland properties were added to the sampling program after the Project SAP/QAPP was completed. These properties were undergoing site hazard assessments by Ecology and included the following:
  - 80 S Hudson Street: two wells, MW-02 and MW-07;
  - Gray Line of Seattle: one well, MW-K01; and
  - WA DOT Spokane Street: one well, MW-2.
- Five groundwater samples and one surface water sample were collected and analyzed as filtered and unfiltered pairs at the request of Ecology. Collection of filtered samples was not described in the Project SAP/QAPP. Samples were filtered by the analytical laboratories using 1-micron glass filters. The six filtered samples that were added to the sampling program are:
  - DMD-MW-17-F,
  - ICS-DOF-MW1-F,
  - CMS-EMW-13S-F,
  - 8801-MW-16A-F,
  - SPL-MW-32-F, and
  - GNW-SW-1-F.
- Surface water samples were not collected at the following LDW adjacent properties due to access limitations to the shore and safety concerns:
  - North Terminal 115, Industrial Container Services;
  - Jorgensen Forge, Boeing Isaacson/Thompson; and
  - 8801 Site/PACCAR.

3.0 Analytical Results

As described in Section 2.0, groundwater and surface water samples were submitted to Ecology-accredited laboratories for the following analyses:

- Analytical Resources, Inc.:
  - PCB Aroclors (EPA SW-846 Method 8082A),
  - chloride (EPA Method EPA 300.0),
  - specific conductance (EPA 120.1),
  - total suspended solids (TSS) (Standard Method [SM] 2540D), and
  - TDS (SM2540C).
- Vista Analytical Laboratory (Vista):
  - PCB congeners (EPA Method 1668C).

Laboratory data reports are provided as Appendix C.

3.1 Analytical Methods

Critical analytical methods for this project included PCB congeners and Aroclors. All other analytical data were collected for informational purposes and did not undergo data validation and are not discussed in detail in this report. These include the conventional parameters: chloride, specific conductance, TSS, and TDS. Total solids were included as one of the non-critical analyses in the Project SAP/QAPP (Leidos 2017), but due to an oversight during sample submittal, total solids were not requested. If needed, total solids can be determined by the addition of TDS and TSS.

All samples were analyzed by Vista for PCB congeners using an SPB-octyl gas chromatography column. Additional details regarding analytical QA/quality control (QC) requirements are presented in the Project SAP/QAPP. Sample analyses conformed to standard EPA and Puget Sound Estuary Protocols (1997) guidance and the Project SAP/QAPP. EPA Method 1668C, *Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by high-resolution gas chromatography/high-resolution mass spectrometry* (HRGC/HRMS) (EPA 2010), quantifies the chlorinated biphenyl congeners in environmental samples by isotope dilution and internal standard HRGC/HRMS. Prior to instrument analysis, the sample is prepared by spiking a known volume of water (approximately 1 liter) with labeled compounds followed by separatory funnel extraction using methylene chloride. The remaining extract is then cleaned up using the appropriate procedures and concentrated to the appropriate final volume before analysis.

Method 8082A, *Polychlorinated Biphenyls by Gas Chromatography* (EPA 2007), determines the concentration of PCBs as Aroclors using open-tubular capillary columns with electron capture detectors. Prior to analysis, the sample is extracted using the appropriate extraction technique. In general, surrogate standards are added to a measured weight of sample, which is extracted using an organic solvent. Following appropriate cleanup methods, the extract is concentrated to a designated final effective volume.

Results are presented by Leidos using the same number of significant figures reported by the laboratory. Calculated totals were reported to two significant figures for Aroclors and three significant figures for congeners. Calculated analyte totals were calculated as described below:

- Total PCB congeners were calculated using only detected values for the individual congener results. If an individual sample has none of the 209 PCB congeners detected, the final total PCB congener result will be given a value equal to the highest detection limit of the individual congeners and assigned a U-qualifier. PCB congeners that did not meet minimum method requirements for qualitative determination (i.e., estimated maximum possible concentrations [identified with a UEMPC qualifier by the laboratory]) were qualified as non-detects during data validation. Approximately 8 percent of the individual congener results were UEMPC-qualified; treating these as non-detects could result in some underestimation of total PCB concentrations, particularly for samples where fewer individual congeners were detected.
- Total PCB Aroclors were calculated in accordance with the procedures described in the Washington State Sediment Management Standards using only detected values for seven Aroclor mixtures (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260). No additional Aroclors were identified in the samples collected for this study. For samples in which none of the Aroclor mixtures were detected, the total PCB Aroclor results were given a value equal to the highest reporting limit of the individual Aroclor mixtures and assigned a U-qualifier.

PCB congener toxic equivalent (TEQ) concentrations are calculated using the World Health Organization consensus toxic equivalency factor (TEF) values (Van den Berg et al. 2006) for mammals, as presented below. The TEQ concentration is calculated as the sum of each detected congener concentration multiplied by the corresponding TEF value. When the congener concentration is reported as non-detect, then the TEF is multiplied by one-half the detection limit.

PCB Congener TEF Values	
PCB Congener IUPAC Number	**TEF Value**
77	0.0001
81	0.0003
105	0.00003
114	0.00003
118	0.00003
123	0.00003
126	0.1
156	0.00003
157	0.00003
167	0.00003
169	0.03
189	0.00003

IUPAC = International Union of Pure and Applied Chemistry.

3.2 Analytical Results for PCBs

Section 3.2.1 summarizes analytical results for total PCB congeners and Aroclors. PCB congener and Aroclor results in individual samples are compared in Section 3.2.2, and filtered/unfiltered sample results are compared in Section 3.2.3. Section 3.2.4 compares the results from field duplicate pairs.

Complete analytical results for all PCB congeners and Aroclors in individual samples are provided in Appendix D, Table D-1.

3.2.1 Total PCBs in Groundwater and Surface Water

Total PCB congener concentrations for all 51 groundwater samples and 7 surface water samples, including filtered samples and duplicates, are listed in Tables 3-1 (groundwater) and 3-2 (surface water), and in Appendix Table D-1. Relative concentrations of total PCB congeners in groundwater are shown on Figure 3-1.

PCB congener and Aroclor concentrations in groundwater varied between properties. PCB Aroclors were not detected in any of the surface water samples. Summary statistics for groundwater and surface water samples are presented below. Results from duplicate samples were averaged across the primary and duplicate samples in the table below. The congener results for sample WT-MW-110 appear to be anomalous compared to the duplicate sample and were excluded from this summary (see Section 3.2.4). The results from WT-MW-110-D are included.

	Frequency of Detection	Minimum Detected Concentration (µg/L)	Median Detected Concentration (µg/L)	Average Detected Concentration (µg/L)	Maximum Detected Concentration (µg/L)
Groundwater Samples					
Total PCB congeners	44 / 44	0.0000131	0.000809	0.0322	0.994
Total PCB Aroclors	8 / 44	0.0050	0.044	0.17	0.89
Surface Water Samples					
Total PCB congeners	5 / 5	0.000275	0.000633	0.000900	0.00217
Total PCB Aroclors	0 / 5	--	--	--	--

Figure 3-2 shows average concentrations of PCB congeners and Aroclors at each property. Another way to view the PCB congener results in groundwater is by means of a rank order chart (Figure 3-3). The rank order chart is generated by sorting the detected results in order from low to high, and then assigning a rank order from 1 to n, where n is the total number of samples. The results (y-axis) are then plotted against the rank order (x-axis). The rank order chart provides a useful overview of the range of detected concentrations; it can be used to assess the range of concentrations that may be considered 'typical' of the sampled population versus those that may be considered 'elevated.'

3.2.2 Comparison of PCB Congeners and Aroclors

For the 11 samples (8 unfiltered samples and 3 filtered samples) in which Aroclors were detected, the total PCB Aroclor and total PCB congener concentrations were compared to

determine whether there is a correlation between the results. The ratio of total PCB congener and PCB Aroclor concentration is shown below.

Property	Sample	Total Detected PCB Congeners (µg/L)		Total Detected PCB Aroclors (µg/L)		Ratio of Total Aroclors to Total Congeners
Glacier Northwest	GNW-MW-33S	0.00655	J	0.0080	J	1.2
Douglas Management Dock	DMD-MW-17	0.0421	J	0.063	J	1.5
	DMD-MW-17-F	0.00983	J	0.043	J	4.4
Industrial Container Services	ICS-DOF-MW1	0.197	J	0.27	J	1.4
	ICS-DOF-MW1-F	0.0297	J	0.036	J	1.2
	ICS-SA-MW2	0.0698	J	0.091	J	1.3
8801 Site/PACCAR	8801-MW-16A	0.0352	J	0.024		0.68
	8801-MW-16A-F	0.0185	J	0.023		1.2
North Boeing Field	NBF-NGW521	0.994	J	0.89		0.90
	NBF-NGW520	0.00564	J	0.0050	J	0.89
	NBF-NGW252	0.00727	J	0.012		1.7

-F = Laboratory filtered sample. J = Estimated concentration.

A linear regression was performed to determine the strength of correlation, and an r-squared value was calculated. The correlation is quite strong, with an r-squared value of 0.988 (Figure 3-4). For samples with congener concentrations less than about 0.005 micrograms per liter (µg/L), PCB Aroclor analysis was generally not able to detect the presence of PCBs.

For samples in which PCB Aroclors were not detected, the total PCB congener concentration was below the reporting limit for PCB Aroclors in all but two samples. The total PCB congener concentration in samples DMC-MW-16 and CMS-EMW-13S exceeded the reporting limit for total PCB Aroclors.

3.2.3 Comparison of Filtered and Unfiltered Samples

Five groundwater samples and one surface water sample were analyzed as an unfiltered and filtered pair to evaluate the degree to which solids in water samples may contribute to PCB concentrations. Filtered/unfiltered sample pairs are summarized below.

Site	Sample	Total PCB Congeners (µg/L)		Total PCB Aroclors (µg/L)	
Douglas Management Dock	DMD-MW-17	0.0421	J	0.063	J
	DMD-MW-17-F	0.00983	J	0.043	J
Industrial Container Services	ICS-DOF-MW1	0.197	J	0.27	J
	ICS-DOF-MW1-F	0.0297	J	0.036	J
Crowley Marine Services	CMS-EMW-13S	0.0153	J	0.010	U
	CMS-EMW-13S-F	0.00134	J	0.010	U
8801 Site	8801-MW-16A	0.0352	J	0.024	
	8801-MW-16A-F	0.0185	J	0.023	
South Park Landfill	SPL-MW-32	0.0000152	J	0.010	U
	SPL-MW-32-F	0.00000743	U	0.010	U
Glacier Northwest (surface water)	GNW-SW-1	0.000468	J	0.010	U
	GNW-SW-1-F	0.0000604	J	0.010	U

-F = Filtered sample. J = Estimated concentration. U = Not detected.

Total PCB congener concentrations measured in the unfiltered samples were approximately 2 to 11 times greater than the concentrations in the six corresponding filtered samples. This suggests that PCBs bound to solids or other forms in the aqueous media are largely being retained by a 1-micron microfiber filter. There does not appear to be a significant relationship between TSS concentrations and the reduction in PCB concentrations between filtered and unfiltered samples. Appendix E provides figures that compare the contribution of each PCB homolog group and individual PCB Aroclors in the filtered/unfiltered sample pairs.

3.2.4 Comparison of Field Duplicate Samples

Two groundwater samples and one surface water sample were collected as field duplicates of primary environmental samples, and analyzed for PCB Aroclors and congeners. Pairs of field duplicates and their corresponding primary samples are summarized below.

Site	Sample	Total PCB Congeners (µg/L)		RPD
Crowley Marine Services	CMS-SW-1	0.000936	J	2.74 percent
	CMS-SW-1-D	0.000962	J	
Boeing Isaacson/Thompson	BIT-MW-10	0.000546	J	10.7 percent
	BIT-MW-10-D	0.000608	J	
Whitehead Tyee	WT-MW-110	0.00445	J	181 percent
	WT-MW-110-D	0.000223	J	

J = Estimated concentration.

Relative percent difference (RPD) values for total PCB congeners in this table indicate that one groundwater sample pair and the surface water sample pair have relatively low RPDs (10.7 percent and 2.74 percent, respectively). However, one groundwater sample pair, collected at the Whitehead Tyee property, has a very large RPD of 181 percent. During collection of this sample, it was raining heavily with a strong wind, and well WT-MW-110 was situated immediately next to a tall container that towered above the sampling team. It is believed that a small amount of dirt or paint containing PCBs may have become dislodged from this container during the rainstorm and contaminated one of the sample jars. Because this elevated detection in WT-MW-110 (0.00445 ug/L total PCB congeners) is 20 times higher than the concentration in the field duplicate (0.000223 ug/L), it is considered to be anomalous and is not used in statistical calculations in this report.

3.2.5 Comparison of Quality Assurance Water Blank Samples

The average total PCB congener concentrations in the equipment rinse and source water blank samples were several orders of magnitude below the average for all groundwater and surface water samples collected for this study, as shown below. No PCB Aroclors were detected in the equipment rinse or source water blank samples. Full analytical results for the equipment rinse and source water blank samples are provided in Appendix D, Table D-3.

		Total PCB Congeners (µg/L)		
Sample Type	Number of Samples	Minimum	Maximum	Average
Equipment Rinse	4	4.19E-07	2.36E-05	8.33E-06
Source Water Blank	2	2.09E-05	4.30E-05	3.19E-05
Unfiltered Groundwater and Surface Water	51	4.03E-05	1.37E+00	2.48E-01

3.3 Analytical Results for Conventional Parameters

Table D-2 lists concentrations for the conventional parameter analyses, including chloride, conductivity, TDS, and TSS. This table is arranged from upgradient to downgradient (top to bottom) within each property. For the LDW adjacent properties, it is expected that the three approximate measures of salinity (chloride, conductivity, and TDS) should typically increase from upgradient to downgradient across a property. Although many exceptions exist, this pattern is expected because tidal influence on the aquifer, with brackish water intrusion, is more prevalent closer to the shore.

At four of the LDW adjacent properties, this salinity pattern described above is not present, and the highest salinity values are not at the downgradient well. For example, at North Terminal 115, the central well (MW-3) has more than an order of magnitude greater TDS and other salinity indicators than the downgradient well (MW-10). This is explained because this property does not show tidal influence of any significance (Table 2-1), and the high TDS is likely a result of factors besides intrusion from the river. Another exception is Boeing Isaacson/Thompson, where the downgradient well close to the shore (MW-10) has approximately one order of magnitude lower TDS and other indicators than the central well (MW-13); the reason for this pattern is unknown.

At four of the five surface water sample locations, the surface water has lower indications of salinity than the nearby downgradient well. Because the surface water was generally sampled at a time close to the LDW low tide, surface water salinity is expected to be relatively low, yet the adjacent aquifer would still contain brackish water due to intrusion. The exception is Glacier Northwest where surface water salinity is greater than MW-33S. However, this property has little indication of tidal influence, and surface water was collected 4 hours prior to LDW low tide (Table 2-1). Surface water samples at all locations except Crowley Marine Services show expected high levels of salinity indicators.

For an inland property, the WA DOT Spokane Street property shows unusually high levels of TDS and other salinity indicators.

3.4 Quality Assurance/Quality Control and Data Validation

All PCB congener and Aroclor results gathered during this investigation were independently validated by EcoChem, Inc. (EcoChem) of Seattle, Washington. A summary-level, EPA Stage 2B data validation was performed on all PCB Aroclor results; a full-level, EPA Stage 4 data validation was performed on all PCB congener results. The data were reviewed using guidance and QC criteria documented in the analytical methods; in Appendix B of the Project SAP/QAPP (Leidos 2017); *Contract Laboratory Program, National Functional Guidelines for*

Organic Data Review (EPA 2008, 2014b); and *National Functional Guidelines for High Resolution Superfund Methods Data Review* (EPA 2016).

The Leidos project chemist reviewed the laboratory QA/QC results for each analysis. EcoChem submitted a data validation report that summarized the results. The Leidos project chemist reviewed the data validation report against the QA/QC results submitted in the laboratories' analytical data packages and contacted EcoChem to resolve any discrepancies. A summary of the QA/QC review and validation results is provided below. The complete data validation report is provided in Appendix F.

Validated sample results will be submitted to Ecology's EIM database following completion of the final data report. Information regarding EIM can be found on Ecology's website: <http://www.ecy.wa.gov/eim/>.

3.4.1 PCB Congeners

Sample receipt, preservation, and holding times were met for all samples. All initial calibrations and continuing calibration verifications met method acceptance criteria. The required target analyte list was complete. Several results were recalculated from the raw data. No transcription or calculation errors were found. The electronic data deliverable (EDD) was verified against the laboratory report for all data packages, and no errors were found. In addition, the laboratory submitted all required deliverables and followed adequate corrective action processes, and all anomalies were discussed in the case narratives for each data package. All data packages were complete.

The specific QC parameters examined during the data validation process are discussed below only if there were QC outliers or deviations from method acceptance criteria in the project data sets. The number of qualified congener results, along with the data validation qualifier and the data qualifier reason code, are provided for each QC parameter examined. In addition, the potential analytical bias (high or low) is provided when QC outliers provide the potential bias in the results. For purposes of the discussion presented below, the term PCB congener result(s) is used to represent single PCB congeners or groups of PCB congeners that co-elute together and are reported together (e.g., PCB-129/138/160/163).

Sample Receipt, Preservation and Holding Times

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2° to 6°C. All samples were received at temperatures less than the lower acceptance criteria, the lowest at 0.1°C. These temperature outliers were determined to have no effect and no data were qualified. All samples were extracted and analyzed within the method specified holding time.

Laboratory and Field QC Blanks

Four equipment rinse blanks and two source water blanks were collected during the field activities, as described in Section 2.0. To assess the impact of any blank contaminant on the reported sample results, an action level was established at five times the concentration reported in the blank. If a contaminant was reported in an associated field sample and the concentration was less than the action level, the result was qualified as not detected (U). The source water

blanks were evaluated for potential laboratory contamination by using the associated method blanks. Eight PCB congener results were qualified as non-detect in the source water blanks due to method blank contamination with reason code 7. Source water blanks and method blank results were used to determine results that should be qualified as non-detect (U) in the equipment rinse blanks. The remaining detects in the rinse blanks and the associated method blanks were used to evaluate potential contamination in the field samples. A total of 37 PCB congener results were qualified as non-detect (U) with reason code 7 in the rinse blanks due to method blank and source water blank contamination. A total of 258 PCB congener results were qualified as non-detect (U) with reason code 7 in the field samples due to method blank contamination. A total of 72 field sample PCB congener results were qualified as not detected (U) with reason code 6 due to rinse blank contamination.

LCS/LCSDs

An ongoing precision and recovery (OPR) standard is required with each analytical batch. The OPR is a method blank spiked with known quantities of each PCB congener and is used to assure that the percent recovery produced by the laboratory remains within the recovery limits of 60 to 135 percent specified by the method. The OPR analysis is equivalent to the analysis of a laboratory control sample (LCS) and was discussed in the data validation report using the term LCS and is discussed in this report using the term LCS. For this project, the laboratory prepared and analyzed an LCS duplicate (LCSD) to obtain analytical precision measurement by comparing the RPD results for each PCB congener in each LCS/LCSD pair to the RPD acceptance criteria of 25 percent used to evaluate LCS/LCSD precision. Only PCB congener detects were qualified if RPD acceptance criteria were not met. PCB congeners were qualified only when both the LCS and LCSD recovery criteria were not met. There were no instances where both the LCS and LCSD were out of recovery acceptance criteria for any one PCB congener; therefore, no PCB congener results were qualified due to LCS/LCSD recoveries, with the following exception. Due to a laboratory oversight, an LCSD was not analyzed with sample delivery group (SDG) 1700413, and the LCS recovery for PCB-8 was above the upper control limit, resulting in the estimation of two PCB congener results with reason code 10H. LCS/LCSD RPD acceptance criteria were met for all SDGs, with the exception of one LCS/LCSD pair associated with SDG 1700373. As a result, 12 PCB congener results were qualified as estimated (J) with reason code 9.

MS/MSDs

Matrix spike (MS)/matrix spike duplicate (MSD) analyses are performed to measure method accuracy and precision in the presence of matrix effects. MS/MSD pairs are prepared by spiking aliquots of a field sample with known concentrations of target analytes and subjected to the entire analytical procedure as all field samples. Due to a relatively small volume collected for MS/MSD analysis, the laboratory split out the volume for MS/MSD purposes, reserving some extra volume in case re-extraction and re-analysis were required. The impact of not using the entire container contents to prepare the MS/MSD could result in a slightly low bias in the primary sample, the MS volume, and the MSD volume results because the sample containers could not be rinsed with solvent prior to analysis. This deviation should have limited impact on data usability for the primary sample and should have no impact on the accuracy and precision measurements produced by the MS/MSD analysis. Only the primary sample is qualified due to MS/MSD outliers. One PCB congener result was qualified as estimated with reason code JH due

to MS/MSD recovery above the upper control limit, and one PCB congener result was qualified as estimated (J) with reason code 9 due to a RPD result above the upper control limit.

Field Duplicate Analysis

Field duplicates are collected and analyzed to measure the overall precision of field and laboratory components for any given analytical method. Three field duplicates were collected for this project. Two field duplicate pairs were analyzed with SDG 1700409. One result for PCB-206 did not meet the RPD acceptance criteria of 35 percent and was qualified as estimated (J) with reason code 9. One field duplicate pair was analyzed with SDG 1700409. Primary sample WT-MW-110-20170327 and field duplicate WT-220-30270327-D produced unusually high RPDs of up to 196 percent. As a result, 65 PCB congener results were qualified as estimated (J/UJ) in both the primary and field duplicate samples. As explained in Section 3.2.4, the unusually high RPD may have resulted from the heavy rain and windy conditions that potentially introduced contamination into one of the sample containers.

Isotopically Labeled Compounds

Isotopically labeled compounds are added to a homogenized aliquot of sample prior to extraction. The labeled compounds correspond to specific PCB congeners and are used in the quantitation of individual congeners and afford recovery correction for all congeners. The percent recovery for labeled compounds was within method-specified control limits with the following exception. One isotopically labeled compound was above the upper control limit of 145 percent in one sample. No action was required because the associated target PCB congeners were not detected in this sample.

Compound Identification, Quantitation, and Reporting Limits

When compound identification did not meet the ion ratio for analyte identification, the laboratory reported the analyte as not detected with a UEMPC qualifier. Because the compound was appropriately qualified as not detected in these instances, no action was required by the data validator.

Several samples had slightly elevated reporting limits due to sample containers that were not completely filled in the field, providing less than the 1 liter required to meet QAPP-specified reporting limits. Samples DOT-MW-2-20170406 and GLS-MW-K01-20170406 had elevated reporting limits because these samples were used for MS/MSD purposes and the laboratory held some sample back from the primary analysis in case more sample volume was needed for re-extraction and re-analysis.

Six samples were filtered in the laboratory using a 1-micron borosilicate glass filter prior to extraction and analysis. In instances where the filtered results were higher than the unfiltered results, the results were evaluated to determine if the sample results were significantly different by examining the RPD value between the two results. If the filtered result was higher than the unfiltered result and the RPD between the two PCB congener results exceeded 35 percent, the results were qualified as estimated (J/UJ) in both the filtered and unfiltered sample. Six PCB congener results were estimated with reason code 14 due to the comparison between filtered and unfiltered samples.

3.4.2 PCB Aroclors

Sample receipt, preservation, and holding times were determined to be acceptable for all samples. All initial calibrations and continuing calibration verifications met method acceptance criteria with the exception noted above that did not result in qualification of sample results. All laboratory method blanks, source water blanks, and equipment rinse blanks were free from contamination. All surrogate and MS/MSD accuracy and precision met method acceptance criteria, where appropriate. The required target analyte list was complete for all samples. Several results were recalculated from the raw data. No transcription or calculation errors were found. The EDD was verified against the laboratory report for all data packages, and no errors were found. In addition, the laboratory submitted all required deliverables and followed adequate corrective action processes and all anomalies were discussed in the case narratives for each data package. All data packages were complete.

The specific QC parameters examined during the data validation process are discussed below if there were QC outliers. The number of qualified congener results, along with the data validation qualifier and the data qualifier reason code, are provided for each QC parameter examined. In addition, the potential analytical bias (high or low) is provided when QC outliers provide the potential bias in the results.

Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2 to 6 degrees Celsius. All samples were received at temperatures less than the lower acceptance criterion, the lowest at 0.1 degree Celsius. These temperature outliers were determined to have no effect, and no data were qualified. All samples were extracted and analyzed within the method-specified holding time.

One or more samples reported were extracted after the 7-day extraction holding time indicated in the Project SAP/QAPP (Leidos 2017). Current SW846 guidance states that, when samples are held under the proper storage conditions (cool, 0 to 6 degrees Celsius), the holding time is up to 1 year. All samples for this project were held under the proper storage conditions; therefore, no qualifiers were applied.

Continuing Calibration

Some continuing calibration exceeded the upper control limit. Because high continuing calibrations represent a possible high bias and the associated field samples were non-detect for PCB Aroclors, no qualifiers were applied.

LCS/LCSDs

The LCS recovery for Aroclor 1260 was below the lower control limit in two LCSs. In both instances, Aroclor 1016 recoveries were acceptable. As a result, 32 PCB Aroclor results were qualified as estimated (J/UJ) with reason code 10L.

Compound Identification, Quantitation, and Reporting Limits

RPD comparison between the results produced on the primary analytical column and the confirmation analytical column are used as a measure to assess the accuracy of compound

identification. Acceptance criteria for column comparison are 40 percent RPD. One Aroclor 1248 result was qualified as estimated (J) with reason code 3 because the RPD was slightly above criteria at 42 percent.

For sample ICS-DOF-MW1-20170329-F, the reporting limit for Aroclor 1248 was elevated due to matrix interferences.

Sample NBF-NGW521-20170322 was re-analyzed at a 10 times dilution due to a high level of Aroclor 1248 in the 1 time dilution. Both sets of analyses were reported. The Aroclor 1248 result from the original analysis exceeded the calibration range of the instrument and was flagged do-not-report (DNR-20). The results for all other Aroclors in the dilution were flagged as do-not-report (DNR-11).

3.4.3 Overall Quality Assurance/Quality Control and Data Validation Assessment

All analytical data, data validation qualifiers, and QC results were evaluated to determine the confidence with which the results could be used in the decision-making process. An evaluation of the data quality parameters against method and the Project SAP/QAPP (Leidos 2017) acceptance criteria, as discussed in the preceding sections, was used to determine the overall data usability. No sample results were rejected, indicating excellent data completeness at 100 percent complete and usable for decision-making. Results that were qualified as qualified U, UJ, J, or NJ for various reasons encountered minor analytical problems, and potential limitations are discussed in the preceding sections, but they are considered fully usable for decision-making.

4.0 References

Ecology (Washington State Department of Ecology). 2015. *Implementation Memorandum #12: When to Use EPA Method 1668 for PCB Congener Analyses*. Publication No. 15-09-052. From Jeff Johnston, Section Manager, Washington State Department of Ecology Information and Policy Section, Toxics Cleanup Program. July 22, 2015. Available online at: <https://fortress.wa.gov/ecy/publications/documents/1509052.pdf>.

EPA (U.S. Environmental Protection Agency). 2007. SW-846 Method 8082A. Polychlorinated Biphenyls by Gas Chromatography. February.

EPA. 2008. *Contract Laboratory Program, National Functional Guidelines for Organic Data Review*. Office of Emergency and Remedial Response. EPA-540-R-08-01. June.

EPA. 2010. EPA Method 1668C. Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS. April.

EPA. 2014a. *Record of Decision, Lower Duwamish Waterway Superfund Site*. Region 10. November.

EPA. 2014b. Office of Superfund Remediation and Technology Innovation. USEPA Contract Laboratory Program, National Functional Guidelines for Superfund Organic Data Review. EPA-540-R-014-002-01. Washington, DC. August 2014

EPA. 2016. *National Functional Guidelines for High Resolution Superfund Methods Data Review*. Office of Superfund Remediation and Technology Innovation. OLEM 9200.3-115. EPA 542-B-16-001. April.

Leidos. 2016a. *Green-Duwamish River Watershed PCB Congener Study: Phase 1*. Prepared for Washington State Department of Ecology, Toxics Cleanup Program. April.

Leidos. 2016b. *Technical Memorandum: Potential for PCB Contamination from Sampling Equipment Tubing Materials*. November 23.

Leidos. 2017. *LDW Groundwater Sampling for PCB Congeners and Aroclors, Sampling and Analysis Plan and Quality Assurance Project Plan*. Prepared for Washington State Department of Ecology, Toxics Cleanup Program. February.

Leidos and L.A. Rodenburg. 2017. *Green-Duwamish River Watershed, PCB Congener Study: Phase 2*. Prepared for Washington State Department of Ecology, Toxics Cleanup Program. June.

PSEP (Puget Sound Estuary Program). 1997. *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound*. U.S. Environmental Protection Agency, Region 10, Seattle, WA. for Puget Sound Estuary Program. April.

Van den Berg, M., L.S. Bimbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, and R. Peterson. 2006. *The 2005 World Health Organization Re-Evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds*. Prepared for the World Health Organization. ToxSci Advance Access published July 7, 2006. Published by Oxford University Press on behalf of the Society of Toxicology.

TABLES

Table 2-1. Groundwater and Surface Water Sampling and Analysis Information

Sample Location	Sample Identifier	Sample Date	Sample Time	Time of LDW Low Tide	Tidal Influence at Well	PCB Congeners and Aroclors	Conventional Analyses	IDW RCRA Metals
LDW Adjacent Properties								
Duwamish Shipyard								
DSIP2-19	DS-DSIP2-19-20170314	03/14/17	1210	1324	No	X	X	--
DSI-PZ-01	DS-DSI-PZ-01-20170313		1630		Yes	X	X	--
DSI-MW-06	DS-DSI-MW-06-20170312		1355		Yes	X	X	--
Surface Water	DS-SW-1-20170311		1405		--	X	X	--
Waste Drum	DS-IDW-20170313		1605		--	--	--	X
Glacier Northwest								
MW-32S	GNW-MW-32S-20170321	03/21/17	1120	1847	No	X	X	--
MW-4S	GNW-MW-4S-20170321		1250		No	X	X	--
MW-33S	GNW-MW-33S-20170321		1438		No	X	X	--
Surface Water	GNW-SW-1-20170321		1440		--	X	X	--
Surface Water	GNW-SW-1-20170321-F		1440		--	X	--	--
Waste Drum	GNW-IDW-20170321		1530		--	--	--	X
North Terminal 115								
MW-20	NT115-MW-20-20170317	03/17/17	1445	1515	No	X	X	--
MW-3	NT115-MW-3-20170317		1250		No	X	X	--
MW-10	NT115-MW-10-20170317		1115		No	X	X	--
Waste Drum	NT115-IDW-20170317		1820		--	--	--	X
Douglas Management Dock								
MW-11	DMD-MW-11-20170330	03/30/17	1115	1340	No	X	X	--
MW-17	DMD-MW-17-20170330		1245		No	X	X	--
MW-17	DMD-MW-17-20170330-F		1245		No	X	--	--
MW-15	DMD-MW-15-20170330		1435		Yes	X	X	--
Surface Water	DMD-SW-1-20170330		1430		--	X	X	--
Waste Drum	DMD-IDW-20170330		1530		--	--	--	X
Industrial Container Services								
DOF-MW3	ICS-DOF-MW3-20170329	03/29/17	1020	1256	No	X	X	--
DOF-MW1	ICS-DOF-MW1-20170329		1505		Yes	X	X	--
DOF-MW1	ICS-DOF-MW1-20170329-F		1505		Yes	X	--	--
SA-MW2	ICS-SA-MW2-20170329		1330		Yes	X	X	--
Waste Drum	ICS-IDW-20170329		1600		--	--	--	X

Table 2-1. Groundwater and Surface Water Sampling and Analysis Information (continued)

Sample Location	Sample Identifier	Sample Date	Sample Time	Time of LDW Low Tide	Tidal Influence at Well	PCB Congeners and Aroclors	Conventional Analyses	IDW RCRA Metals
Duwamish Marine Center								
MW-10	DMC-MW-10-20170313	03/13/17	1640	1250	Yes	X	X	--
MW-8	DMC-MW-8-20170313		1530		Yes	X	X	--
MW-16	DMC-MW-16-20170313		1323		Yes	X	X	--
Surface Water	DMC-SW-1-20170313		1245		--	X	X	--
Waste Drum	DMC-IDW-20170313		1640		--	--	--	X
Crowley Marine Services								
EMW-1S	CMS-EMW-1S-20170316	03/16/17	1305	1436	No	X	X	--
DMW-6A	CMS-DMW-6A-20170316		1725		Yes	X	X	--
EMW-13S	CMS-EMW-13S-20170316		1505		Yes	X	X	--
EMW-13S	CMS-EMW-13S-20170316-F		1505		Yes	X	--	--
Surface Water	CMS-SW-1-20170316		1500		--	X	X	--
Surface Water	CMS-SW-1-20170316-D		1500		--	X	--	--
Waste Drum	CMS-IDW-20170316		1820		--	--	--	X
Jorgensen Forge								
MW-23	JF-MW-23-20170331	03/31/17	1205	1426	No	X	X	--
MW-48	JF-MW-48-20170331		1330		No	X	X	--
MW-51	JF-MW-51-20170331		1505		Yes	X	X	--
Waste Drum	JF-IDW-20170331		1530		--	--	--	X
Boeing Isaacson/Thompson								
MW-25	BIT-MW-25-20170315	03/15/17	1215	1359	No	X	X	--
MW-13	BIT-MW-13-20170315		1355		No	X	X	--
MW-10	BIT-MW-10-20170315		1555		Yes	X	X	--
MW-10	BIT-MW-10-20170315-D		1555		Yes	X	--	--
Waste Drum	BIT-IDW-20170315		1600		--	--	--	X
8801 Site/PACCAR								
MW-16A	8801-MW-16A-20170328	03/28/17	1115	1216	No	X	X	--
MW-16A	8801-MW-16A-20170328-F		1115		No	X	--	--
MW-42A	8801-MW-42A-20170328		1255		No	X	X	--
MW-30A	8801-MW-30A-20170328		1430		Yes	X	X	--
Waste Drum	8801-IDW-20170328		1510		--	--	--	X

Table 2-1. Groundwater and Surface Water Sampling and Analysis Information (continued)

Sample Location	Sample Identifier	Sample Date	Sample Time	Time of LDW Low Tide	Tidal Influence at Well	PCB Congeners and Aroclors	Conventional Analyses	IDW RCRA Metals
LDW Inland Properties								
South Park Landfill								
MW-12	SPL-MW-12-20170320	03/20/17	1230	NA	No	X	X	--
MW-32	SPL-MW-32-20170320		1015		No	X	X	--
MW-32	SPL-MW-32-20170320-F		1015		No	X	--	--
MW-31	SPL-MW-31-20170320		1400		No	X	X	--
Waste Drum	SPL-IDW-20170320		1430		--	--	--	X
Whitehead Tyee								
WT-MW-110	WT-MW-110-20170327	03/27/17	1400	NA	No	X	X	--
WT-MW-110	WT-MW-110-20170327-D		1400		No	X	--	--
WT-MW-108	WT-MW-108-20170327		1210		No	X	X	--
WT-MW-06	WT-MW-06-20170327		1035		No	X	X	--
Waste Drum	WT-IDW-20170327		1445		--	--	--	X
North Boeing Field								
NGW521	NBF-NGW521-20170322	03/22/17	1610	NA	No	X	X	--
NGW520	NBF-NGW520-20170322		1440		No	X	X	--
NGW252	NBF-NGW252-20170322		1255		No	X	X	--
Electronics Manufacturing Facility								
EMF-MW-7	EMF-MW-7-20170322	03/22/17	1055	NA	No	X	X	--
WA DOT Spokane Street								
MW-2	DOT-MW-2-20170406	04/6/17	0815	NA	No	X	X	--
Gray Line of Seattle								
MW-K01	GLS-MW-K01-20170406	04/6/17	1040	NA	No	X	X	--
80 S Hudson Street								
MW-07	SHS-MW-07-20170406	04/6/17	1240	NA	No	X	X	--
MW-02	SHS-MW-02-20170406		1405		No	X	X	--
Equipment Rinse and Source Water Blank Samples								
Equipment Rinse	LER-ER-1-20170316	03/16/17	1200	NA	NA	X	--	--
Equipment Rinse	LER-ER-1-20170317	03/17/17	1200	NA	NA	X	--	--
Equipment Rinse	LER-ER-1-20170327	03/27/17	1125	NA	NA	X	--	--
Equipment Rinse	LER-ER-1-20170406	04/06/17	0940	NA	NA	X	--	--

Table 2-1. Groundwater and Surface Water Sampling and Analysis Information (continued)

Sample Location	Sample Identifier	Sample Date	Sample Time	Time of LDW Low Tide	Tidal Influence at Well	PCB Congeners and Aroclors	Conventional Analyses	IDW RCRA Metals
Source Blank	LSB-SB-1-20170315	03/15/17	1810	NA	NA	X	--	--
Source Blank	LSB-SB-1-20170328	03/28/17	1615	NA	NA	X	--	--
					Number of Samples Analyzed	**64**	**49**	**12**

Wells are ordered from upgradient to downgradient for each site. Where a surface water sample was collected, it follows the downgradient well.
Tidal influence was determined for wells by reviewing tidal surveys (if previously completed at site) and/or evaluating the measures of salinity (chloride, conductance, and total dissolved solids); where tidal influence appeared negligible, a determination of 'No' was given for that well.
PCBs as congeners by U.S. Environmental Protection Agency (EPA) Method 1668C.
PCBs as Aroclors by EPA Method 8082A.
Conventional analyses include chloride, specific conductance, total suspended solids, and total dissolved solids.
Chloride by EPA Method 300.0.
Specific conductance by EPA Method 120.1.
Total dissolved solids by Method SM2540 C-97.
Total suspended solids by Method SM2540 D-97.
Metals by EPA Method 6010C (arsenic, barium, cadmium, chromium, lead, selenium, and silver) and EPA Method 7470A (mercury).
-D = Field duplicate sample.
-F = Laboratory filtered sample.
IDW = Investigation-derived waste.
LDW = Lower Duwamish Waterway.
NA = Not applicable.
PCB = Polychlorinated biphenyl.
RCRA = Resource Conservation and Recovery Act.
WA DOT = Washington State Department of Transportation.

Table 2-2. Tubing Present in Wells Before Sampling

Well Identifier	Status of Dedicated Tubing Identified in Well Prior to Sampling
LDW Adjacent Properties	
Duwamish Shipyard	
DSIP2-19	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
DSI-PZ-01	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed 14 days prior to sampling
DSI-MW-06	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
Glacier Northwest	
MW-32S	No tubing present in well
MW-4S	No tubing present in well
MW-33S	No tubing present in well
North Terminal 115	
MW-20	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
MW-3	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
MW-10	Polyethylene and silicone tubing in well, polyethylene and silicone tubing below water level; all tubing removed 15 days prior to sampling
Douglas Management Dock	
MW-11	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
MW-17	Polyethylene and silicone tubing in well, polyethylene and possibly silicone tubing below water level; all tubing removed at time of sampling
MW-15	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
Industrial Container Services	
DOF-MW3	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
DOF-MW1	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
SA-MW2	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
Duwamish Marine Center	
MW-10	No tubing present in well
MW-8	No tubing present in well
MW-16	No tubing present in well
Crowley Marine Services	
EMW-1S	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
DMW-6A	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
EMW-13S	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
Jorgensen Forge	
MW-23	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed 28 days prior to sampling
MW-48	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed 28 days prior to sampling
MW-51	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed 28 days prior to sampling

Table 2-2. Tubing Present in Wells Before Sampling (continued)

Well Identifier	Status of Dedicated Tubing Identified in Well Prior to Sampling
Boeing Isaacson/Thompson	
MW-25	Polyethylene and silicone tubing in well, polyethylene and silicone tubing below water level; all tubing removed at time of sampling
MW-13	Polyethylene and silicone tubing in well, polyethylene and silicone tubing below water level; all tubing removed 12 days prior to sampling
MW-10	No tubing present in well
8801 Site/PACCAR	
MW-16A	No tubing present in well
MW-42A	No tubing present in well
MW-30A	No tubing present in well
LDW Inland Properties	
South Park Landfill	
MW-12	Bladder pump and all associated tubing remained in well while sample was collected
MW-32	Bladder pump and all associated tubing remained in well while sample was collected
MW-31	Bladder pump and all associated tubing remained in well while sample was collected
Whitehead Tyee	
WT-MW-110	No tubing present in well
WT-MW-108	No tubing present in well
WT-MW-06	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed at time of sampling
North Boeing Field	
NGW521	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed 21 days prior to sampling
NGW520	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed 21 days prior to sampling
NGW252	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed 21 days prior to sampling
Electronics Manufacturing Facility	
EMF-MW-7	Polyethylene and silicone tubing in well, polyethylene tubing below water level; all tubing removed 21 days prior to sampling
80 S Hudson Street	
MW-07	No tubing present in well
MW-02	No tubing present in well
Gray Line of Seattle	
MW-K01	No tubing present in well
WA DOT Spokane Street	
MW-2	No tubing present in well

LDW = Lower Duwamish Waterway
PCB = Polychlorinated biphenyl.
WA DOT = Washington State Department of Transportation.

Table 2-3. Monitoring Well Information and Final Purge Parameters

Well or Surface Water Sample	Well Screen Depth (feet bgs)	Tidal Influence at Well	Initial DTW (feet bgs)	Final DTW (feet bgs)	ORP (mV)	Temperature (degrees Celsius)	pH	Conductivity (mS/cm)	DO (mg/L)	Turbidity (NTU)
LDW Adjacent Properties										
Duwamish Shipyard										
DSIP2-19	5 – 15	No	3.12	3.30	-93.5	10.31	6.89	2.431	0.52	3.28
DSI-PZ-01	5 – 14.7	Yes	5.75	5.65	-98.1	10.41	6.48	4.816	1.06	1.12
DSI-MW-06	5.4 – 15.1	Yes	3.02	3.43	-61.9	9.69	6.39	7.751	0.70	0.33
Surface Water	NA	--	NA	NA	156.3	7.80	6.51	33.82	11.05	13.9
Glacier Northwest										
MW-32S	4 – 11	No	2.03	2.05	-86.1	11.26	6.61	0.753	0.61	1.83
MW-4S	5 – 10	No	5.40	5.40	22.2	8.19	6.72	0.394	2.69	1.05
MW-33S	4 – 11	No	3.84	3.96	15.0	9.21	13.18	3.862	13.08	0.68
Surface Water	NA	--	NA	NA	176.0	8.49	NM	4.358	10.73	17.9
North Terminal 115										
MW-20	3.2 – 12.2	No	5.72	7.11	-51.4	8.49	7.04	0.690	0.43	2.53
MW-3	8 – 18	No	9.81	10.16	-96.6	10.87	6.43	5.566	0.46	4.15
MW-10	7 – 11.5	No	5.21	5.23	88.3	10.03	6.50	0.442	3.17	1.00
Douglas Management Dock										
MW-11	10 – 20	No	9.52	9.66	114.2	7.59	8.71	2.675	9.74	0.43
MW-17	7 – 22	No	8.73	9.15	-116.0	14.82	7.33	2.167	0.19	2.91
MW-15	7 – 22	Yes	7.98	8.80	-43.1	11.03	6.39	2.976	0.17	1.56
Surface Water	NA	--	NA	NA	176.4	9.53	NM	3.747	10.97	16.9
Industrial Container Services										
DOF-MW3	12 – 22	No	10.60	10.78	-21.1	14.35	7.03	2.596	0.16	8.03
DOF-MW1	12 – 17	Yes	7.39	10.47	-33.4	10.88	7.07	9.155	0.98	4.22
SA-MW2	4 – 24	Yes	4.61	4.79	-34.3	10.74	6.76	2.901	0.22	2.07
Duwamish Marine Center										
MW-10	9 – 19	Yes	5.90	6.00	59.4	8.66	7.24	0.716	6.42	0.70
MW-8	8 – 18	Yes	8.17	7.90	4.4	9.12	7.25	1.765	1.16	0.74
MW-16	9 – 19	Yes	12.39	13.72	-116.9	10.73	7.12	29.03	0.50	0.34
Surface Water	NA	--	NA	NA	180.2	7.86	7.24	8.176	9.60	5.80

Table 2-3. Monitoring Well Information and Final Purge Parameters (continued)

Well or Surface Water Sample	Well Screen Depth (feet bgs)	Tidal Influence at Well	Initial DTW (feet bgs)	Final DTW (feet bgs)	ORP (mV)	Temperature (degrees Celsius)	pH	Conductivity (mS/cm)	DO (mg/L)	Turbidity (NTU)
Crowley Marine Services										
EMW-1S	5 – 19.8	No	5.62	5.66	143.4	9.04	7.30	0.469	7.96	3.20
DMW-6A	5 – 20	Yes	12.43	11.95	-98.3	14.58	6.77	0.588	0.30	1.04
EMW-13S	5 – 19.8	Yes	10.96	11.98	174.5	8.13	8.33	5.302	8.33	9.42
Surface Water	NA	--	NA	NA	117.5	7.72	NM	0.360	12.66	46.0
Jorgensen Forge										
MW-23	6 – 15.8	No	9.79	9.82	-61.0	14.34	6.31	0.647	0.30	2.32
MW-48	5 – 17	No	10.10	10.10	-10.9	12.38	6.22	0.254	1.16	0.76
MW-51	23 – 27	Yes	15.29	15.45	-24.9	15.29	6.68	0.414	0.40	24.5
Boeing Isaacson/Thompson										
MW-25	8 – 18	No	9.27	9.27	170.7	11.84	7.16	2.095	0.71	3.31
MW-13	8 – 18	No	9.61	9.66	-61.3	15.50	6.63	3.077	0.32	3.31
MW-10	8 – 18	Yes	7.80	8.80	69.5	9.48	7.22	0.300	7.15	2.96
8801 Site/PACCAR										
MW-16A	2 – 17	No	3.96	4.00	133.4	9.96	6.43	0.186	11.14	2.15
MW-42A	5 – 20	No	5.83	5.89	-8.8	13.32	6.67	0.347	0.98	10.0
MW-30A	14 – 24	Yes	8.41	8.41	-53.3	12.55	7.23	2.792	0.39	1.23
LDW Inland Properties										
South Park Landfill										
MW-12	10 – 15	No	4.50	4.45	15.0	8.86	7.33	0.130	3.10	19.4
MW-32	19 – 24	No	8.90	8.87	-105.0	12.76	6.67	1.090	0.65	12.0
MW-31	18 – 23	No	9.05	9.02	-58.6	13.00	6.59	0.394	0.64	8.84
Whitehead Tyee										
WT-MW-110	6 – 16	No	9.15	9.18	58.5	12.50	6.24	0.411	1.11	0.63
WT-MW-108	6 – 16	No	9.29	9.38	-93.9	14.28	6.70	0.742	0.39	1.04
WT-MW-06	5 – 20	No	7.11	7.19	-12.5	12.76	5.99	0.366	0.71	4.85
North Boeing Field										
NGW521	5 – 15	No	1.51	1.52	1.0	9.73	7.02	0.802	1.66	0.90
NGW520	5 – 15	No	3.41	3.44	-27.6	13.26	6.65	0.450	0.37	4.22
NGW252	5 – 15	No	9.96	9.95	111.0	13.00	6.23	0.460	2.32	1.82

Table 2-3. Monitoring Well Information and Final Purge Parameters (continued)

Well or Surface Water Sample	Well Screen Depth (feet bgs)	Tidal Influence at Well	Initial DTW (feet bgs)	Final DTW (feet bgs)	ORP (mV)	Temperature (degrees Celsius)	pH	Conductivity (mS/cm)	DO (mg/L)	Turbidity (NTU)
Electronics Manufacturing Facility										
EMF-MW-7	5 – 15	No	6.52	6.47	89.9	7.37	7.10	0.321	10.92	0.72
80 S Hudson Street										
MW-07	10 – 20	No	6.87	6.89	-45.2	15.17	7.10	0.807	0.31	3.34
MW-02	10 – 20	No	6.89	6.90	-56.0	13.39	6.97	0.286	0.69	4.53
Gray Line of Seattle										
MW-K01	10 – 20	No	10.58	10.65	-58.0	13.09	6.88	1.435	0.95	2.21
WA DOT Spokane Street										
MW-2	5 – 19	No	7.84	7.84	0.8	12.26	7.01	3.896	0.70	0.91

Parameters were measured in a flow-through cell; turbidity was measured from the cell exit tubing.
Wells are ordered from upgradient to downgradient for each site. Where a surface water sample was collected, it follows the downgradient well.
bgs = Below ground surface.
DO = Dissolved oxygen.
DTW = Depth to water.
LDW = Lower Duwamish Waterway.
mg/L = Milligrams per liter.
mS/cm = MilliSiemens per centimeter.
mV = Millivolt.
NA = Not applicable.
NM = Not measured (pH meter malfunctioned).
NTU = Nephelometric turbidity unit.
ORP = Oxidation reduction potential.
PCB = Polychlorinated biphenyl.
WA DOT = Washington State Department of Transportation.

Table 3-1. Total PCB Congeners and Aroclors in Groundwater Samples

Site	Sample	Number of Congeners Detected	Total PCB Congeners (µg/L)		Total PCB Aroclors (µg/L)	
LDW Adjacent Properties						
Duwamish Shipyard	DS-DSIP2-19	43	0.000139	J	0.010	U
	DS-DSI-PZ-01	14	0.0000343	J	0.010	U
	DS-DSI-MW-06	9	0.0000284	J	0.010	U
Glacier Northwest	GNW-MW-32S	9	0.0000158	J	0.010	U
	GNW-MW-4S	26	0.0000839	J	0.010	U
	GNW-MW-33S	83	0.00655	J	0.008	J
North Terminal 115	NT115-MW-20	82	0.00464	J	0.010	U
	NT115-MW-3	63	0.00119	J	0.010	U
	NT115-MW-10	74	0.00176	J	0.010	U
Douglas Management Dock	DMD-MW-11	54	0.00128	J	0.010	U
	DMD-MW-17	138	0.0421	J	0.063	J
	DMD-MW-17-F	87	0.00983	J	0.043	J
	DMD-MW-15	102	0.00309	J	0.010	U
Industrial Container Services	ICS-DOF-MW3	33	0.000167	J	0.010	U
	ICS-DOF-MW1	131	0.197	J	0.27	J
	ICS-DOF-MW1-F	99	0.0297	J	0.036	J
	ICS-SA-MW2	130	0.0698	J	0.091	J
Duwamish Marine Center	DMC-MW-10	29	0.000159	J	0.010	U
	DMC-MW-8	69	0.00112	J	0.010	U
	DMC-MW-16	110	0.0148	J	0.010	U
Crowley Marine Services	CMS-EMW-1S	29	0.000124	J	0.010	U
	CMS-DMW-6A	54	0.00104	J	0.010	U
	CMS-EMW-13S	117	0.0153	J	0.010	U
	CMS-EMW-13S-F	72	0.00134	J	0.010	U
Jorgensen Forge	JF-MW-23	45	0.0000681	J	0.010	U
	JF-MW-48	22	0.000028	J	0.010	U
	JF-MW-51	19	0.0000295	J	0.010	U
Boeing Isaacson/Thompson	BIT-MW-25	92	0.00184	J	0.010	U
	BIT-MW-13	76	0.00266	J	0.010	U
	BIT-MW-10	47	0.000546	J	0.010	U
	BIT-MW-10-D	49	0.000608	J	0.010	U
8801 Site/PACCAR	8801-MW-16A	102	0.0352	J	0.024	
	8801-MW-16A-F	58	0.0185	J	0.023	
	8801-MW-42A	80	0.00299	J	0.010	U
	8801-MW-30A	90	0.00367	J	0.010	U
LDW Inland Properties						
South Park Landfill	SPL-MW-12	18	0.0000403	J	0.010	U
	SPL-MW-32	7	0.0000152	J	0.010	U
	SPL-MW-32-F	0	0.00000743	U	0.010	U
	SPL-MW-31	11	0.0000294	J	0.010	U
Whitehead Tyee	WT-MW-110	113	0.00445	J	0.010	U
	WT-MW-110-D	50	0.000223	J	0.010	U
	WT-MW-108	27	0.0000667	J	0.010	U
	WT-MW-06	48	0.00016	J	0.010	U

Table 3-1. Total PCB Congeners and Aroclors in Groundwater Samples (continued)

Site	Sample	Number of Congeners Detected	Total PCB Congeners (µg/L)	Total PCB Aroclors (µg/L)
North Boeing Field	NBF-NGW521	132	0.994 J	0.89
	NBF-NGW520	87	0.00564 J	0.005 J
	NBF-NGW252	73	0.00727 J	0.010
Electronics Manufacturing Facility	EMF-MW-7	16	0.0000506 J	0.010 U
80 S Hudson Street	SHS-MW-07	14	0.0000308 J	0.010 U
	SHS-MW-02	2	0.0000131 J	0.011 U
Gray Line of Seattle	GLS-MW-K01	70	0.00137 J	0.01 U
WA DOT Spokane Street	DOT-MW-2	7	0.0000363 J	0.011 U
Quality Assurance Samples				
Equipment Rinse	LER-ER-1-031617	1	0.000000419 J	0.010 U
	LER-ER-1-031717	5	0.00000682 J	0.010 U
	LER-ER-1-032417	4	0.00000247 J	0.010 U
	LER-ER-1-040617	18	0.0000236 J	0.010 U
Source Water Blank	LSB-SB-1-031517	12	0.000043 J	0.010 U
	LSB-SB-1-032817	10	0.0000208 J	0.010 U

PCB congeners were detected in all samples, with the exception of sample SPL-MW-32-F.
All samples had at least one J-flagged result, with the exception of SPL-MW-32-F.
Wells are ordered from upgradient to downgradient for each site.
-D = Field duplicate sample.
-F = Laboratory filtered sample.
J = Estimated concentration.
LDW = Lower Duwamish Waterway.
µg/L = Micrograms per liter.
PCB = Polychlorinated biphenyl.
U = Not detected at or above the reporting limit.
WA DOT = Washington State Department of Transportation.

Table 3-2. Total PCB Congeners and Aroclors in Surface Water Samples

Site	Sample	Number of Congeners Detected	Total PCB Congeners (µg/L)		Total PCB Aroclors (µg/L)	
LDW Adjacent Properties						
Duwamish Shipyard	DS-SW-1	58	0.000275	J	0.010	U
Glacier Northwest	GNW-SW-1	62	0.000468	J	0.010	U
	GNW-SW-1-F	16	0.0000604	J	0.010	U
Douglas Management Dock	DMD-SW-1	88	0.000633	J	0.010	U
Duwamish Marine Center	DMC-SW-1	71	0.00217	J	0.010	U
Crowley Marine Services	CMS-SW-1	88	0.000936	J	0.010	U
	CMS-SW-1-D	79	0.000962	J	0.010	U

PCB congeners were detected in all samples.
All samples had at least one J-flagged result.
-D = Field duplicate sample.
-F = Laboratory filtered sample.
J = Estimated concentration.
LDW = Lower Duwamish Waterway.
µg/L = Micrograms per liter.
PCB = Polychlorinated biphenyl.
U = Not detected at or above the reporting limit.

FIGURES

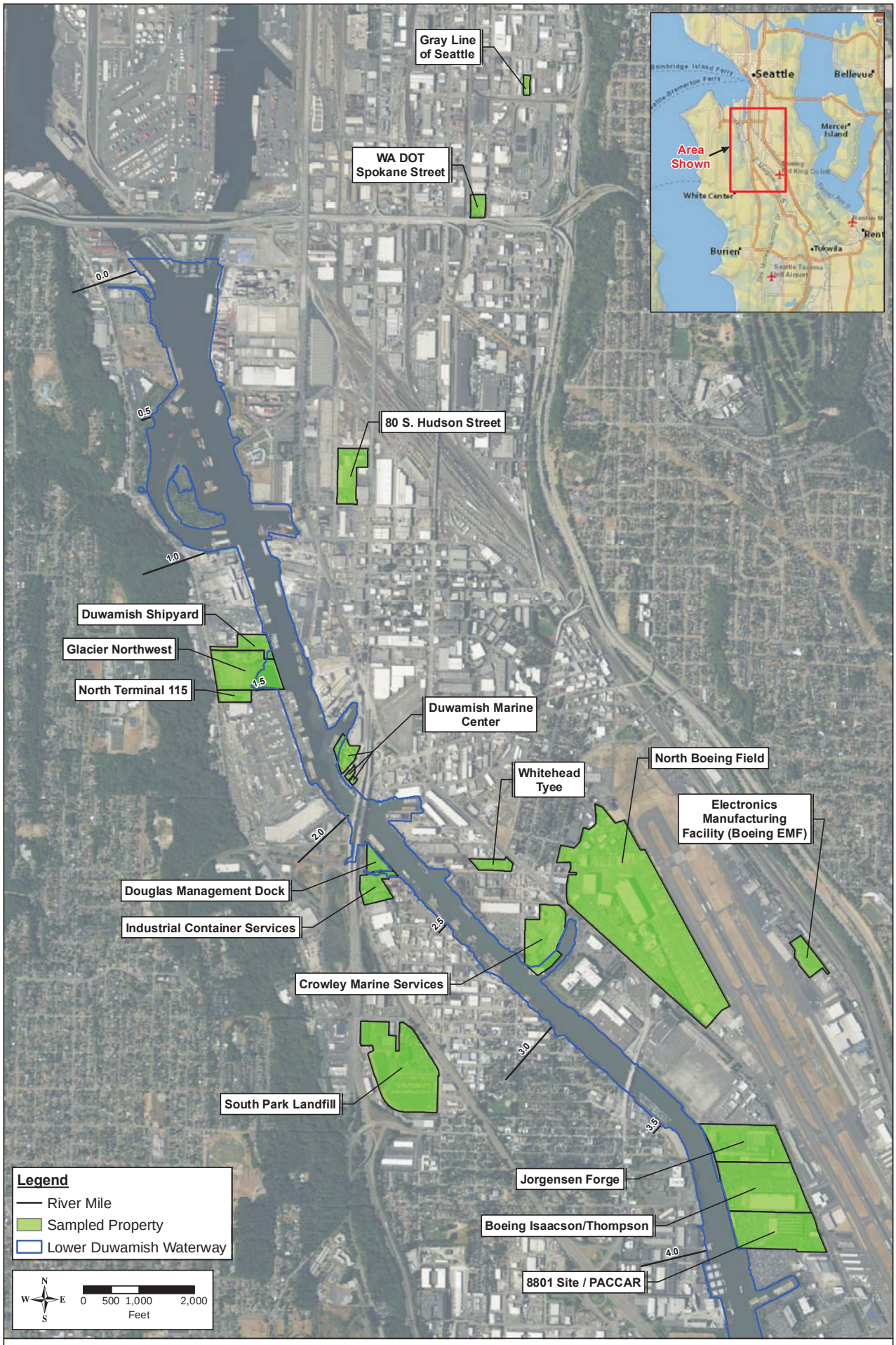

Figure 1-1
Lower Duwamish Waterway - Sampled Properties

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State of Washington

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: cjc
File: LDW_GW_Figure_1_PCB_Sample_Properties_11x17.mxd
Illustrative purposes only.

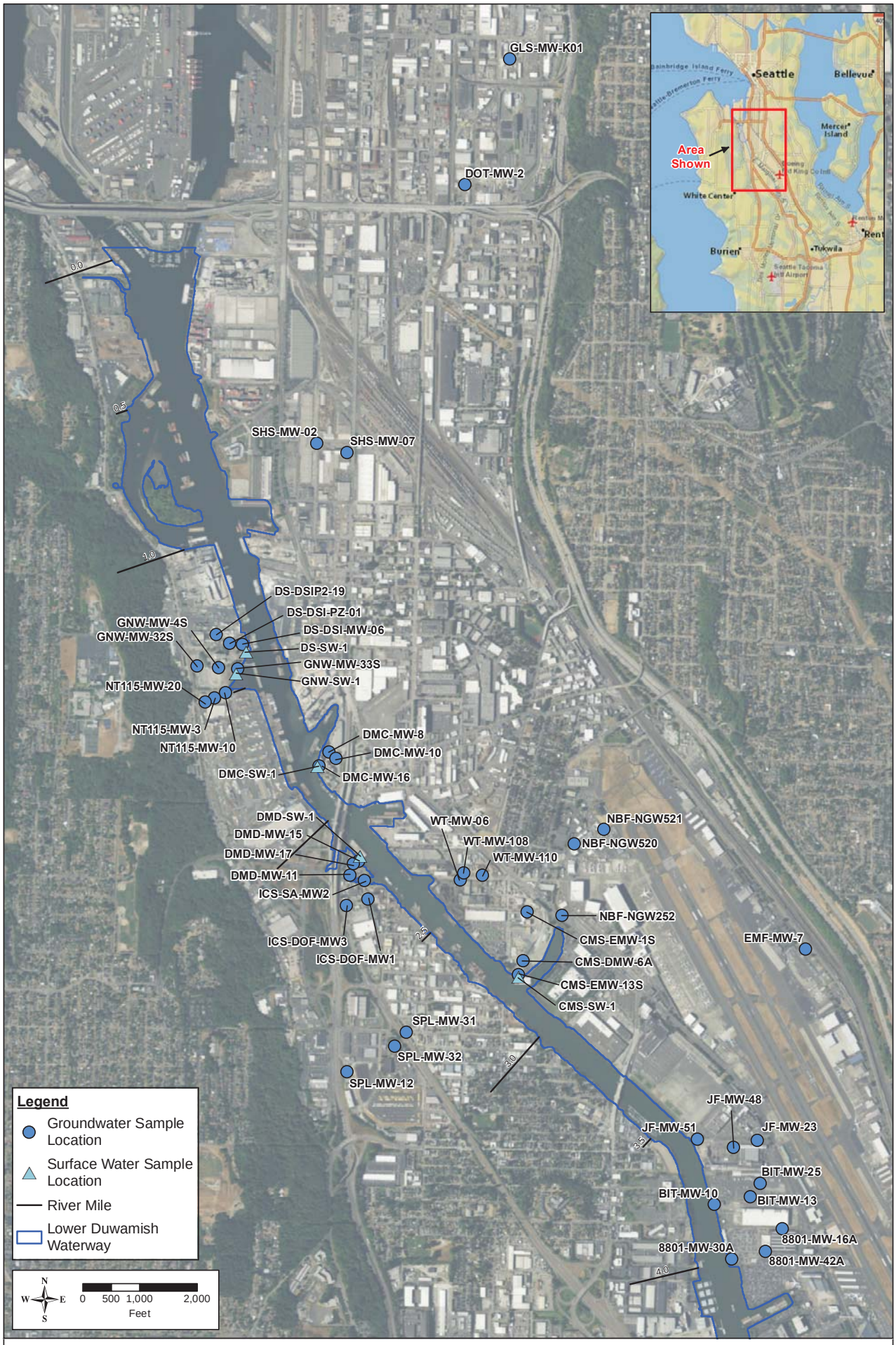

Figure 2-1
LDW Groundwater and Surface Water Sampling Locations

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Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: cjc
File: LDW_GW_Figure_2_Sample_Locations_11x17.mxd
Illustrative purposes only.

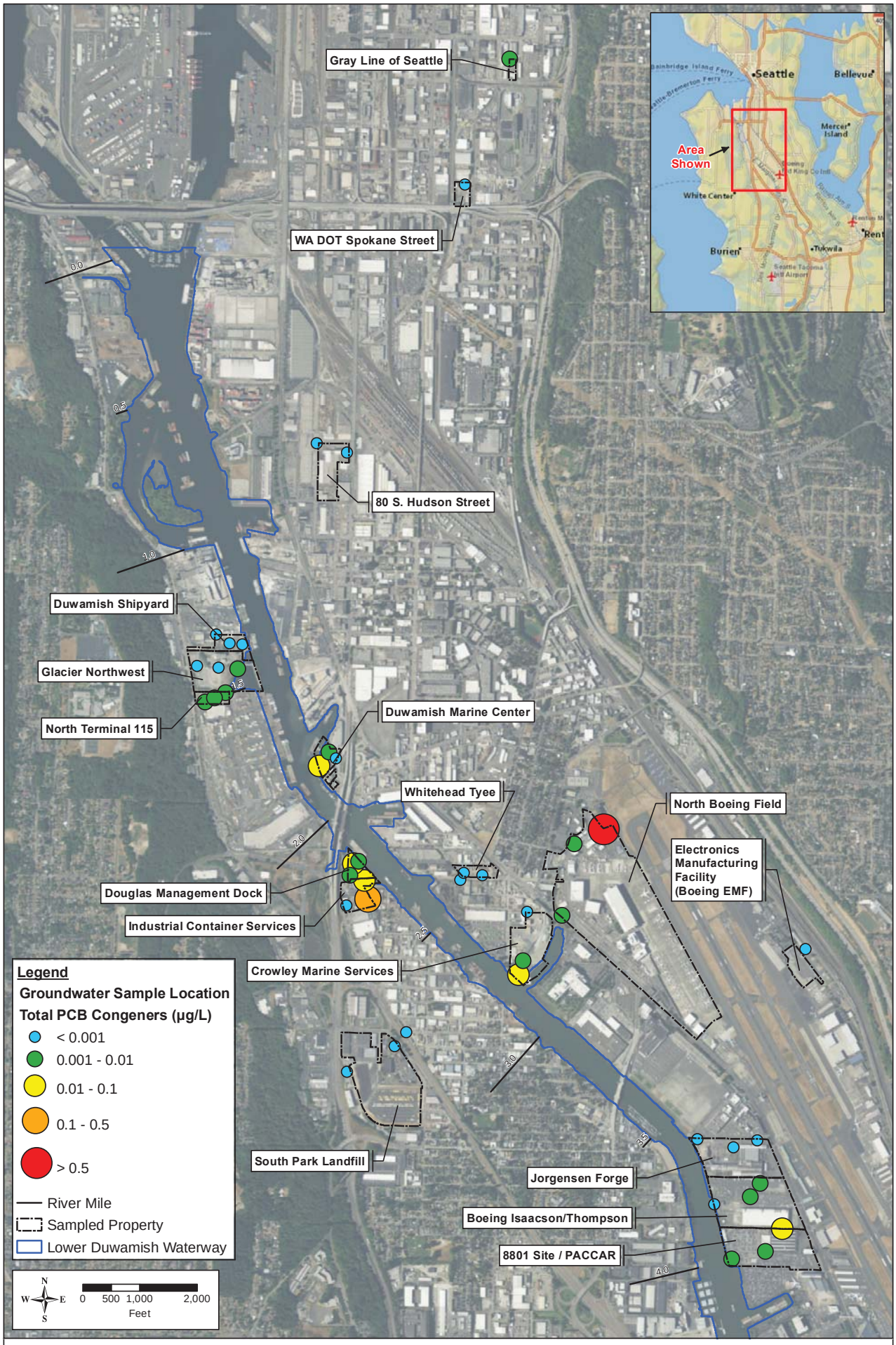


Figure 3-1
Relative Concentrations of Total PCBs in LDW Groundwater

DEPARTMENT OF ECOLOGY
State of Washington

leidos

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: cjc
File: LDW_GW_Figure_3_PCBs_in_LDW_GW_11x17.mxd
Illustrative purposes only.

Figure 3-2
Average Total PCB Congeners and Aroclors by Property

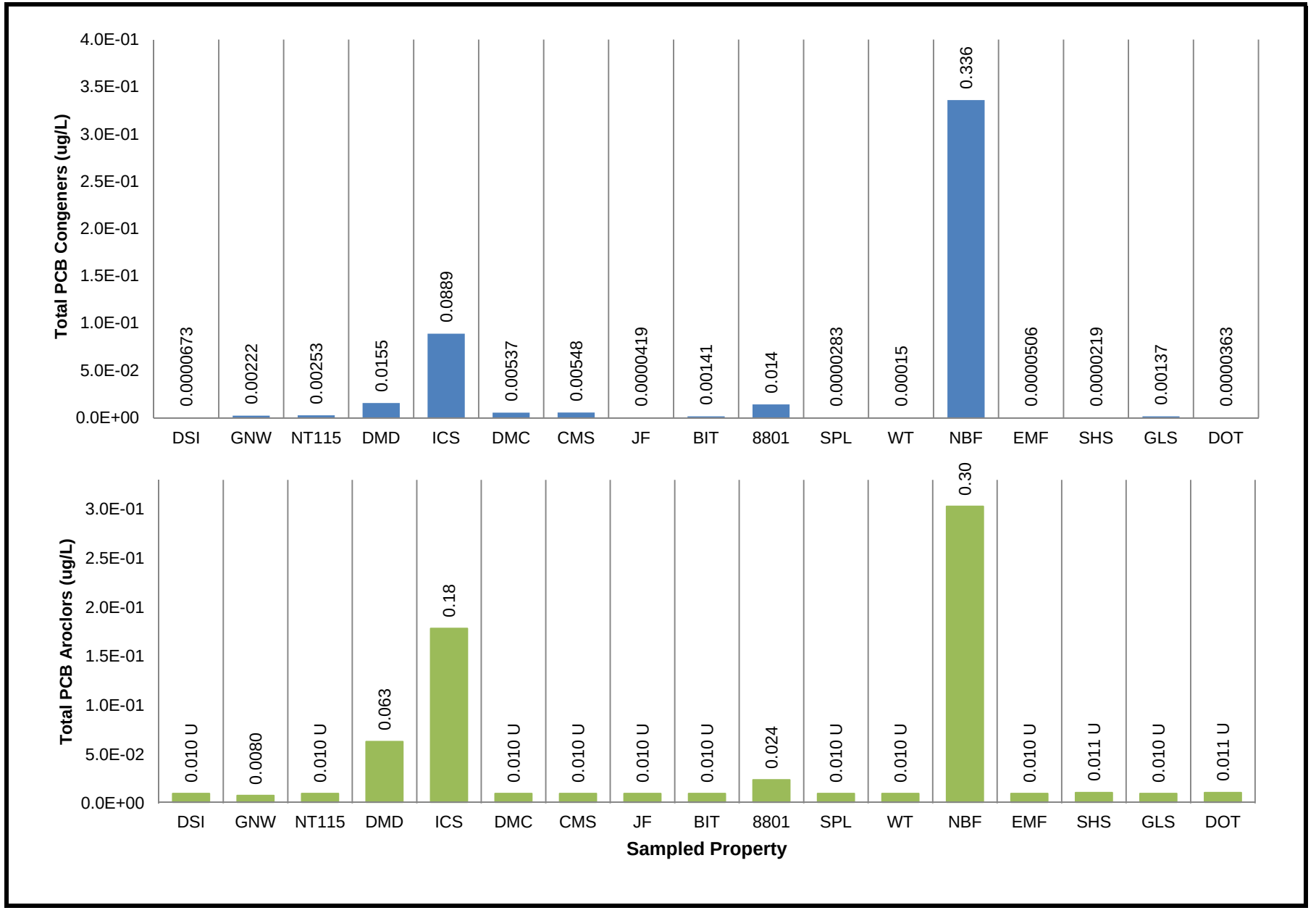
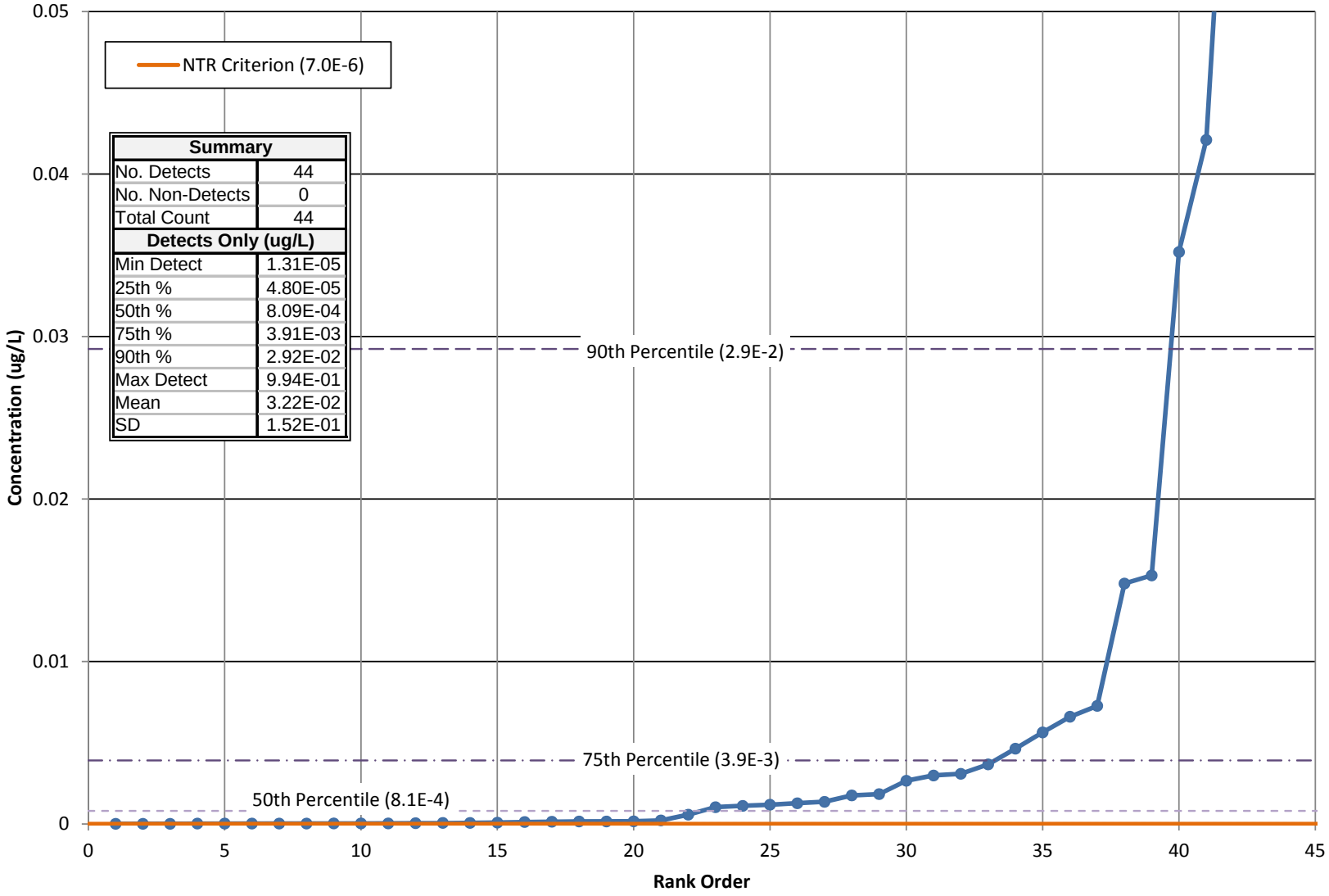
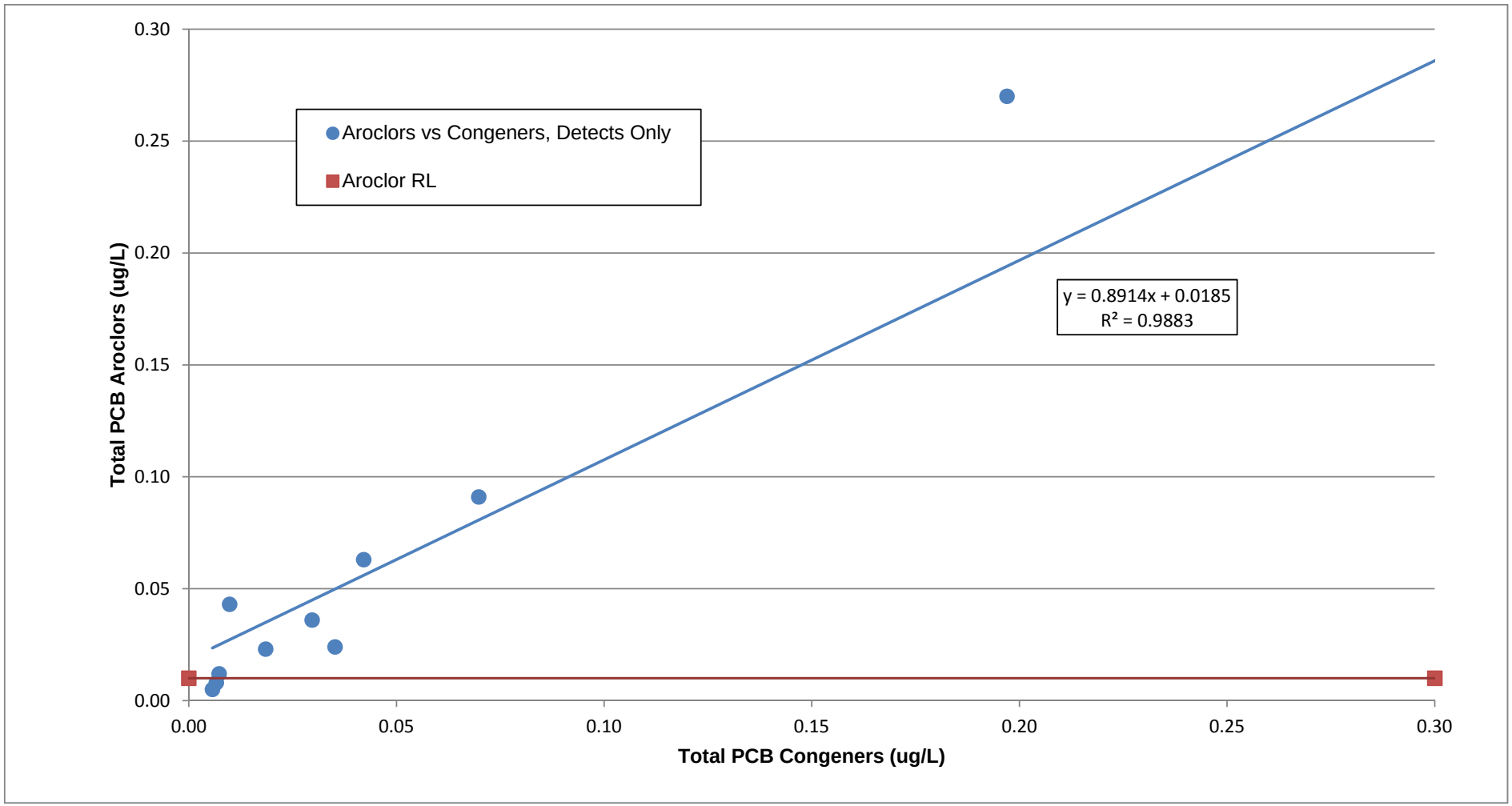


Figure 3-3
Rank Order Chart for PCB Congeners in LDW Groundwater



Note: two highest values not shown.

Figure 3-4
Correlation Between PCB Aroclor and PCB Congener Results in Groundwater

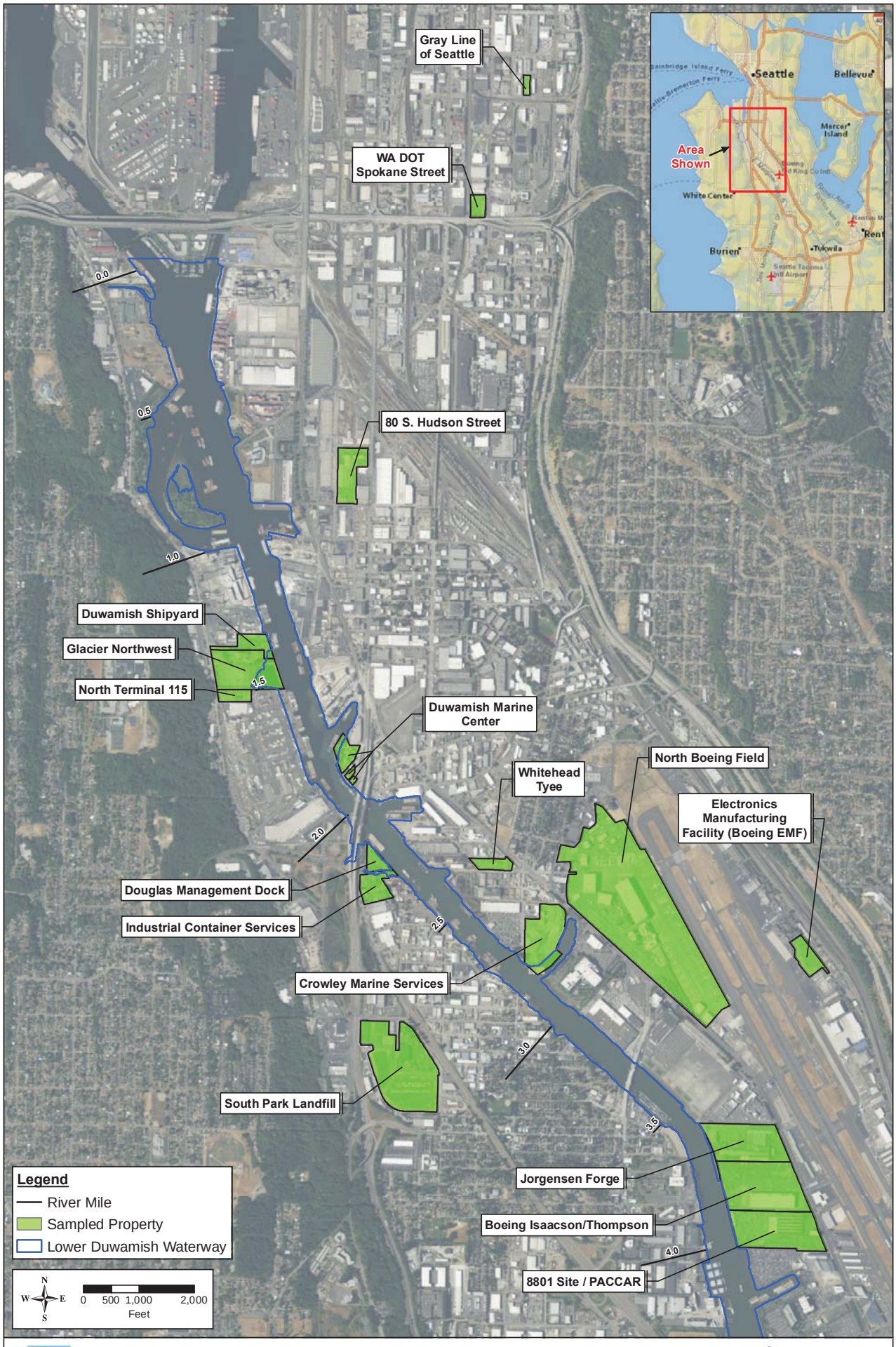


Note: Highest value is not shown on this graph (NBF-NGW521). RL = Reporting limit.

Appendix A
Selected Properties and Sampling Locations

Appendix A
Sampling Location Maps

Note: Wells sampled during the investigation are identified with green boxes. Surface water sample locations are identified with blue boxes.



DEPARTMENT OF ECOLOGY
State of Washington

Lower Duwamish Waterway - Sampled Properties
Page A-1

leidos

Coordinate System:
NAD 1983 StatePlane Washington North FIPS 4601 Feet
Prepared By: cjc
File: LDW_GW_Figure_1_PCB_Sample_Properties_11x17.mxd
Illustrative purposes only.

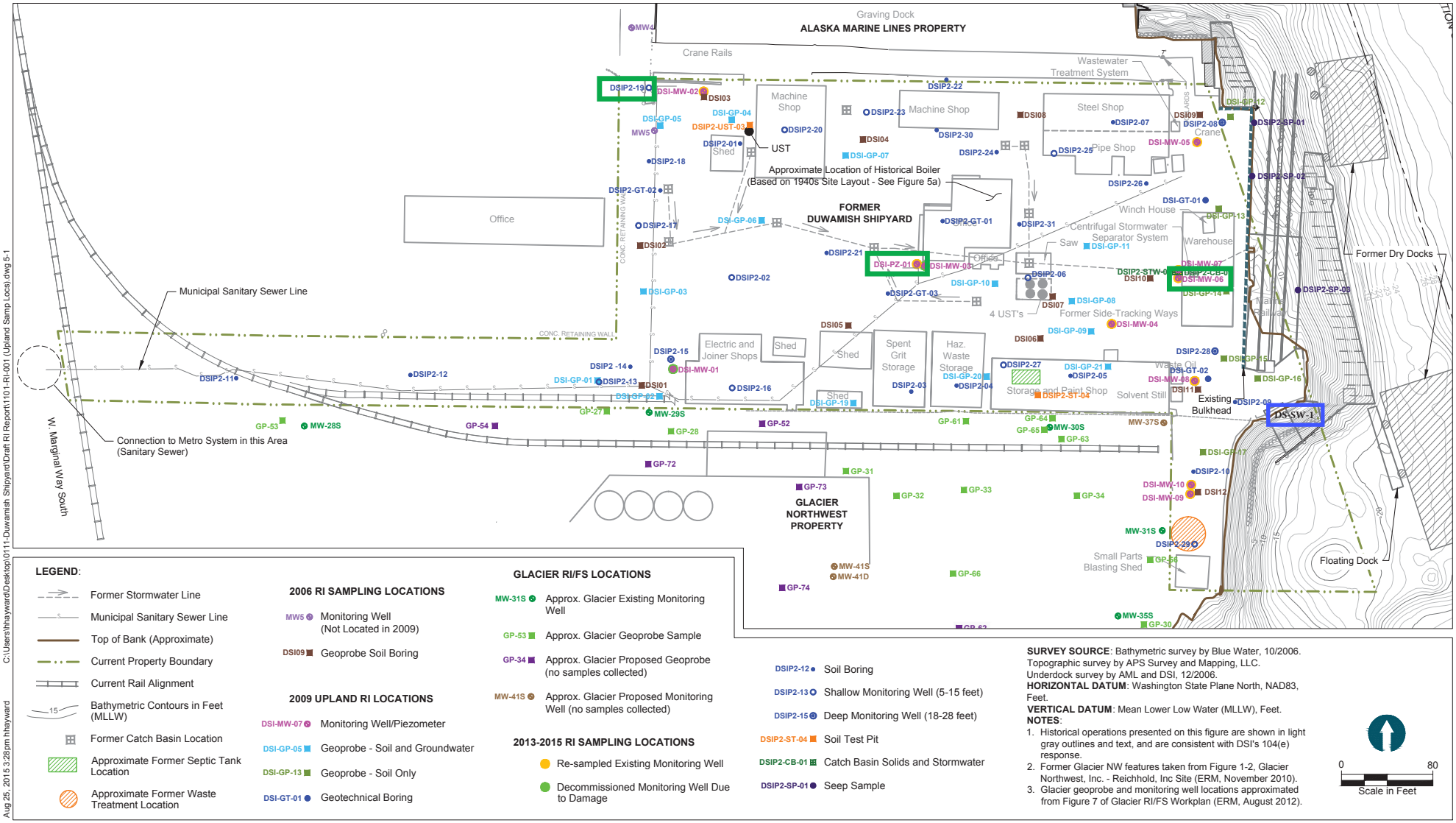


Figure 5-1
Upland Sampling Locations
Draft RI Report
Duwamish Shipyard, Inc.

ANCHOR QEA

Duwamish Marine Center

File: F:\Projects\Reichhold-Glacier Local (main file on SEA server)\GIS\mxds\Draft_RI\Figure2-19 TopAquitard_ElevationContours.mxd

Drawn By: Mike Appel

Date: 4/28/2015

Legend

- Borehole Location with Top of Aquitard Elevation
- Top of Aquitard Contour (1 ft)
- Stormwater Drainage Mainline
- Stormwater Outfall
- Current Property Boundary

N

0 50 100 200 Feet

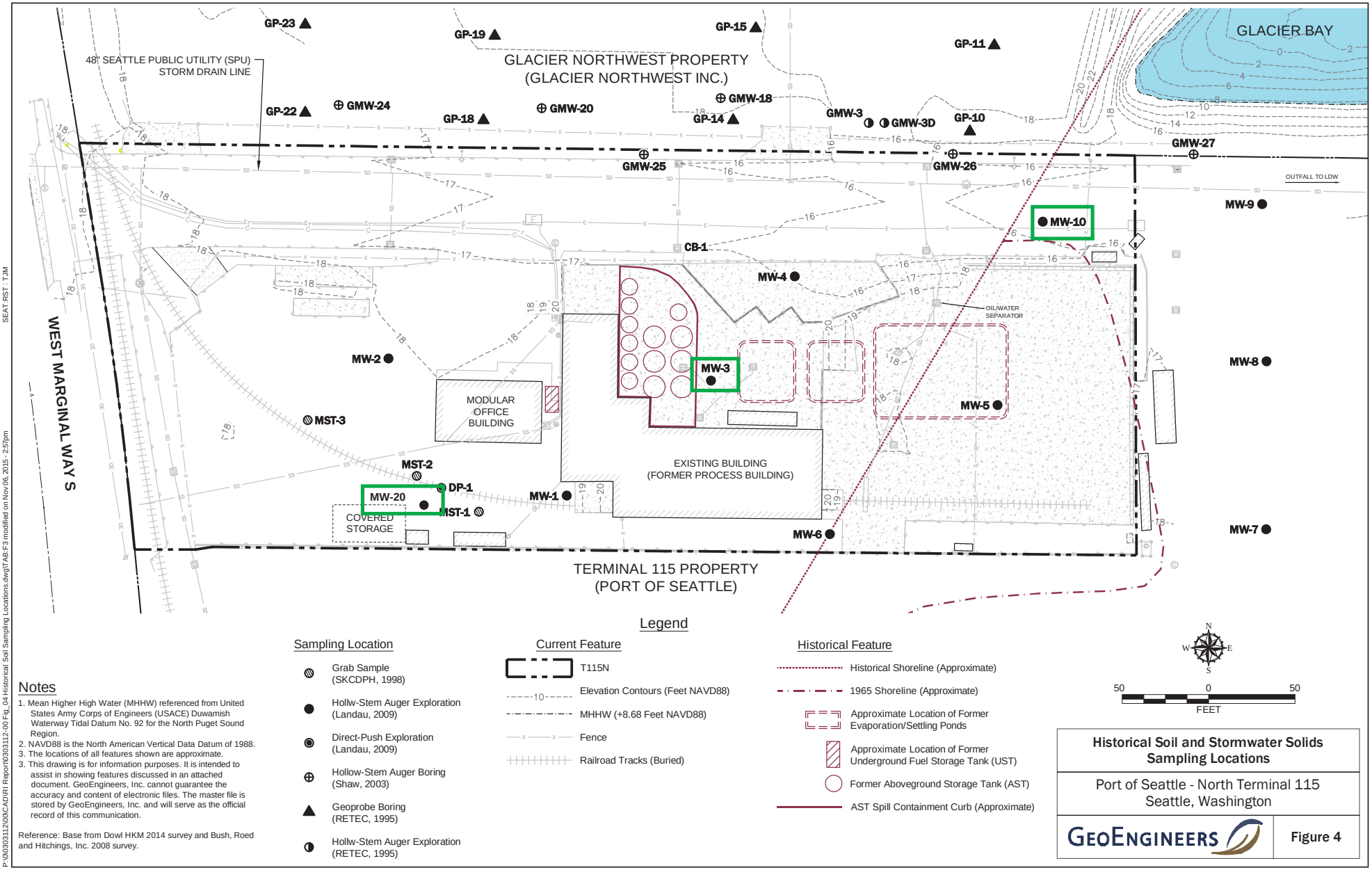
FIGURE 2-19

TOP OF AQUITARD ELEVATION CONTOUR MAP
5900 West Marginal Way Site
Seattle, Washington

Notes:
- Aerial: King County: 3/23/2012, 0.25 ft per pixel
- Elevations in feet above mean sea level, NAVD88.

Glacier Northwest

Environmental Resources Management
1218 3rd Avenue, Suite 1412
Seattle, Washington 98101
425-214-0468



Notes

1. Mean Higher High Water (MHHW) referenced from United States Army Corps of Engineers (USACE) Duwamish Waterway Tidal Datum No. 92 for the North Puget Sound Region.
2. NAVD88 is the North American Vertical Data Datum of 1988.
3. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base from Dowl HKM 2014 survey and Bush, Roed and Hitchings, Inc. 2008 survey.

Historical Soil and Stormwater Solids Sampling Locations

Port of Seattle - North Terminal 115
Seattle, Washington

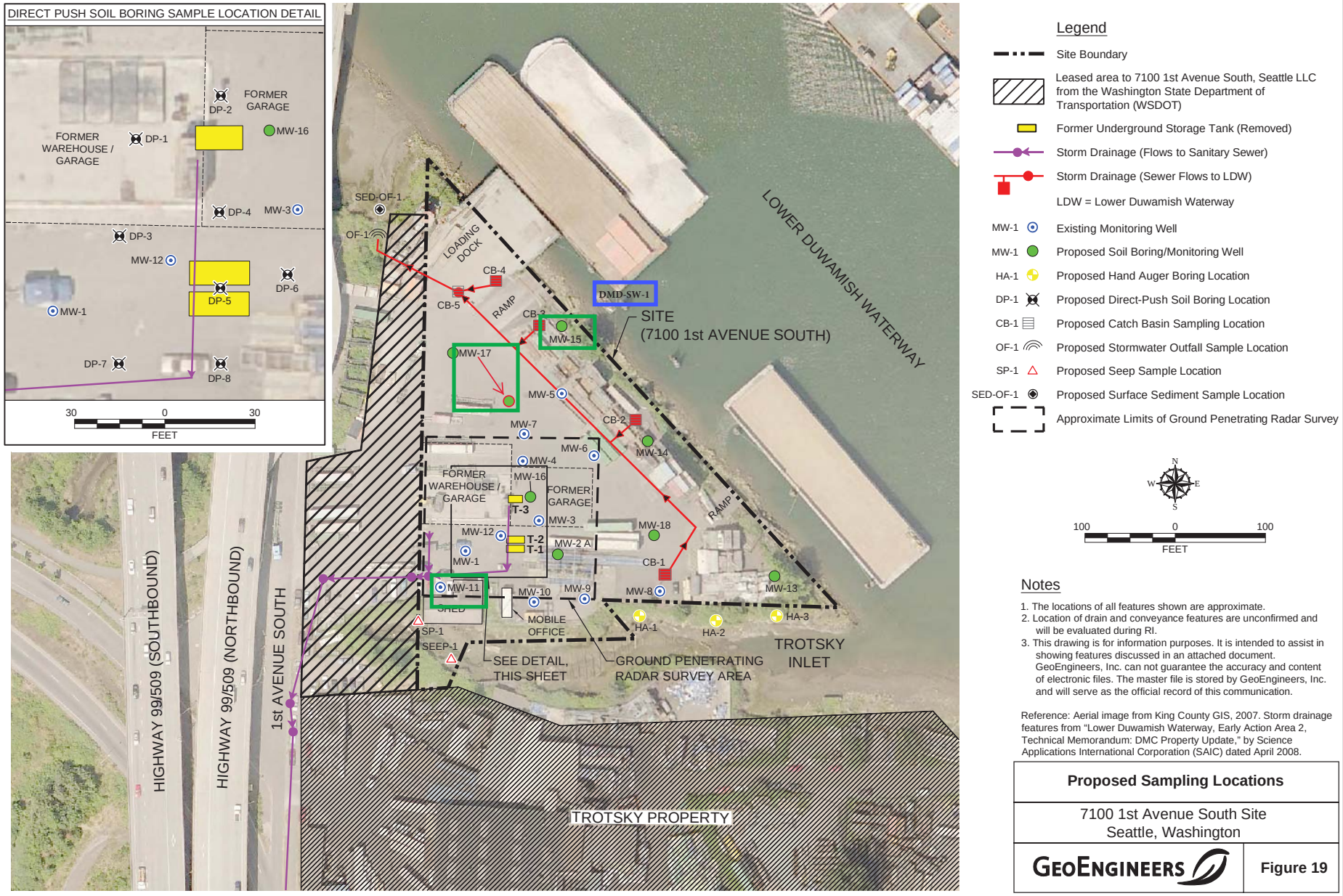
GeoEngineers

Figure 4

P:\0\0303112\00\CAD\R\ Report\0303112-00 Fig_04 Historical Soil Sampling Locations.dwg\TAB:F3 modified on Nov 06, 2015 - 2:57pm

SEAT-RST : TJM

North Terminal 115



Notes

1. The locations of all features shown are approximate.
2. Location of drain and conveyance features are unconfirmed and will be evaluated during RI.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007. Storm drainage features from "Lower Duwamish Waterway, Early Action Area 2, Technical Memorandum: DMC Property Update," by Science Applications International Corporation (SAIC) dated April 2008.

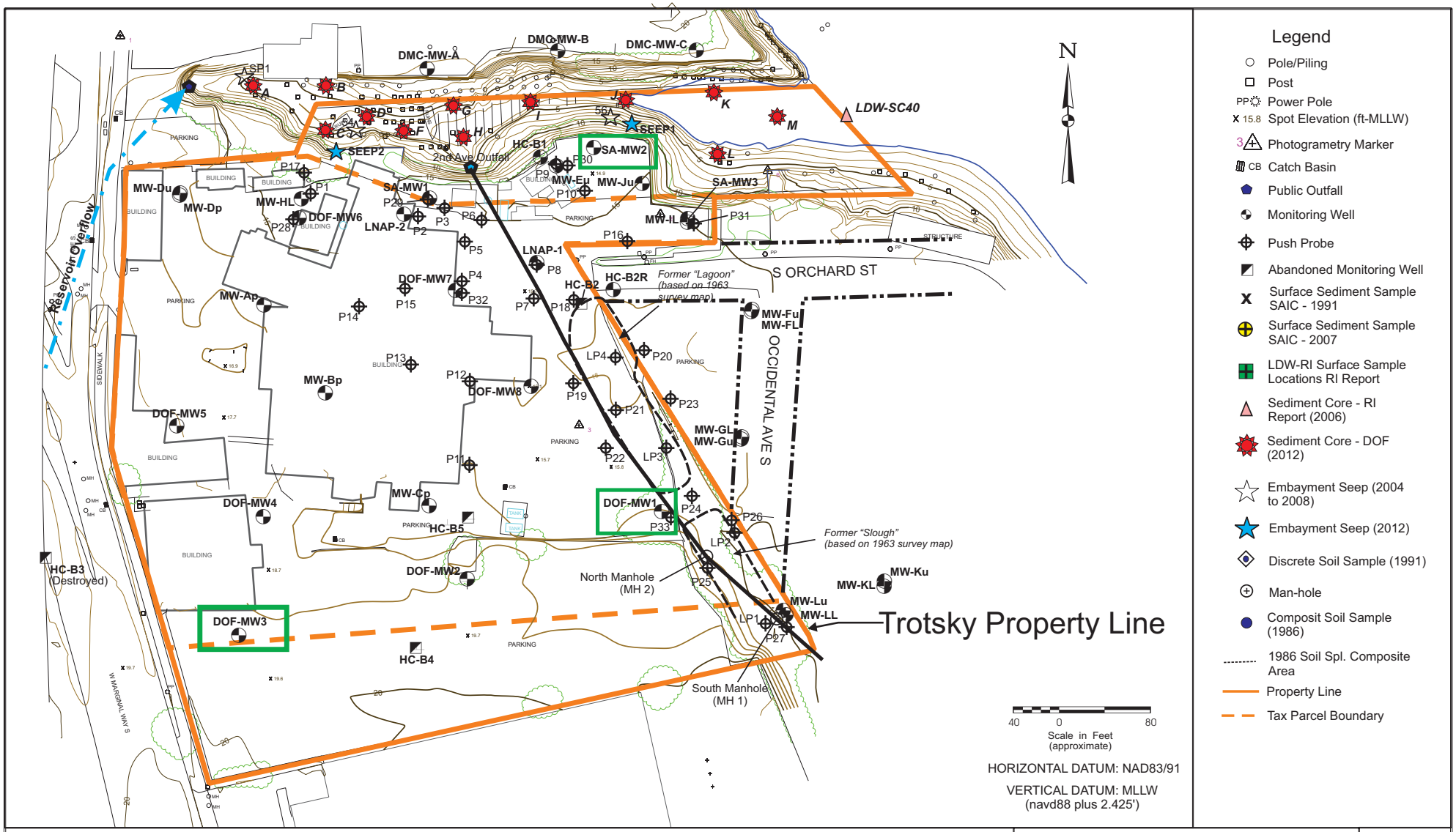
Proposed Sampling Locations

7100 1st Avenue South Site
Seattle, Washington

GeoEngineers | **Figure 19**

P:\0\02750\50\01\CAD\Figures\Ecology Review Document\02750150_Fig 19 Proposed Sampling Locations.dwg\TAB:Fig 18 modified by TMichaud on Jan 14, 2013 - 14:03

Douglas Management Dock



Notes:

1) Property Survey by Continental Survey Co. (12-15-09)
2) Topography by David C. Smith Associates (flown 3-18-10 @ 1412 PDT)

Ref: Subsurface Locations a.cdr

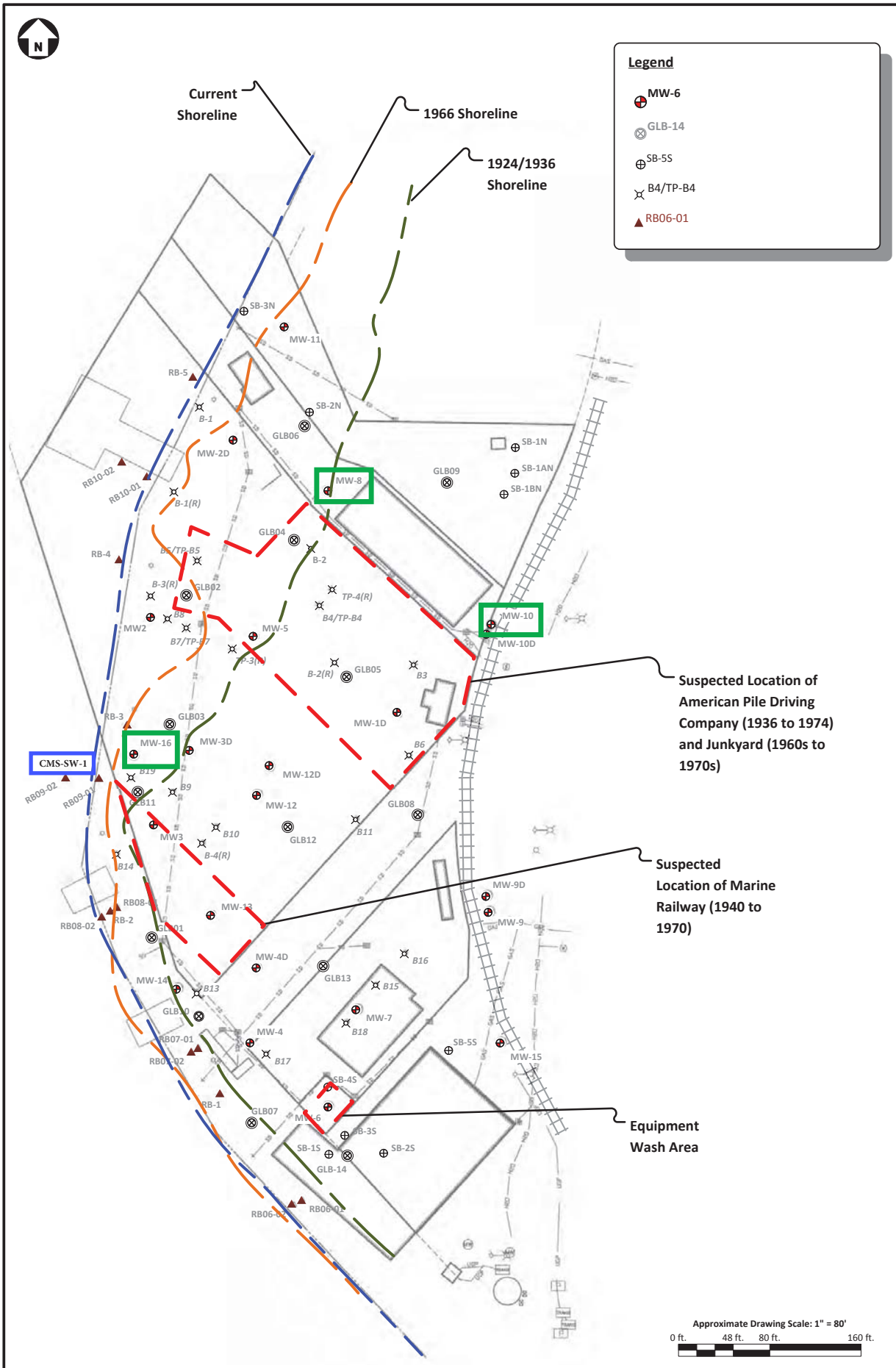
ICS/NW Cooperage Site

Push-Probe, Well and Core Locations

SUM-008-00 (ICS) *July 2016*

Dalton, Olmsted & Fuglevand, Inc.

FIGURE 4-1a



Note: This figure contains information in color. Black & white photocopies may not be suitable for review.

g-logics

Duwamish Marine Center

Figure 0

Project File: Historical Practices.vsd

Mapping Reference: SoundEarth Mapping, PLS Inc. Survey, G-Logics Site Measurements

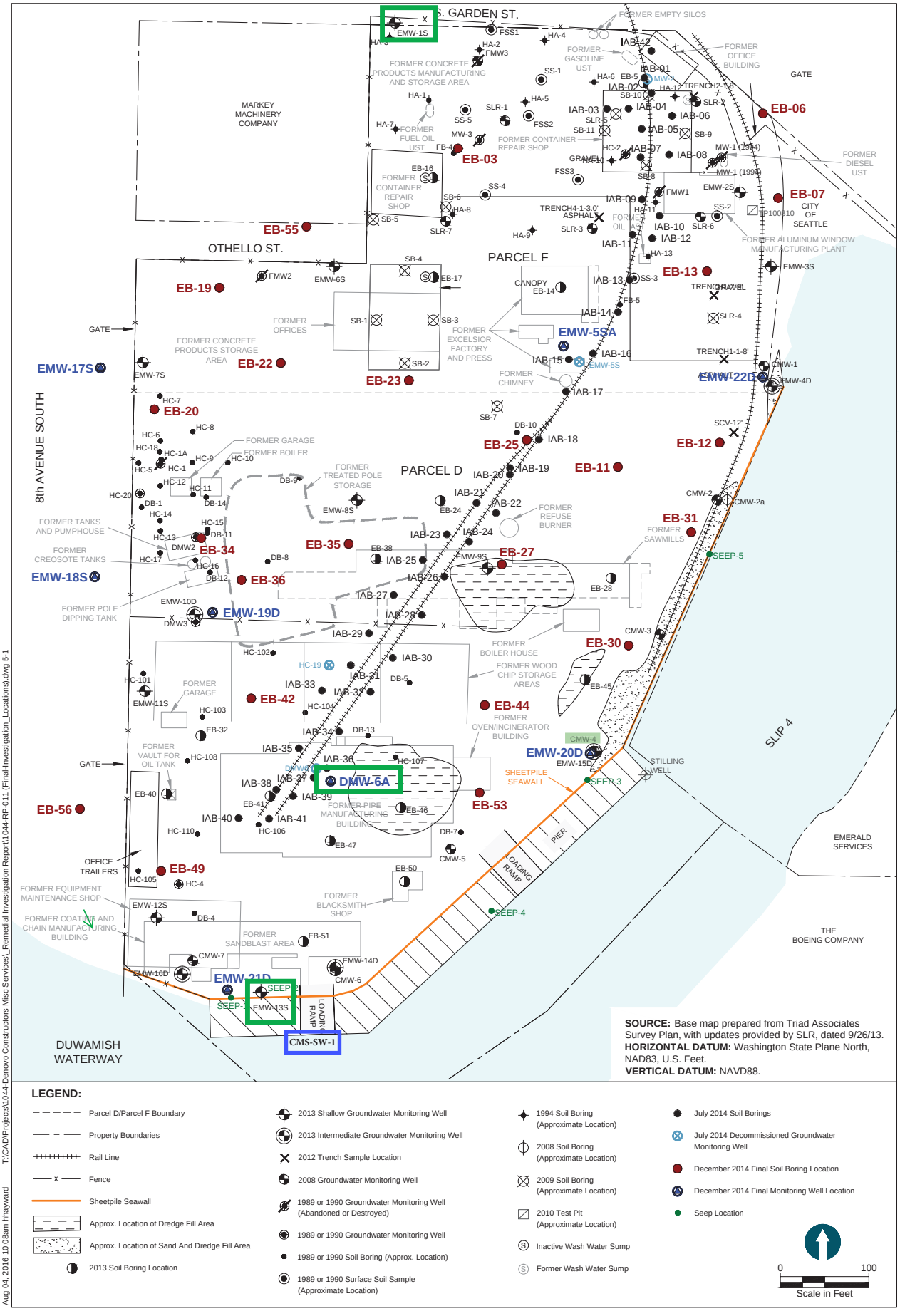
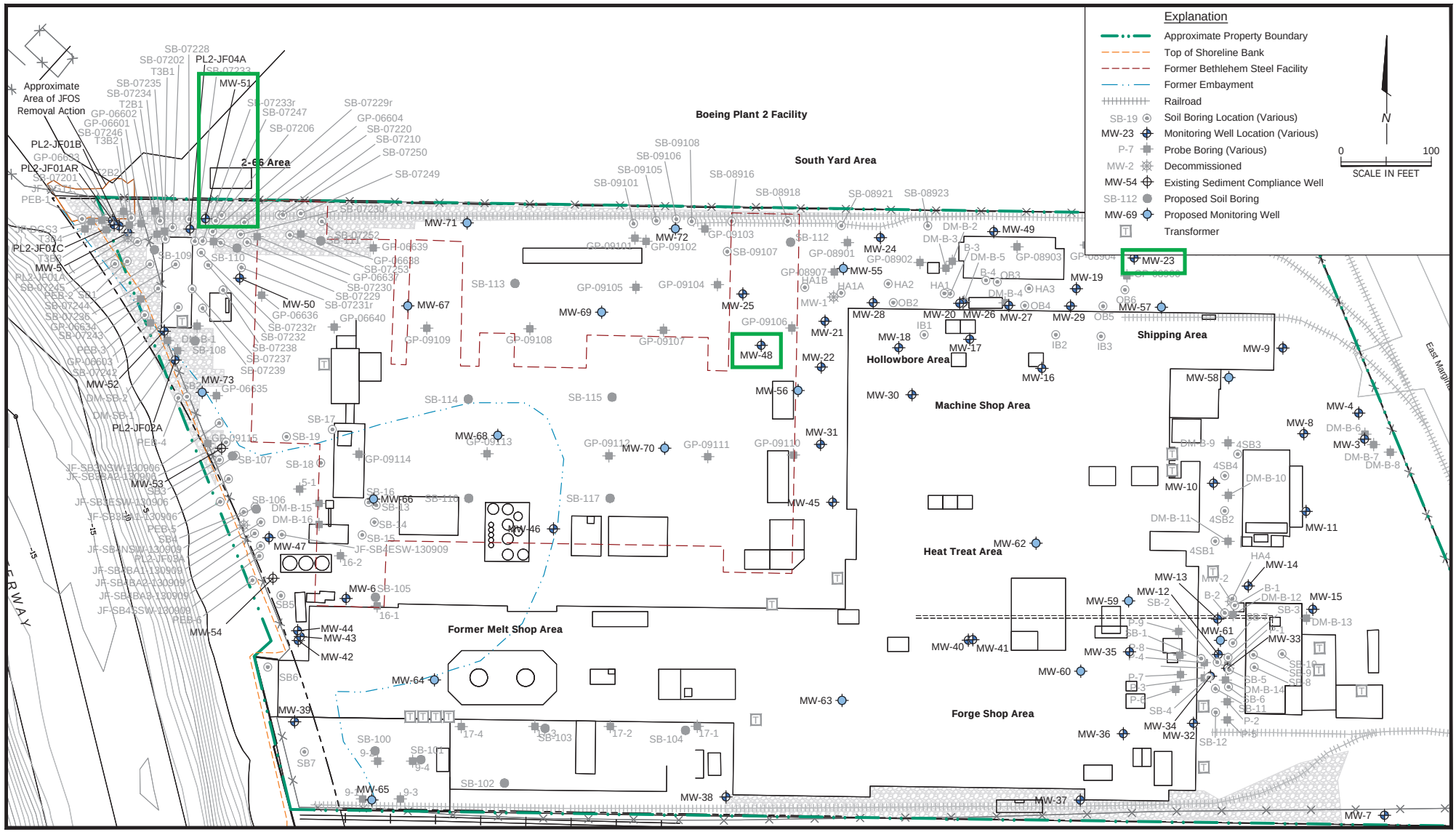


Figure 5-1
Final Soil and Groundwater Investigation Locations
Draft Remedial Investigation Report
8th Avenue Terminals, Inc. Site



PES Environmental, Inc.
Engineering & Environmental Services

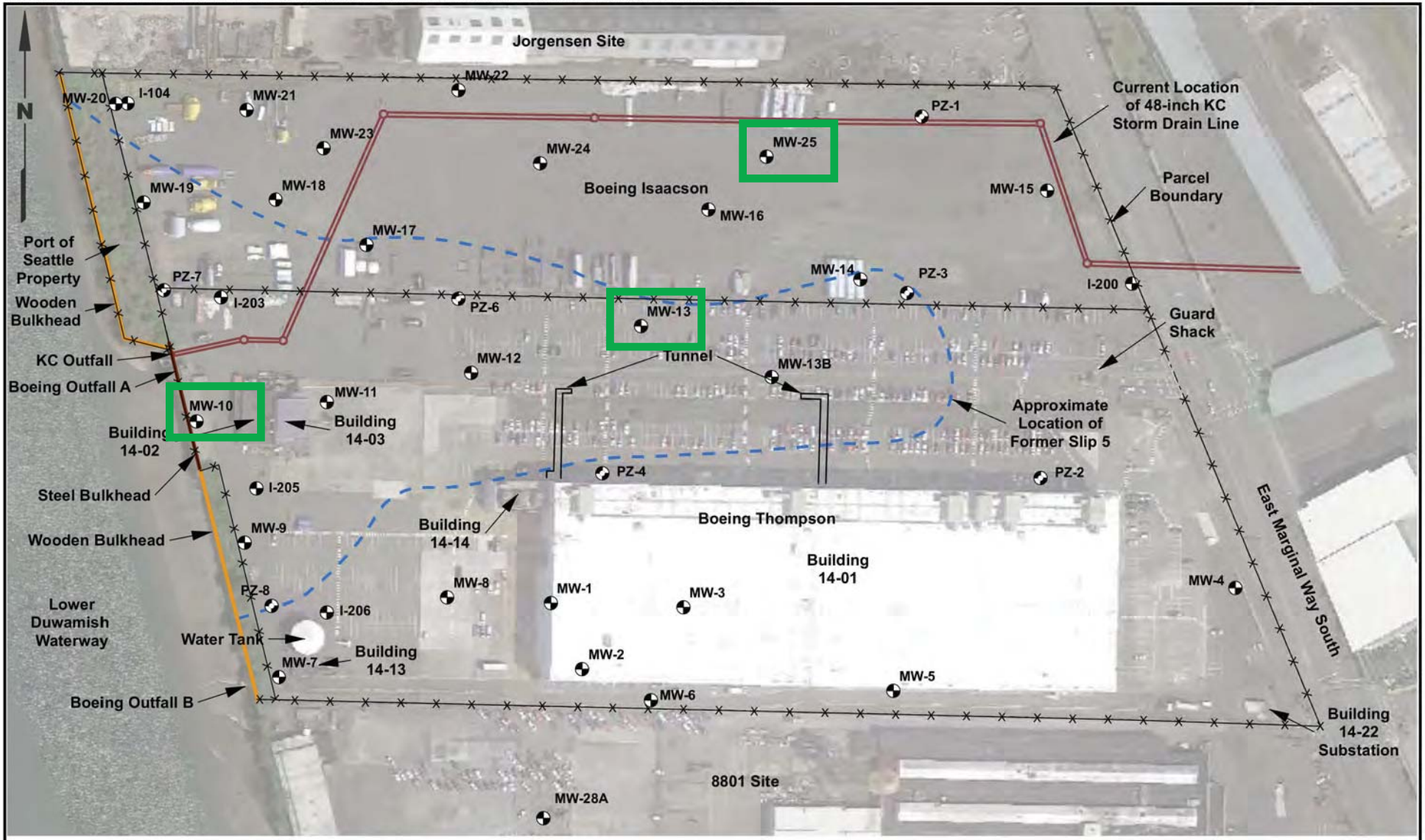
Proposed Groundwater Monitoring Network
Jorgensen Forge Facility
8531 East Marginal Way
Seattle, Washington

FIGURE
15

1415.001.01.002	141500101002_15	WRH	7/15
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

Jorgensen Forge

G:\Projects\025\190\213\013\RI\ES\FigureES-2CurrentSiteFeatures.mxd 3/28/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet



Legend

- Monitoring Well
- Piezometer
- Fence

0 200 400

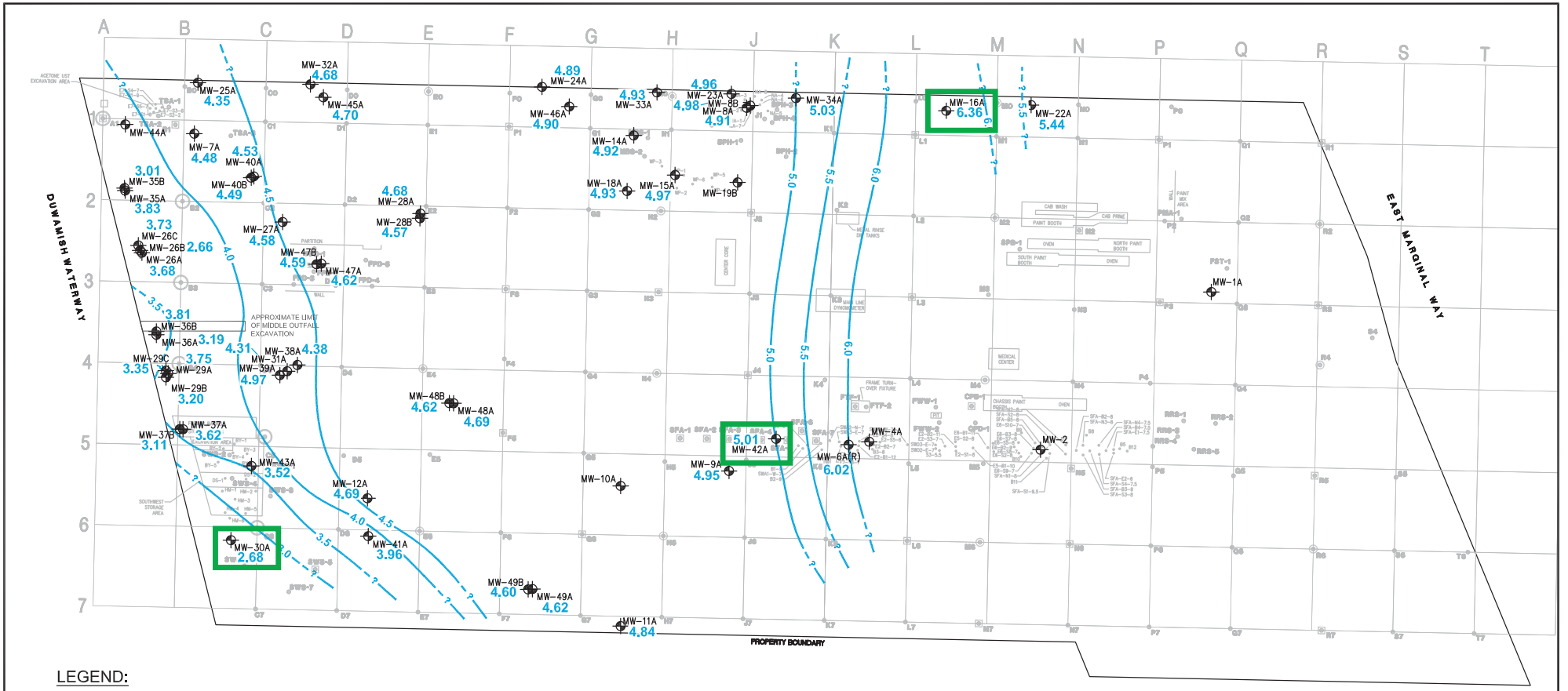
Scale in Feet

Boeing Isaacson/Thompson

Data Sources: Google Earth Pro 2012; King County Parcel Data.

LANDAU ASSOCIATES

Boeing Isaacson-Thompson Site Tukwila, Washington	**Current Site Features**	Figure ES-2



LEGEND:

GROUNDWATER SYMBOLOGY

- GROUNDWATER ELEVATION CONTOUR, DASHED WHERE APPROXIMATE
- 6.0 GROUNDWATER ELEVATION IN FEET (NAVD88)

PHASE II SAMPLE LOCATIONS

- GRID SOIL SAMPLING LOCATION
- MW-36B SHALLOW ZONE GROUNDWATER MONITORING WELL (INSTALLED DURING PHASE II)
- PREVIOUS SOIL BORING LOCATION

NOTE: ALL LOCATIONS ARE APPROXIMATE

0 60 120 240
SCALE IN FEET

CLIENT LOGO

CLIENT: PACCAR INC

AMEC
11810 North Creek Parkway North
Bothell, WA, U.S.A. 98011-8201

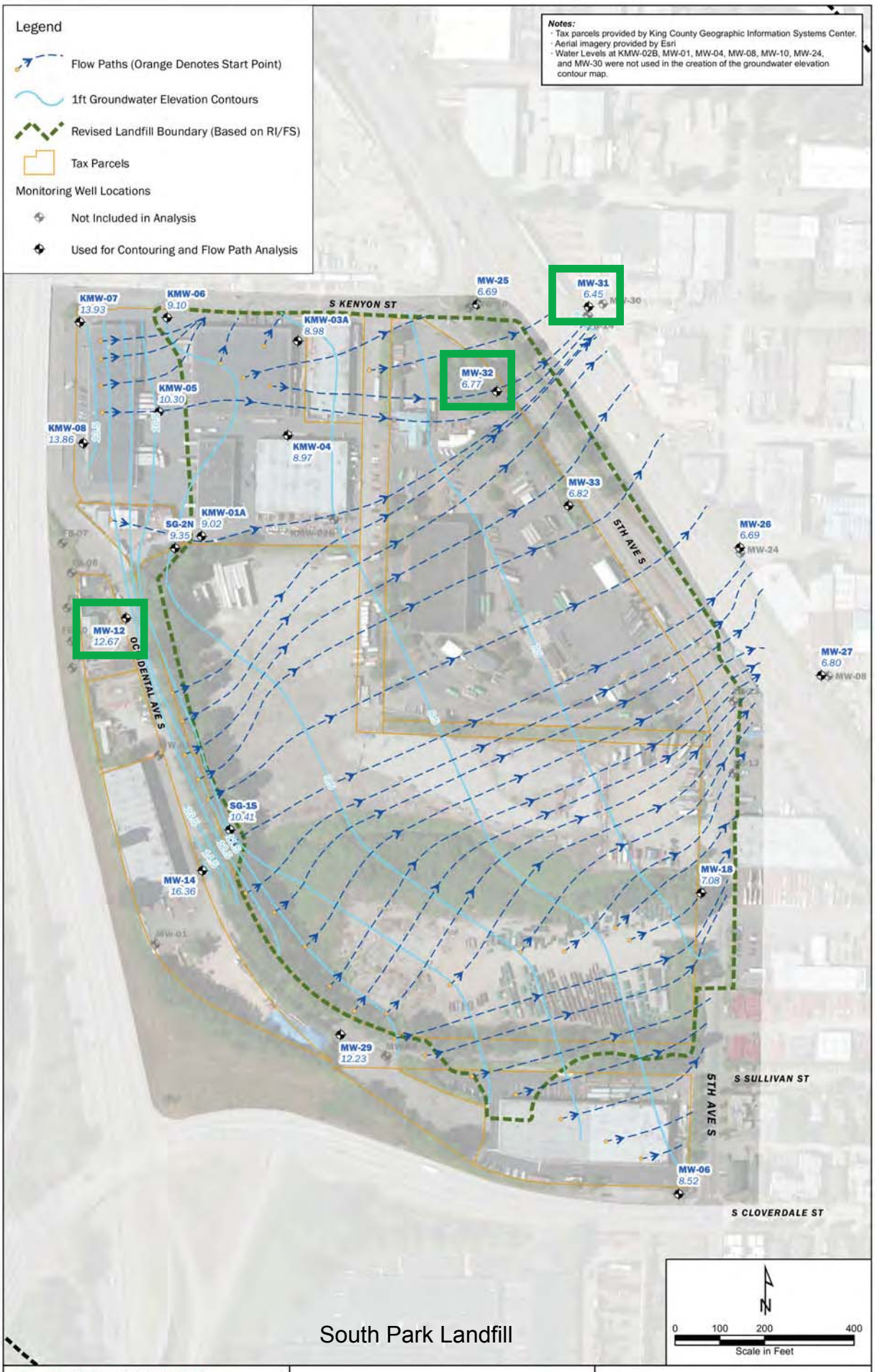
DWN BY:	JRS
CHK'D BY:	MS
DATUM:	NAD27
PROJECTION:	WA SP North
SCALE:	AS SHOWN

PROJECT: 8801 SITE
8801 EAST MARGINAL WAY SOUTH
TUKWILA, WASHINGTON

TITLE: GROUNDWATER ELEVATION
SEPTEMBER 27, 2011 (LOW TIDE)

DATE:	JANUARY 2012
PROJECT NO:	991514995L
REV. NO.:	1
FIGURE No.	3

G:\91\14000\14995-L - PACCAR\14995-L-34.dwg - Layout - Feb. 02, 2012 10:23am - jeffrey.sanders



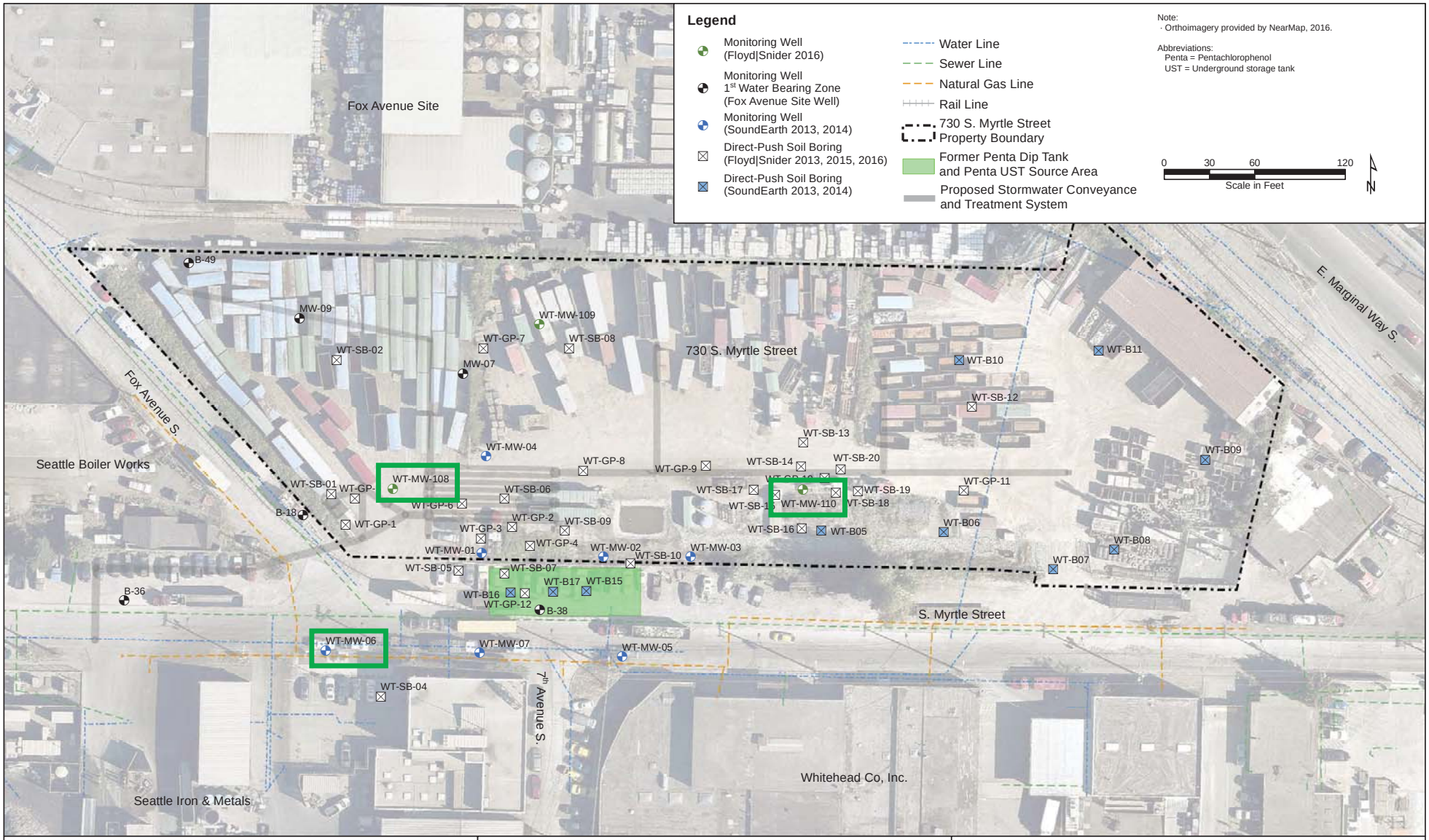
South Park Landfill

FLOYD | SNIDER
strategy • science • engineering
Aspect Consulting
HERRERA ENVIRONMENTAL CONSULTANTS

Interim Site-wide Groundwater Monitoring
South Park Landfill
Seattle, Washington

Figure 2.1
Groundwater Elevation Contour Map
April 2013

T:\projects_8\SouthPark_Landfill\Delivered\April2013Monitoring\RevSept20-2013\Fig 2-1 GW Elevation Contour Map.mxd
9/20/2013

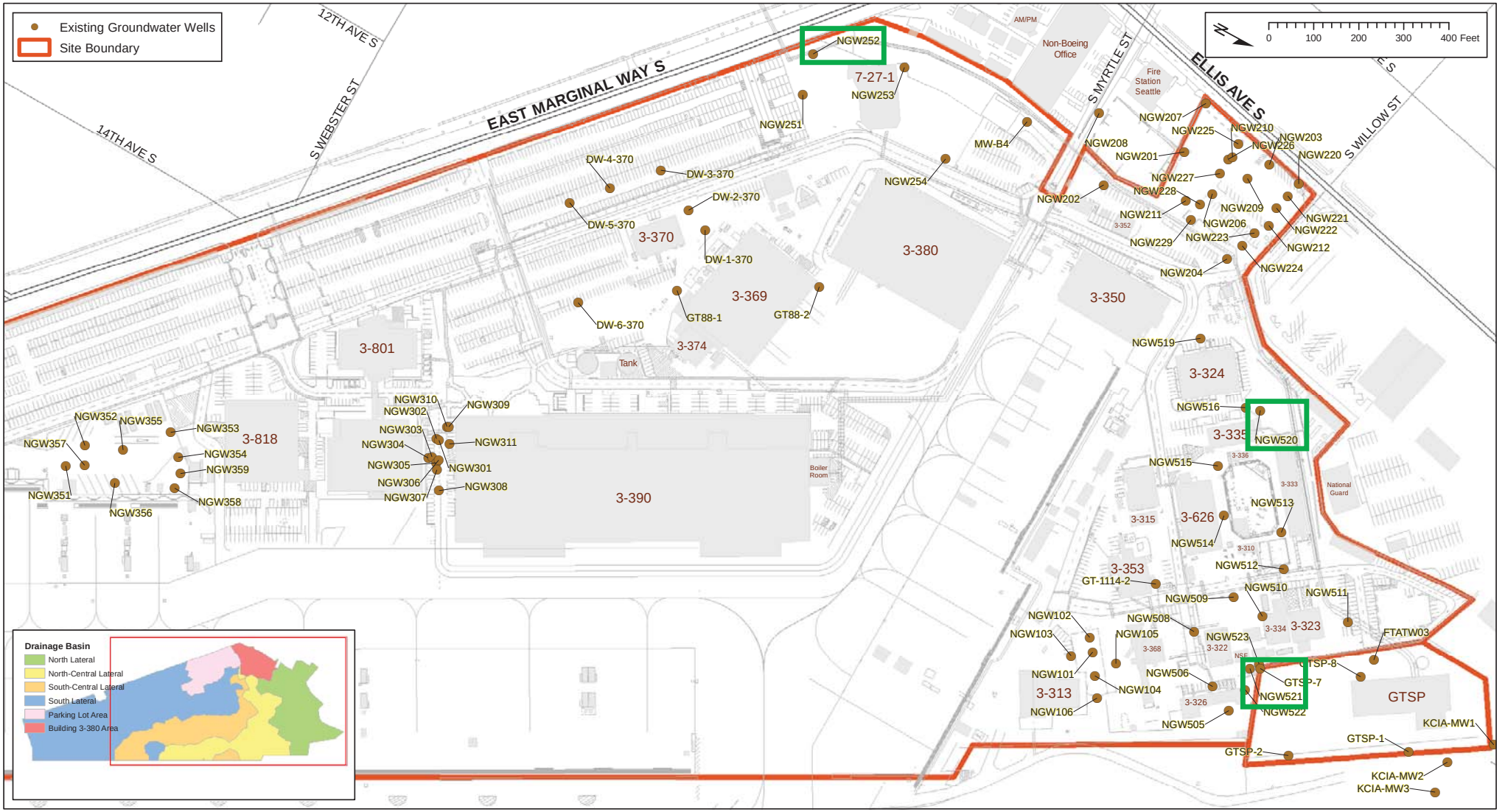


FLOYD | SNIDER
strategy • science • engineering

Interim Action Work Plan
Whitehead Tyee Site
Seattle, Washington

Figure 3.1
Soil Boring and Monitoring Well Locations

I:\GIS\Projects\SIM-730EDR\MXD\Interim Action Work Plan\Figure 3.1 Soil Boring and Monitoring Well Locations.mxd
10/20/2016



DEPARTMENT OF ECOLOGY
State of Washington

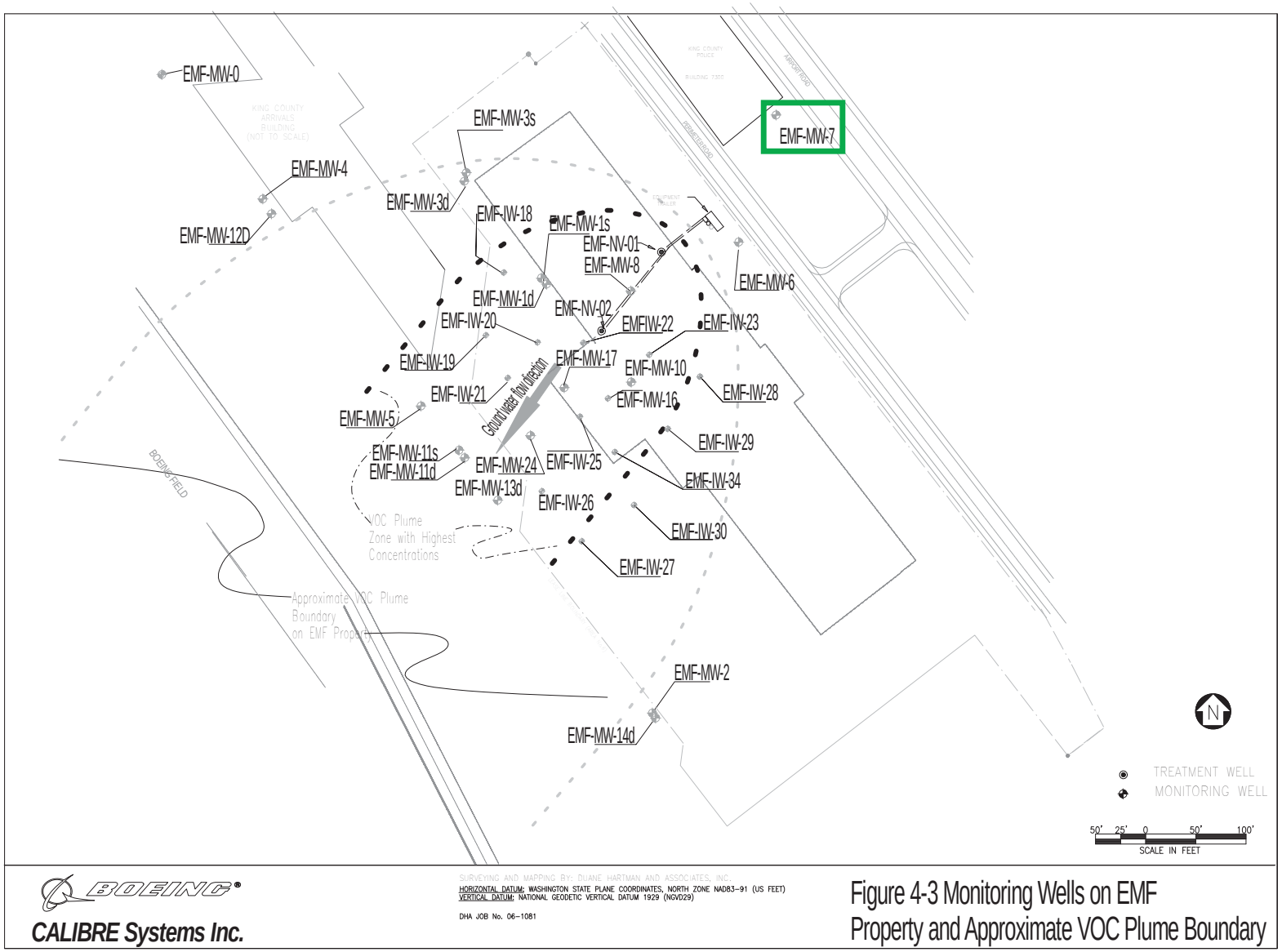
Figure 7.1-1. Existing Groundwater Monitoring Well Locations at NBF-GTSP Site

SAIC From Science to Solutions

Coordinate System:
NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet
Prepared By: apw/mlf
File: Figure_7_1-01_GW_Monitoring_Wells.mxd
Illustrative purposes only.
Date Saved: 11/5/2013 1:53:47 PM

Figure 7.1-1

North Boeing Field



BOEING®

CALIBRE Systems Inc.

SURVEYING AND MAPPING BY: DUANE HARTMAN AND ASSOCIATES, INC.
HORIZONTAL DATUM: WASHINGTON STATE PLANE COORDINATES, NORTH ZONE NAD83-91 (US FEET)
VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM 1929 (NGVD29)

DHA JOB No. 06-1081

Figure 4-3 Monitoring Wells on EMF Property and Approximate VOC Plume Boundary

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- 1995 Excavation Area
- 1992 Excavation Area
- Former UST
- 2017 Soil Borings
- 2017 Monitoring Wells
- Previous Wells (no longer exist)
- GW Diesel concentrations > MTCA Method A CUL, Oct 1995
- Residual TPH Concentrations in soil > MTCA Method A CUL

80 S Hudson Street

Kennedy/Jenks Consultants

N

DRAFT

0 80 160

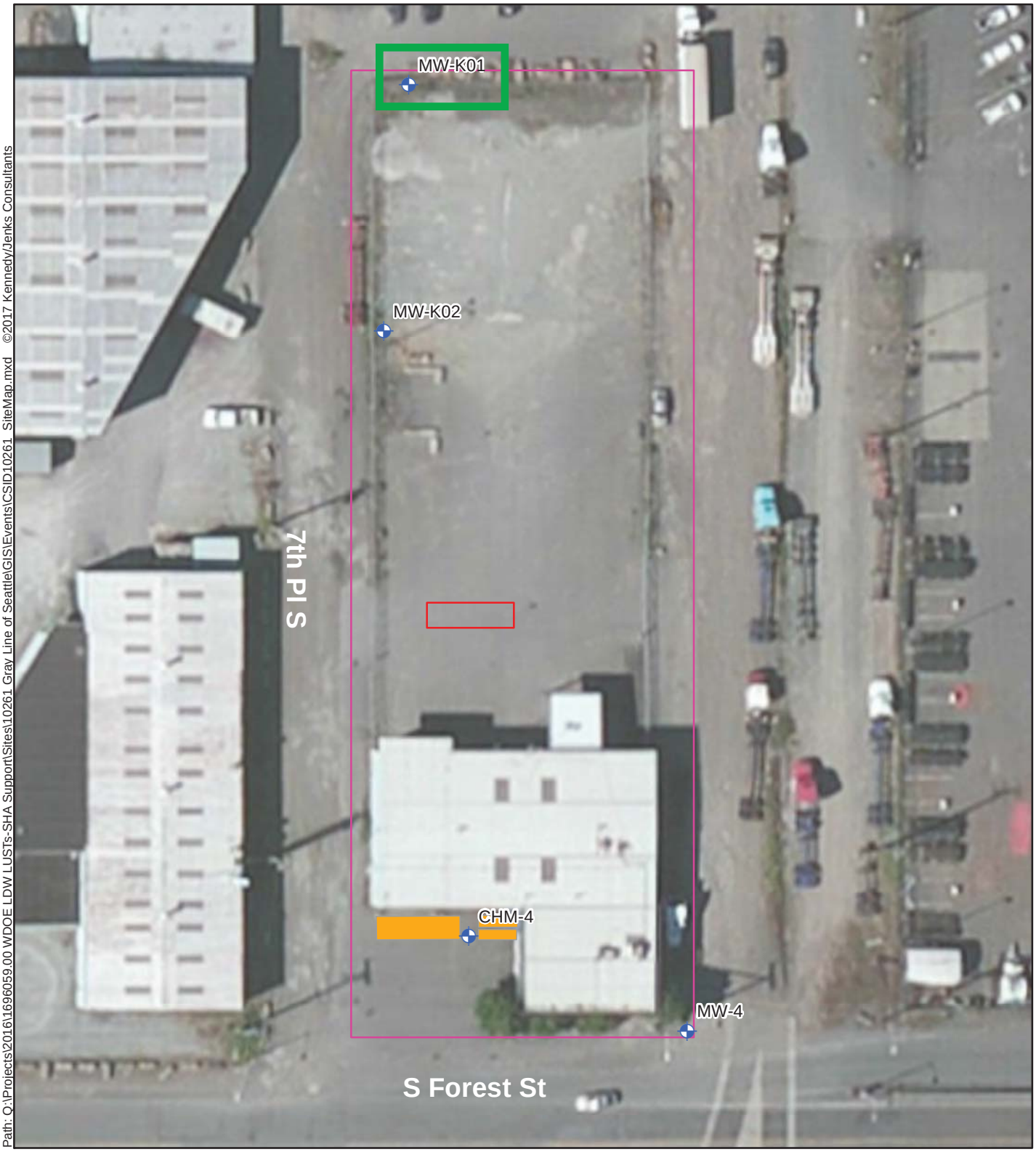
Scale: Feet

80 S Hudson St (CSID 8390)
80 South Hudson Street
Seattle, WA 98134

Site Overview Map

1696059*00
March 2017

Figure X



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Well Locations
- Former AST (approximate)
- Former UST Location
- Property Location

Note:
1. All locations are approximate, and not to scale

N

0 40 80

Gray Line of Seattle

Kennedy/Jenks Consultants

Gray Line of Seattle (CSID 10261)
720 S Forest Street
Seattle, WA 98134

DRAFT

Site Overview Map

1696059*00
April 2017

Figure 2

Path: \\wv01\data\Projects\2016\1696059.00 WDOE LDW LUSTs-SHA Support\Sites\8873 WSDOT Spokane St Maintenance\GIS\Events\CSID8873 AllWells 03232017.mxd ©2017 Kennedy/Jenks Consultants

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- 2017 KJ Recovery Wells
- Monitoring Wells
- Abandoned Monitoring Wells
- Site Features
- Former UST
- Approximate parcel boundary

WA DOT Spokane Street

Note:
1. All locations are approximate.

Kennedy/Jenks Consultants

WA DOT Spokane St Maintenance
Seattle, Washington

N

0 40

Scale: Feet

Wells

1696059*00
April 2017

Figure 1

Appendix B
Field Records and Sampling Summary

Table B-1.
Lower Duwamish Waterway
PCB Groundwater Sampling - Weather Data

Date	Sampled Property	Local Weather During Sampling	Daily Low Temperature (°F)	Average Daily Temperature (°F)	Daily High Temperature (°F)
Week 1 of Sampling					
3/12/2017, Sun	--	Overcast	45	49	53
3/13/2017, Mon	DMC	Heavy rain during collection of surface water, MW-16, and MW-8; light rain during collection of MW-10	48	50	54
3/14/2017, Tue	DS	Light rain during collection of DSIP2-19 and DSI-PZ-01, overcast during collection of DSI-MW-06 and surface water	48	52	57
3/15/2017, Wed	BIT	Moderate rain during collection of MW-25, overcast during collection of MW-13 and MW-10	46	50	52
3/16/2017, Thu	CMS	Scattered clouds with sun breaks	39	46	54
3/17/2017, Fri	NT115	Light rain during collection of MW-10, transitioning to heavy rain during collection of MW-3, and maintaining heavy rainfall throughout collection of MW-20	39	42	48
Week 2 of Sampling					
3/19/2017, Sun	--	Clear, sunny	33	43	53
3/20/2017, Mon	SPL	Scattered clouds during collection of MW-32, transitioning to light rainfall and cloudy with some sunbreaks for collection of MW-12 and MW-31	39	45	53
3/21/2017, Tue	GNW	Overcast with occasional light rain throughout the day	46	50	57
3/22/2017, Wed	EMF, NBF	Mostly cloudy	44	50	57
Week 3 of Sampling					
3/26/2017, Sun	--	Light rain	44	46	50
3/27/2017, Mon	WT	Overcast during collection of MW-06 and MW-108, heavy rainfall during collection of MW-110	44	49	55
3/28/2017, Tue	8801	Slight rainfall during collection of MW-16A, transitioning to overcast for the remainder of the day	46	50	54
3/29/2017, Wed	ICS	Moderate rainfall during collection of DOF-MW-3, transitioning to overcast with occasional sunbreaks for the remainder of the day	46	50	55
3/30/2017, Thu	DMD	Cloud cover with occasional sunbreaks throughout the day	44	49	55
3/31/2017, Fri	JF	Overcast for most of the day, with occasional later sunbreaks during collection of MW-51	39	47	55

Table B-1.
Lower Duwamish Waterway
PCB Groundwater Sampling - Weather Data

Date	Sampled Property	Local Weather During Sampling	Daily Low Temperature (°F)	Average Daily Temperature (°F)	Daily High Temperature (°F)
Week 4 of Sampling					
4/5/2017, Wed	--	Light rain	48	51	55
4/6/2017, Thu	DOT, GLS, SHS	Heavy rain during collection of DOT-MW-2, slight rain during collection of GLS-MW-K01, turning to overcast with occasional sun breaks during collection of SHS-MW-07 and SHS-MW-02	48	54	60

Notes:

Daily temperature data are from KBFI weather station at KCIA/Boeing Field.

This table presents weather data for each sampling day and for the immediately previous day.

8801 - 8801 Site/PACCAR

BIT - Boeing Isaacson/Thompson

CMS - Crowley Marine Services

DMC - Duwamish Marine Center

DMD - Douglas Management Dock

DOT - Washington State Department of Ecology Spokane Stree

DS - Duwamish Shipyard

EMF - Electronics Manufacturing Facility at King County International Airport

GLS - Gray Line of Seattle

GNW - Glacier Northwest

ICS - Industrial Container Services

JF - Jorgensen Forge

NBF - North Boeing Field

NT115 - North Terminal 115

SHS - 80 S Hudson Street

SPL - South Park Landfill

WT - Whitehead Tyee

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - Duwamish Marine Center
Project Number:
Purged by: SHB & MCE
Sampled by: SHB & MCE
Checked by:

Well Identification: Surface Water
Sample ID: DMC-SW-1-20170313
Date: 3/13/17
Date: 3/13/17
Date:

WELL INFORMATION:

Well Depth from Well Log: N/A
Screen Interval: N/A
Starting Water Level: N/A

Well Diameter: N/A
Pump Intake: ↓
Final Water Level: ↓
Total Depth (measured after sampling):

PURGE INFORMATION:

Time Purge Start: 1218
Time Purge End: 1241
Pump Type and ID: Peristaltic R4223
Purge Rate: (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
MCE 3/13/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): NM

SAMPLING INFORMATION:

Time Sample Start: 1245
Time Sample End: 1222
Grab x Composite
\# of Bottles Collected: 7
Bottle Preservatives: NA
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
12:21	7.98	7.06	208.5	8.448	7.96	11.43			
12:26	7.97	7.12	202.6	8.453	6.85	10.35			
12:31	7.90	7.21	187.5	8.350	7.04	9.73			
12:36	7.85	7.22	182.9	8.216	6.21	9.60			
12:41	7.86	7.24	180.2	8.176	5.50	9.60			
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

MCE 3/13/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-Duwamish Marine Center
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by: SMB

Well Identification: DMC-MW-16
Sample ID: DMC-MW-16-201703
Date: 3/13/17
Date: 3/13/17
Date:

WELL INFORMATION:

Well Depth from Well Log: N/A
Screen Interval: 9-19 ft
Starting Water Level: 12.39 ft

Well Diameter: 2"
Pump Intake: 16.0 ft
Final Water Level: 13.65 ft
Total Depth (measured after sampling): —

PURGE INFORMATION:

Time Purge Start: 1249
Time Purge End: 1322
Pump Type and ID: Peristaltic #
Purge Rate: 250.0 (mL/min)
Controller Settings: CPM: NA
PSI:
Discharge Time: NA
Recharge Time: NA
Water Quality Meter: YSI 556 / Hach 2100Q
Total Purge Volume (mL): ~7.25 L

SAMPLING INFORMATION:

Time Sample Start: 1323
Time Sample End: 1351
Grab x Composite
# of Bottles Collected: 8
Bottle Preservatives: NO
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1250	10.78	6.33	44.0	27.33	2.20	7.23	250	13.17	250 mL/min
1255	10.73	6.54	-54.9	25.20	1.15	1.07	1.5	13.35	250
1300	10.73	6.78	-83.6	28.71	0.85	0.93	2.75	13.50	250
1305	10.74	6.91	-98.6	28.89	0.55	0.90	4.0 L	13.60	250
1310	10.74	7.00	-107.8	28.95	0.53	0.82	5.25	13.70	250
1315	10.73	7.06	-112.8	29.02	0.54	0.70	6.25	13.70	200
1320	10.73	7.12	-116.9	29.03	0.34	0.50	7.25	13.72	200
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Maureen Joe 3/13/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-Duwamish Marine Center
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: DMC-MW-8
Sample ID: DMC-MW-8-20170313
Date: 3/13/17
Date: 3/13/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 8-18 Ft
Starting Water Level: 8.17 Ft

Well Diameter: 2"
Pump Intake: 14.0 Ft
Final Water Level: 7.90 Ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1450
Time Purge End: 1526
Pump Type and ID: Penstaltic Pump
Purge Rate: 300 (mL/min)
Controller Settings: CPM: NA
PSI: NA
Discharge Time: NA
Recharge Time: NA
Water Quality Meter: YSI 556 / Hach 2100Q
Total Purge Volume (mL): ~10.8 L

SAMPLING INFORMATION:
Time Sample Start: 1530
Time Sample End: 1555
Grab x Composite
# of Bottles Collected: 8
Bottle Preservatives: None
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate mL/min
1451	9.16	8.27	+20.3	2.400	3.14	4.80	0.3	8.41	300 mL/min
1456	9.16	7.84	-17.0	1.933	2.160	1.83	1.8	8.41	300
1501	9.13	7.59	-6.4	1.838	2.0	1.77	3.3	8.41	300
1506	9.12	7.47	-2.3	1.779	0.95	1.60	4.8	8.41	300
1511	9.08	7.37	0.7	1.770	1.06	1.46	6.3	8.41	300
1516	9.09	7.33	1.7	1.768	0.37	1.42	7.8	8.41	300
1521	9.14	7.29	2.9	1.762	0.97	1.31	9.3	8.41	300
1526	9.12	7.25	4.4	1.705	0.74	1.16	10.8	8.22	300
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

3/13/17

10/13/2014

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDO
Project Number:
Purged by: SHB & MCE
Sampled by: SHB & MCE
Checked by: SHB

Well Identification: DMC-MW-10-20170313
Sample ID: DMC-MW-10-20170313
Date: 3/13/17
Date: 3/13/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 9-19 ft
Starting Water Level: 5.90 ft

Well Diameter: 2"
Pump Intake: 12.0 ft
Final Water Level: 6.00 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1614
Time Purge End: 1640
Pump Type and ID: Peristaltic pump
Purge Rate: 275.0 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556/Hach 2100Q
Total Purge Volume (mL): ~6.5L

MCE 3/13/17

SAMPLING INFORMATION:
Time Sample Start: 1640
Time Sample End: 1703
Grab x Composite
# of Bottles Collected: 8
Bottle Preservatives: none

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1616	9.07	7.62	58.1	0.739	3.47	10.32	0.550	6.02	275 mL/min
1621	8.78	7.40	54.0	0.734	1.25	6.71	1.925	6.02	275
1626	8.71	7.31	56.3	0.721	0.70	6.60	3.3	6.02	275
1631	8.70	7.24	59.8	0.715	0.70	6.52	4.676	6.02	275
1636	8.66	7.24	59.4	0.716	0.70	6.42	6.050	6.02	275
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Maria Clark 3/13/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - Duwamish Shipyard
Project Number:
Purged by: SHB & MCE
Sampled by: SHB & MCE
Checked by:

Well Identification: DSIP2-19
Sample ID: DS-DSIP2-19-20170314
Date: 3/14/17
Date: 3/14/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-15 ft
Starting Water Level: 3.12 ft

Well Diameter: 2"
Pump Intake: 10 ft
Final Water Level: 3.30
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1130
Time Purge End: 1208
Pump Type and ID: Peristaltic pump
Purge Rate: 350 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
MCE 3/14/17
Water Quality Meter: YSI 556 # 17506
Total Purge Volume (mL): ~ 14 L

SAMPLING INFORMATION:
Time Sample Start: 1210
Time Sample End: 1246
Grab x Composite
# of Bottles Collected: 4
Bottle Preservatives: None

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1132	10.90	6.89	-102.6	2.316	6.49	12.04	700 mL	3.25	350 mL/min
1137	10.49	6.85	-94.3	2.337	4.73	1.04	2.45	3.30	350
1142	10.48	6.87	-99.0	2.353	4.42	0.62	4.20	3.30	350
1147	10.45	6.88	-99.0	2.367	5.16	0.58	5.95	3.30	350
1152	10.39	6.89	-99.4	2.382	4.23	0.62	7.70	3.30	350
1157	10.35	6.89	-97.6	2.402	3.14	0.56	9.45	3.30	350
1202	10.32	6.89	-95.9	2.418	3.59	0.57	11.20	3.30	350
1207	10.31	6.89	-93.5	2.431	3.28	0.52	12.95	3.30	350
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Matthew Reiff 3/14/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - Duwamish Shipyard
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: DSI-MW-D6
Sample ID: DS-DSI-MW-D6-201708
Date: 3/14/17
Date: 3/14/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5.4 - 15.1 ft
Starting Water Level: 3.07

Well Diameter: 2"
Pump Intake: 10 ft
Final Water Level: 3.43 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1319 MCE 3/14/17 1326
Time Purge End: 1353
Pump Type and ID: Peristaltic Pump
Purge Rate: 300 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time: MCE 3/14/17
Water Quality Meter: YSI 556 # 17506
Total Purge Volume (mL): ~8.0 L

SAMPLING INFORMATION:
Time Sample Start: 1355
Time Sample End: 1417
Grab ___ x ___ Composite
# of Bottles Collected: 8
Bottle Preservatives: none

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity (NTU)	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1327	9.98	6.33	-54.4	7.445	2.33	2.33	300 mL	3.44	300 mL/min
1332	9.68	6.37	-55.9	7.418	0.97	1.03	1.8	3.44	300
1337	9.67	6.39	-57.9	7.437	0.78	0.79	3.3	3.44	300
1342	9.67	6.40	-59.5	7.719	0.58	0.74	4.8	3.43	300
1347	9.68	6.38	-61.2	7.736	0.42	0.87	6.3	3.43	300
1352	9.69	6.39	-61.9	7.751	0.33	0.70	7.8	3.43	300
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Marcus Cole 3/14/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-Duwamish Shipyard
Project Number:
Purged by: SHB & HCE
Sampled by: SHB & HCE
Checked by:

Well Identification: Surface Water
Sample ID: DS-SW-1-20170314
Date: 3/14/17
Date: 3/14/17
Date:

WELL INFORMATION:

Well Depth from Well Log: N/A
Screen Interval: N/A
Starting Water Level: N/A

Well Diameter: N/A
Pump Intake: N/A
Final Water Level: N/A
Total Depth (measured after sampling):

PURGE INFORMATION:

Time Purge Start: 1340
Time Purge End: ~~1200~~ SHB 1400
Pump Type and ID: Peristaltic
Purge Rate: NA (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
HCE 3/14/17
Water Quality Meter: YSI
Total Purge Volume (mL): NM

SAMPLING INFORMATION:

Time Sample Start: ~~12~~ SHB 1405
Time Sample End: 1420
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: N/A

Duplicate Sampling: N/A
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1340	8.03	6.00	165.5	33.86	13.5	9.71			~~275ml/m~~ SHB
1345	7.83	6.32	161.0	33.11	14.5	10.88			
1348	7.80	6.39	159.4	32.90	14.6	11.17			
1351	7.80	6.47	157.6	32.47	12.6	11.14			
1354	7.82	6.49	156.5	32.92	14.2	11.05			
1357	7.80	6.51	156.3	33.82	13.9	11.05			
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - Duwamish Shipyard
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: DSI-PZ-01
Sample ID: DS-DSI-PZ-01-20170314
Date: 3/14/17
Date: 3/14/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-14.7 ft
Starting Water Level: 5.75

Well Diameter: 2"
Pump Intake: 10.07 ft
Final Water Level: 5.65 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1608
Time Purge End: 1628
Pump Type and ID: Peristaltic Pump
Purge Rate: 320.0 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556 # 17506
Total Purge Volume (mL): ~1000

MCE 3/14/17

SAMPLING INFORMATION:
Time Sample Start: 1630
Time Sample End: 1648
Grab x Composite
# of Bottles Collected: 14
Bottle Preservatives: none
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Black particles in water / Yellowish water

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1610	10.52	6.52	-73.3	4.804	11.7	4.45	640mL	5.65	320.0 mL/min
1615	10.58	6.50	-89.9	4.806	7.84	1.49	2.24	5.65	320
1620	10.45	6.44	-95.2	4.833	2.10	1.44	3.84	5.65	320
1624	10.43	6.44	-95.2	4.866	1.65	1.14	5.44	5.65	320
1627	10.44	6.46	-96.4	4.846	1.25	1.24	7.04	5.65	320
1627	10.41	6.48	-98.1	4.816	1.12	1.06	8.64	5.65	320
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Alexander Lee 3/14/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

wrong well (MW-14)

Project Name: LDW-BIT
Project Number:
Purged by: SHB & MCE
Sampled by: SHB & MCE
Checked by:

Well Identification: MW-25
Sample ID: BIT-MW-25-20170315
Date: 3/15/17
Date: 3/15/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 8-18 ft
Starting Water Level: 9.79

Well Diameter: 2"
Pump Intake: 14 ft
Final Water Level:
Total Depth (measured after sampling): N/A

PURGE INFORMATION:
Time Purge Start: 1121
Time Purge End:
Pump Type and ID:
Purge Rate: 300 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL):

SAMPLING INFORMATION:
Time Sample Start:
Time Sample End:
Grab x Composite
# of Bottles Collected: 8
Bottle Preservatives: none

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1123	14.49	6.59	183.3	3.21	2.00	4.86	600mL	9.81	300mL/min
1128									
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

wrong well MW-14 - actually

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDO - BIT
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-25
Sample ID: BIT-MW-25-20170315
Date: 3/15/17
Date: 3/15/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 8-18ft
Starting Water Level: 9.27

Well Diameter: 2"
Pump Intake: 14ft
Final Water Level: 9.27ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1148
Time Purge End: 1215
Pump Type and ID: Peristaltic pump
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time: MCE 3/15/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10 (L)

SAMPLING INFORMATION:
Time Sample Start: 1215
Time Sample End: 1247
Grab x Composite
# of Bottles Collected: 8
Bottle Preservatives: none
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1150	11.98	6.98	169.3	2.095	3.70	5.57	500 mL	9.30	250 mL/min
1155	11.90	6.96	175.7	2.083	4.65	1.35	1.75	9.30	250
1200	11.86	7.04	175.6	2.062	3.81	0.91	3.00	9.30	250
1203	11.87	7.08	173.5	2.0606	3.38	0.83	4.25	9.30	250
1206	11.86	7.12	172.3	2.077	3.33	0.78	5.50	9.30	250
1209	11.87	7.14	171.5	2.086	3.08	0.80	6.75	9.30	250
1212	11.84	7.16	170.7	2.095	3.31	0.91	8.00	9.30	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Maverick 3/15/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - BIT
Project Number:
Purged by: SNB & MCE
Sampled by: SNB & MCE
Checked by:

Well Identification: MW-13
Sample ID: BIT-MW-13-20170315
Date: 3/15/17
Date: 3/15/17
Date:

WELL INFORMATION:
Well Depth from Well Log: NA
Screen Interval: 8-18 ft
Starting Water Level: 9.61 ft

Well Diameter: 2"
Pump Intake: 14 ft
Final Water Level: 9.61 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1319
Time Purge End: 1354
Pump Type and ID: Peristaltic Pump
Purge Rate: 350 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~18(L)

MCE 3/15/17

SAMPLING INFORMATION:
Time Sample Start: 1355
Time Sample End: 1411
Grab x Composite
# of Bottles Collected: 8
Bottle Preservatives: None
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Artesian water

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1350	14.89	6.94	27.3	3.172	10.3	2.48	350 mL	9.68	350 mL/min
1385	15.04	6.79	-3.0	3.166	6.94	0.97	2.10	9.68	350
1380	15.19	6.71	-30.2	3.131	8.18	0.71	3.85	9.69	350
1385	15.31	6.167	-43.4	3.097	7.45	0.64	5.60	9.69	350
1338	15.34	6.166	-49.5	3.086	5.27	0.64	7.35	9.70	350
1341	15.40	6.165	-53.5	3.081	4.92	0.58	9.10	9.70	350
1344	15.41	6.165	-54.4	3.082	5.24	0.50	10.85	9.70	350
1347	15.48	6.164	-58.6	3.078	3.84	0.42	12.60	9.70	350
1350	15.45	6.164	-59.8	3.077	3.27	0.38	14.35	9.70	350
1353	15.50	6.163	-61.3	3.077	3.31	0.32	16.10	9.70	350
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

MCE 3/15/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - BIT
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-10
Sample ID: BIT-MW-10-20170315
Date: 3/15/17
Date: 3/15/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 8-18 FT
Starting Water Level: 7.80 FT

Well Diameter: 13 ft MCE 3/15/17 2"
Pump Intake: 13 FT
Final Water Level: 7.80 FT
Total Depth (measured after sampling): N/M

PURGE INFORMATION:
Time Purge Start: 1504
Time Purge End: 1554
Pump Type and ID: Peristaltic pump
Purge Rate: 300-200 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
MCE 3/15/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~12 (L)

SAMPLING INFORMATION:
Time Sample Start: 1555
Time Sample End: 1650
Grab x Composite
# of Bottles Collected: 41
Bottle Preservatives: none 3/15/17 MCE
Duplicate Sampling: NO YES
Laboratory: BIT-MW-10-20170315-1
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Collect Field Duplicate

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1504	10.10	7.164	18.0	0.320	10.15	10.15	600mL	8.22	300 mL/min
1511	9.59	7.22	35.6	0.327	4.80	9.92	2.1	8.47	300
1516	9.50	7.13	45.8	0.330	4.07	9.74	3.6	8.70	300
1521	9.47	7.17	50.2	0.320	3.95	8.76	4.8	8.84	250
1526	9.47	7.22	52.8	0.316	3.31	6.47	5.8	8.90	240
1531	9.52	7.25	52.7	0.312	3.07	6.17	6.8	8.88	300 mL/min
1536	9.50	7.26	50.6	0.306	2.93	6.11	7.8	8.85	200
1541	9.48	7.24	61.5	0.304	3.16	6.46	8.8	8.81	200
1546	9.61	7.24	64.7	0.301	2.93	6.85	9.8	8.80	200
1551	9.48	7.22	69.5	0.300	2.97	7.15	10.8	8.80	200
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW- CMS
Project Number:
Purged by: SHB & MCE
Sampled by: SHB & MCE
Checked by:

Well Identification: EMW EHW-1S
Sample ID: CMS-EHW-1S-20170311
Date: 3/16/17
Date: 3/16/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-19.0 ft
Starting Water Level: 5.16 ft

Well Diameter: 2"
Pump Intake: 13.7
Final Water Level: 5.66
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1223
Time Purge End: 1305
Pump Type and ID: Peristaltic pump
Purge Rate: 250.0 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time: MCE 3/16/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~12(L)

SAMPLING INFORMATION:
Time Sample Start: 1305
Time Sample End: 1330
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: None

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1226	9.62	7.53	147.8	0.475	55.4	14.92	840mL	5.75	250 mL/min
1231	9.34	7.25	140.4	0.470	31.9	8.54	2.24	5.75	250
1236	9.27	7.12	154.9	0.470	12.4	8.55	3.04	5.76	250
1241	9.01	7.14	150.3	0.470	16.43	8.45	5.04	5.79	250
1246	9.15	7.19	148.2	0.469	5.26	8.28	6.44	5.80	250
1251	8.99	7.23	146.4	0.469	3.68	8.33	7.84	5.80	250
1256	9.00	7.26	145.2	0.468	3.31	8.10	9.24	5.80	250
1301	9.04	7.30	143.4	0.469	3.20	7.96	10.64	5.80	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - CMS
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: EMW-13S
Sample ID: CMS-EMW-13S-201703
Date: 3/16/17
Date: 3/16/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-19.8 ft
Starting Water Level: 10.96 ft

Well Diameter: 2"
Pump Intake: 15 ft
Final Water Level: 11.95 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1405
Time Purge End: 1505
Pump Type and ID: Peristaltic Pump
Purge Rate: 145.0 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: 451556
Total Purge Volume (mL): ~10(L)

MCE 3/16/17

SAMPLING INFORMATION:
Time Sample Start: 1505
Time Sample End: 1612
Grab x Composite
# of Bottles Collected: 11
Bottle Preservatives: none

Duplicate Sampling: CMS-EMW-13S-201703
Laboratory: * Filter
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1410	9.38	7.84	171.5	3.096	23.70	12.60	1.2	11.70	240 mL/min
1415	8.65	7.91	173.5	3.301	27.7	12.14	2.3	12.03	220
1420	8.17	7.96	174.0	3.530	16.3	11.40	3.3	12.36	200
1425	8.18	7.99	175.2	3.904	17.2	10.57	4.175	12.46	175 mL/min
1430	8.25	8.03	175.8	4.209	15.3	9.98	4.9	12.47	145
1435	8.25	8.08	175.8	4.500	11.20	9.49	5.625	12.50	145
1440	8.20	8.15	175.2	4.762	11.70	9.08	6.350	12.52	145
1445	8.17	8.20	175.1	4.909	12.50	8.75	7.075	12.54	145
1450	8.19	8.25	174.5	5.084	9.01	8.52	7.8	12.570	145
1455	8.18	8.29	174.6	5.209	9.83	8.36	8.525	12.58	145
1500	8.13	8.33	174.5	5.309	9.42	8.33	9.250	12.58	145
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

3/16/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - CMS
Project Number:
Purged by: SHB & MCB
Sampled by: SHB & MCB
Checked by:

Well Identification: Surface Water
Sample ID: CMS-SW-1-20170316
Date: 3/16/17
Date: 3/16/17
Date:

WELL INFORMATION:
Well Depth from Well Log: NA
Screen Interval: NA
Starting Water Level: NA

Well Diameter: NA
Pump Intake: NA
Final Water Level: NA
Total Depth (measured after sampling):

PURGE INFORMATION:
Time Purge Start: 1437
Time Purge End: 1500
Pump Type and ID: Peristaltic
Purge Rate: 380 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): NM

MCB 3/16/17

SAMPLING INFORMATION:
Time Sample Start: ~~1500~~ SHB/MCB 1500
Time Sample End: 1450
Grab x Composite
# of Bottles Collected: 11
Bottle Preservatives: NA

Duplicate Sampling: F
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
pH probe not functioning properly unable to recalibrate, all other parameters operating within range and calibration.
NM - not measured

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1438	8.18	8.09	13.0	0.392	47.4	126.4			380
1441	8.04	11.10	33.8	0.380	45.4	12.20			↓
1450	8.59	NM	102.2	0.344	53.3	12.87			
1453	7.88	↓	97.6	0.255	61.3	12.75			
1456	7.71		92.3	0.214	54.9	12.61			
1459	7.72		114.5	0.360	46.0	12.66			↓
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

recalibrate of pH failed

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-CMS
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: BHW-6A
Sample ID: CMS-BHW-6A-201703
Date: 3/16/17
Date: 3/16/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-20'
Starting Water Level: 12.43

Well Diameter: 2"
Pump Intake: 17 ft
Final Water Level: 11.95 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1640
Time Purge End: 1725
Pump Type and ID: Peristaltic pump
Purge Rate: 250.0 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
MCE 3/16/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~11 (L)

SAMPLING INFORMATION:
Time Sample Start: 1725
Time Sample End: 1750
Grab x Composite
# of Bottles Collected: 8
Bottle Preservatives: none
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1642	14.30	7.92	8.6	0.563	4.20	6.20	500 mL	12.33	250 mL/min
1647	14.36	7.20	-45.6	0.579	5.67	0.86	1.75	12.33	250
1650	14.42	6.95	-108.8	0.585	4.28	0.69	3.0	12.30	250
1657	14.61	6.85	-77.8	0.588	3.34	0.52	4.25	12.30	250
1702	14.58	6.81	-84.3	0.588	2.15	0.51	5.50	12.30	250
1709	14.59	6.79	-90.9	0.588	1.95	0.47	6.75	12.25	250
1712	14.61	6.78	-94.1	0.591	1.84	0.33	8.0	12.21	250
1717	14.58	6.77	-96.5	0.590	1.18	0.30	9.25	12.16	250
1722	14.58	6.77	-98.3	0.588	1.04	0.30	10.5	12.14	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Autumn Bair 3/16/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-NT11S
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: HW-10
Sample ID: NT11S-HW-10-20170317
Date: 3/17/17
Date: 3/17/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 7-11.5 FT
Starting Water Level: 5.23 FT

Well Diameter: 2"
Pump Intake: 9 ft
Final Water Level: 5.23 FT
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1035
Time Purge End: 1115
Pump Type and ID: Peristaltic pump
Purge Rate: 240 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: 451 556
Total Purge Volume (mL):

MCE 3/17/17

SAMPLING INFORMATION:
Time Sample Start: 1115
Time Sample End: 1137
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: None

Duplicate Sampling: ND
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1040	10.52	5.68	131.5	0.436	2.02	4.63	1.2	NM	240
1045	10.24	5.81	116.3	0.437	1.06	2.99	2.4		240
1050	10.15	6.03	106.6	0.441	1.09	2.76	3.6		240
1055	10.17	6.31	98.8	0.442	0.98	2.85	4.8		240
1102	10.11	6.34	93.5	0.442	0.910	2.97	6.0		240
1105	10.07	6.44	89.4	0.443	1.00	3.09	7.2		240
1110	10.03	6.50	88.3	0.442	1.00	3.17	8.4	↓	240
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

MCE 3/17/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - NT11S
Project Number:
Purged by: SMB & HCE
Sampled by: SMB & HCE
Checked by:

Well Identification: MW-3
Sample ID: NT11S-MW-3-20170317
Date: 3/17/17
Date: 3/17/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 8-18 ft
Starting Water Level: 9.81 ft

Well Diameter: 2"
Pump Intake: 14 ft
Final Water Level: 10.16 ft
Total Depth (measured after sampling):

PURGE INFORMATION:
Time Purge Start: 1218
Time Purge End: 1280
Pump Type and ID: Peristaltic pump
Purge Rate: 200 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~ 6 L

HCE 3/17/17

SAMPLING INFORMATION:
Time Sample Start: 1250
Time Sample End: 1320
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: None
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Yellowish water

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1220	11.63	10.14	-19.7	6.224	94.4	8.71	400 mL	NM	200 mL/min
1225	11.37	6.28	-95.4	5.601	25.4	2.75	1.4		200
1230	11.02	6.36	-117.0	5.334	6.54	0.108	2.4		200
1235	10.91	6.39	-104.7	5.413	4.42	0.105	3.4		200
1240	10.89	6.41	-96.4	5.538	4.00	0.45	4.4		200
1245	10.87	6.43	-96.6	5.566	4.15	0.46	5.4	V	200
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Matthew Clune 3/17/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: UDW - NT115
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: HW-20
Sample ID: NT115-HW20-207031
Date: 3/17/17
Date: 3/17/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 3.2 - 12.2 ft
Starting Water Level: 5.72 ft

Well Diameter: 2"
Pump Intake: 10 ft
Final Water Level: 7.11 ft
Total Depth (measured after sampling): DH

PURGE INFORMATION:
Time Purge Start: 1358
Time Purge End: 1446
Pump Type and ID: Peristaltic pump
Purge Rate: 150 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time: MCE 3/17/17
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~ 7.0L

SAMPLING INFORMATION:
Time Sample Start: 1445
Time Sample End: 1525
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: None

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1405	8.60	7.87	-26.2	0.777	6.04	2.12	1.050	6.21	150 mL/min
1410	8.57	7.58	-34.4	0.747	4.07	1.31	1.8	6.45	150
1415	8.44	7.43	-40.8	0.715	4.69	1.00	2.55	6.53	150
1420	8.41	7.32	-45.5	0.705	4.30	0.109	3.30	6.62	150
1425	8.43	7.22	-47.7	0.698	3.65	0.53	4.05	6.72	150
1430	8.41	7.13	-48.8	0.696	2.52	0.47	4.8	6.80	150
1435	8.49	7.11	-51.4	0.693	2.98	0.43	5.55	6.91	150
1440	8.49	7.04	-51.4	0.690	2.53	0.43	6.3	6.98	150
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Manuel Cruz 3/17/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-SPL
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-32
Sample ID: SPL-MW-32-20170320
Date: 3/20/17
Date: 3/20/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 19 - 24 ft
Starting Water Level: 8.90 ft

Well Diameter: 2"
Pump Intake: 22 ft
Final Water Level: 8.87 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 0930
Time Purge End: 1015
Pump Type and ID: Peristaltic pump
Purge Rate: 200.0 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~9.5 L

MCE 3/20/17

SAMPLING INFORMATION:
Time Sample Start: 1015
Time Sample End: 1103
Grab x Composite
# of Bottles Collected: 11
Bottle Preservatives: None

Duplicate Sampling: NO - FIELD
Laboratory: ~~SPL~~ SPL-MW-32-20170320
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Bladder pump in well NOT able TO remove while sampling
1 filter collected in well

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
0933	12.13	6.73	49.2	1.054	160	16.15	1000 mL	8.90	200 mL/min
0938	12.31	6.44	-43.0	1.054	49.4	2.25	1.6	8.90	200
0943	12.42	6.50	-69.4	1.055	25.6	1.72	2.6	8.90	200
0948	12.46	6.56	-82.2	1.059	20.5	1.42	3.6	8.90	200
0953	12.54	6.60	-85.3	1.064	16.8	1.00	4.6	8.90	200
0958	12.51	6.62	-93.7	1.072	14.9	0.87	5.6	8.90	200
1003	12.60	6.64	-99.1	1.080	12.9	0.73	6.6	8.90	200
1008	12.67	6.66	-102.8	1.086	10.7	0.68	7.6	8.90	200
1013	12.76	6.67	-105.0	1.090	12.0	0.65	8.6	8.90	200
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if ≥1	±10%			

MCE 3/20/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - SPL
Project Number:
Purged by: ~~SBM~~ SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-31
Sample ID: SPL-MW-31-20170330
Date: 3/20/17
Date: 3/20/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 18-23 ft
Starting Water Level: 9.05 ft

Well Diameter: 2"
Pump Intake: 21 ft
Final Water Level: 9.07 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1325
Time Purge End: 1400
Pump Type and ID: Peristaltic pump
Purge Rate: (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~9.0 (L)

MCE 3/20/17

SAMPLING INFORMATION:
Time Sample Start: 1415
Time Sample End: 1430
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: none
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Bladder pump inside well, not able to remove prior sampling

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1327	12.85	7.35	45.8	0.375	23.7	14.13	500 mL	9.02	250 mL/min
1332	12.79	6.91	-8.3	0.382	14.1	2.26	1.450	9.03	250
1337	12.79	6.72	-28.5	0.385	11.0	1.55	2.70	9.07	250
1342	12.83	6.67	-38.8	0.390	9.41	1.24	3.95	9.02	250
1347	12.92	6.64	-48.7	0.392	8.27	0.91	5.20	9.03	250
1352	13.00	6.61	-55.0	0.393	8.90	0.72	6.45	9.03	250
1357	13.00	6.59	-58.6	0.394	8.84	0.64	7.7	9.02	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Maureen Pelli 3/20/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-SPL
Project Number:
Purged by: SHB & MCE
Sampled by: SHB & MCE
Checked by:

Well Identification: MW-12
Sample ID: SPL-MW-12-20170321
Date: 3/20/17
Date: 3/20/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 10-15 ft
Starting Water Level: 4.5 ft

Well Diameter: 2"
Pump Intake: 12 ft
Final Water Level: 4.45 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1155
Time Purge End: 1237
Pump Type and ID: Peristaltic pump
Purge Rate: 260 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): 9.10 (L)

Wee 3/20/17

SAMPLING INFORMATION:
Time Sample Start: 1230
Time Sample End: 1252
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: None

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Bladder pump inside well, not able to remove.

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity L	Depth to Water	Purge Rate
1157	9.04	7.94	-16.8	0.161	120	13.30	520 mL	4.5	260 mL/min
1202	8.91	7.63	6.8	0.143	55.1	4.76	1.820	4.45	260
1207	8.91	7.50	11.3	0.130	27.2	4.01	3.12	4.45	260
1212	8.81	7.46	11.9	0.128	20.7	3.60	4.42	4.45	260
1217	8.79	7.40	14.0	0.126	18.7	3.40	5.72	4.45	260
1222	8.82	7.37	14.2	0.129	19.1	3.21	7.02	4.45	260
1227	8.86	7.33	15.0	0.130	19.4	3.10	8.32	4.45	260
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Flow Rate 3/20/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - Glacier Northwest (GNW)
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-32S
Sample ID: GNW-MW-32S-20170321
Date: 3/21/17
Date: 3/21/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 4-14 ft
Starting Water Level: 2.03 ft

Well Diameter: 2"
Pump Intake: 8 ft
Final Water Level: 2.05 ft
Total Depth (measured after sampling): ND

PURGE INFORMATION:
Time Purge Start: 1041
Time Purge End: 1120
Pump Type and ID: Peristaltic Pump
Purge Rate: (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10L

SAMPLING INFORMATION:
Time Sample Start: 1120
Time Sample End: 1143
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: None

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
ERM On-site
Turbidity @ 1128 : 1.16 NTU

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1043	11.165	8.73	26.3	0.754	5.61	9.77	500 mL	2.06	250 mL/min
1048	11.41	7.44	-27.9	0.754	4.19	1.85	1.75	2.07	250
1053	11.216	6.92	-53.7	0.758	3.30	1.36	3.0	2.07	250
1058	11.27	6.76	-70.3	0.757	2.20	0.92	4.25	2.07	250
1103	11.28	6.69	-79.0	0.760	1.93	0.72	5.50	2.07	250
1108	11.31	6.65	-82.5	0.756	1.70	0.65	6.75	2.07	250
1113	11.27	6.63	-84.4	0.754	1.51	0.60	8.0	2.07	250
1118	11.216	6.61	-86.1	0.753	1.83	0.61	9.25	2.08	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

3/21/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-45
Sample ID: GNW-MW-45-201703
Date: 3/21/17
Date: 3/21/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-10 ft
Starting Water Level: 5.4

Well Diameter: 2"
Pump Intake: 8 ft
Final Water Level: 5.4 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1202
Time Purge End: 1250
Pump Type and ID: Peristaltic Pump
Purge Rate: 280 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: 451 556
Total Purge Volume (mL): ~ 13(L)

MCE 3/21/17

SAMPLING INFORMATION:
Time Sample Start: 1250
Time Sample End: 1322
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: none

Duplicate Sampling: ND
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate
1203	8.49	7.32	4.7	0.393	2.36	12.86	280 mL	5.50	280 mL/min
1208	8.34	7.15	1.9	0.393	1.25	5.09	1.68	5.45	280
1213	8.35	6.97	5.0	0.393	1.41	3.95	3.08	5.42	280
1218	8.32	6.94	6.5	0.393	1.51	3.95	4.48	5.42	280
1223	8.33	6.89	8.9	0.393	2.03	3.57	5.88	5.41	280
1228	8.35	6.85	11.0	0.393	1.12	3.34	7.28	5.41	280
1233	8.31	6.81	13.9	0.394	1.28	3.13	8.68	5.42	280
1238	8.28	6.78	16.3	0.394	1.02	2.98	10.08	5.40	280
1243	8.21	6.75	19.2	0.394	0.80	2.88	11.48	5.41	280
1248	8.19	6.72	22.2	0.394	1.05	2.89	12.88	5.41	280
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Manuel Paw 3/21/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-GNW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-33S
Sample ID: GNW-MW-33S-2017
Date: 3/21/17
Date: 3/21/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 4-11 ft
Starting Water Level: 3.84 ft

Well Diameter: 2"
Pump Intake: 8 ft
Final Water Level: 3.96
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1357
Time Purge End: 1438
Pump Type and ID: Peristaltic pump
Purge Rate: (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~13 (L)

MCE 3/21/17

SAMPLING INFORMATION:
Time Sample Start: 1438
Time Sample End: 1507
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: n/a
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1359	9.37	10.90	4.4	3.683	1.11	17.90	600 mL	4.0	300 mL/min
1404	9.23	11.38	24.6	3.865	0.48	14.89	2.1	3.99	300
1409	9.19	12.27	21.7	3.930	0.83	14.53	3.6	3.98	300
1414	9.16	12.73	14.5	4.047	0.69	14.33	5.1	3.98	300
1419	9.17	13.88	15.4	4.038	0.62	14.05	6.6	3.98	300
1424	9.15	13.04	16.1	3.976	0.54	13.48	8.1	3.98	300
1429	9.20	13.13	15.3	3.911	0.72	13.06	9.6	3.98	300
1434	9.21	13.18	15.0	3.862	0.68	13.08	11.1	3.98	300
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Mmenthall 3/21/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-GNW
Project Number:
Purged by: SMB &
Sampled by: SMB &
Checked by:

Well Identification: Surface Water
Sample ID: GNW-SW-1-20170321
Date: 3/21/17
Date: 3/21/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval:
Starting Water Level:

Well Diameter: NA
Pump Intake: NA
Final Water Level: NA
Total Depth (measured after sampling): N/A

PURGE INFORMATION:
Time Purge Start: 1405
Time Purge End: 1435
Pump Type and ID: Peristaltic Pump
Purge Rate: 540 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL):

Mcc 3/21/17

SAMPLING INFORMATION:
Time Sample Start: 1440
Time Sample End:
Grab x Composite
# of Bottles Collected:
Bottle Preservatives: None

Duplicate Sampling: F
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
pH malfunction, unable to calibrate pH
Tubing placed ~2-3' below surface

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1410	8.48	~~5.42~~	200.6	4.762	19.3	12.61	NA	NA	540
1415	8.30	NM	192.7	4.757	18.3	11.31			
1420	8.21		187.8	4.740	20.1	11.01			
1425	8.16		180.0	4.335	19.7	10.73			
1430	8.47		177.8	4.295	18.8	10.69			
1435	8.49		176.0	4.358	17.9	10.73			
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - EMF
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: EMF-MW-7
Sample ID: EMF-MW-7-20170322
Date: 3/22/17
Date: 3/22/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-15 ft
Starting Water Level: 6.52 ft

Well Diameter: 2"
Pump Intake: 12 ft
Final Water Level: 6.47
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1014
Time Purge End: 1055
Pump Type and ID: Peristaltic pump
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10.5(L)

MF 3/22/17

SAMPLING INFORMATION:
Time Sample Start: 1055
Time Sample End: 1118
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1016	7.35	8.38	119.1	0.363	3.59	18.88	500 mL	6.47	250 mL/min
1021	7.37	8.01	101.4	0.350	1.67	12.44	1.75	6.47	250
1026	7.35	7.71	91.8	0.342	1.93	11.37	3.0	6.47	250
1031	7.24	7.48	88.5	0.328	0.98	11.16	4.25	6.47	250
1036	7.23	7.30	88.8	0.322	0.79	11.12	5.5	6.47	250
1041	7.26	7.20	88.3	0.322	0.48	11.03	6.75	6.47	250
1046	7.32	7.11	88.8	0.321	0.50	10.99	8.0	6.47	250
1051	7.37	7.10	89.9	0.321	0.72	10.92	9.25	6.47	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

MF 3/22/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: NGW-520
Sample ID: NBF-NGW520-201703[illegible]
Date: 3/22/17
Date: 3/22/17
Date:

WELL INFORMATION:

Well Depth from Well Log: N/A
Screen Interval: 5-15 ft
Starting Water Level: 3.41 ft

Well Diameter: 2"
Pump Intake: 10 ft
Final Water Level: 3.44 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:

Time Purge Start: 1352
Time Purge End: 1440
Pump Type and ID: Peristaltic pump
Purge Rate: 300 (mL/min)
Controller Settings: CPM: PSI: Discharge Time: Recharge Time: MCE 3/22/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~14.5(L)

SAMPLING INFORMATION:

Time Sample Start: 1440
Time Sample End: 1506
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: None
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1355	12.82	6.75	91.2	0.518	35.1	9.60	900 mL	3.47	300
1400	12.70	6.51	60.1	0.513	29.3	1.37	2.4	3.47	300
1405	12.78	6.52	44.0	0.496	20.6	1.17	3.9	3.47	300
1410	12.85	6.61	26.0	0.481	13.0	1.00	5.4	3.47	300
1415	13.13	6.71	4.2	0.472	8.28	0.66	6.9	3.47	300
1420	13.22	6.69	-7.6	0.463	6.92	0.51	8.4	3.46	300
1425	13.15	6.61	-13.6	0.457	4.22	0.46	9.9	3.47	300
1430	13.22	6.65	-21.4	0.452	5.12	0.40	11.3	3.47	300
1435	13.26	6.65	-27.6	0.450	4.22	0.37	12.9	3.44	300
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Marvin Baw 3/22/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: IDW - NBF
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: NGW252
Sample ID: NBF-NGW252-20170322
Date: 3/22/17
Date: 3/22/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-15 ft
Starting Water Level: 4.96 ft

Well Diameter: 2"
Pump Intake: 13 ft
Final Water Level: 4.95 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1208
Time Purge End: 1255
Pump Type and ID: Peristaltic pump
Purge Rate: 250 (mL/min)
Controller Settings:
CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: 451 5516
Total Purge Volume (mL): ~12 (L)

MCE 3/22/17

SAMPLING INFORMATION:
Time Sample Start: 1255
Time Sample End: 1323
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1211	12.64	6.33	111.6	0.452	6.08	11.18	750 mL	9.94	250
1216	12.67	6.75	111.7	0.453	4.00	5.17	2.0	9.94	250
1221	12.68	6.54	111.6	0.456	3.99	4.53	3.25	9.94	250
1226	12.79	6.42	110.9	0.461	2.50	4.07	4.50	4.95	250
1231	12.86	6.36	110.5	0.463	3.35	3.70	5.75	9.95	250
1236	12.91	6.31	110.6	0.463	2.28	3.26	7.0	9.95	250
1241	12.97	6.29	110.3	0.462	2.32	2.58	8.25	9.95	250
1246	13.01	6.24	111.0	0.462	2.23	~~2.64~~ 2.50	9.50	9.95	250
1251	13.00	6.23	111.0	0.460	1.82	2.32	10.75	9.95	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

3/22/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - NBF
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: NGW-521
Sample ID: NBF-NGW521-20170322
Date: 3/22/17
Date: 3/22/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-15 ft
Starting Water Level: 1.51 ft

Well Diameter: 2"
Pump Intake: 10 ft
Final Water Level: 1.52 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1532
Time Purge End: 1610
Pump Type and ID: Peristaltic Pump
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~ 10 (L)

LMF 3/22/17

SAMPLING INFORMATION:
Time Sample Start: 1610
Time Sample End: 1640
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1534	10.41	7.16	-6.1	0.785	3.38	4.95	500 mL	1.51	250
1539	9.99	6.84	-1.7	0.798	4.40	2.26	1.75	1.52	250
1544	9.82	6.85	-4.6	0.800	4.27	2.05	3.0	1.52	250
1549	9.85	6.92	-5.5	0.802	1.44	1.90	4.25	1.52	250
1554	9.81	6.95	-4.2	0.802	1.54	1.78	5.50	1.52	250
1559	9.81	6.98	-2.1	0.803	0.92	1.71	6.75	1.52	250
1604	9.79	7.00	-0.4	0.803	0.165	1.68	8.0	1.52	250
1609	9.73	7.02	1.0	0.802	0.90	1.66	9.25	1.52	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if ≥1	±10%			

3/22/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - WT
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: WT-MW-108
Sample ID: WT-MW-108-20170307
Date: 3/27/17
Date: 3/27/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 10-110
Starting Water Level: 9.20 ft

Well Diameter: 2"
Pump Intake: 13 ft
Final Water Level: 9.38 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1134
Time Purge End: 1210
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10(L)

MCE 3/27/17

SAMPLING INFORMATION:
Time Sample Start: 1210
Time Sample End: 1240
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1138	13.83	6.43	24.0	0.714	1.30	8.90	1.0	9.37	250
1143	14.06	6.57	-54.3	0.733	0.74	1.92	2.25	9.38	250
1148	14.19	6.62	-70.1	0.735	1.13	1.28	3.50	9.38	250
1153	14.37	6.69	-83.2	0.740	1.17	0.88	4.75	9.39	250
1158	14.54	6.71	-89.4	0.741	0.81	0.59	6.0	9.39	250
1203	14.55	6.72	-93.7	0.744	0.96	0.41	7.25	9.38	250
1208	14.28	6.70	-93.9	0.742	1.04	0.39	8.50	9.38	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Marcus Pau 3/27/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - WT
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: WT-MW-06
Sample ID: WT-MW-06-20170327
Date: 3/28/17
Date: 3/28/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-20 ft
Starting Water Level: 7.11 ft

Well Diameter: 2"
Pump Intake: 15ft
Final Water Level: 7.19
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 0957
Time Purge End: 1035
Pump Type and ID: Peristaltic pump
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10 (L)

SAMPLING INFORMATION:
Time Sample Start: 1035
Time Sample End: 1100
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: None

Duplicate Sampling: NO
Laboratory: ~~Split w/ Hoyt~~
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged (L) Quantity	Depth to Water	Purge (mL/min) Rate
0959	13.21	7.72	74.8	0.3608	16.10	12.60	700 mL	7.19	250.0
1004	13.04	6.33	35.3	0.3606	10.7	2.21	1.75	7.19	250
1009	12.95	5.95	20.9	0.3605	5.95	1.51	3.00	7.19	250
1014	12.88	5.90	16.0	0.3604	4.05	1.10	4.25	7.19	250
1019	12.81	5.92	-1.7	0.3604	5.70	0.82	5.50	7.19	250
1024	12.77	5.96	-8.4	0.3606	4.70	0.70	6.75	7.19	250
1029	12.76	5.99	-12.5	0.3606	4.35	0.71	8.00	7.19	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - WT
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: WT-MW-110
Sample ID: WT-MW-110-20170327
Date: 3/27/17
Date: 3/27/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 6-16 ft
Starting Water Level: 9.15 ft

Well Diameter: 2"
Pump Intake: 13 ft
Final Water Level: 9.18 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1319
Time Purge End: 1400
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10(L)

MCE 3/27/17

SAMPLING INFORMATION:
Time Sample Start: 1400
Time Sample End: 1440
Grab x Composite
# of Bottles Collected: 11
Bottle Preservatives: None

Duplicate Sampling: Yes
Laboratory: WT-MW-110-20170327-
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1321	12.56	7.68	29.3	0.475	1.15	7.36	500 mL	9.17	250
1326	12.36	7.17	37.4	0.470	1.09	2.72	1.75	9.18	250
1331	12.14	6.66	48.3	0.456	1.38	1.80	3.0	9.18	250
1336	12.26	6.53	51.0	0.441	1.85	1.58	4.25	9.18	250
1341	12.34	6.41	53.2	0.435	0.79	1.42	5.50	9.18	250
1346	12.42	6.34	54.7	0.422	0.61	1.32	6.75	9.18	250
1351	12.50	6.28	56.3	0.414	0.62	1.20	8.0	9.18	250
1356	12.50	6.34	58.5	0.411	0.63	1.11	9.25	9.18	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

MCE 3/27/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: 881-MW-30A
Sample ID: 881-MW-30A-20170328
Date: 3/28/17
Date: 3/28/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 14-24 ft MCE 3/28/17
Starting Water Level: ~~8.48 ft~~ 8.41 ft

Well Diameter: 2"
Pump Intake: 19 ft
Final Water Level: 8.41 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1353
Time Purge End: 1430
Pump Type and ID: Peristaltic pump
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time: MCE 3/28/17
Water Quality Meter: YSI
Total Purge Volume (mL): ~ 9.0(L)

SAMPLING INFORMATION:
Time Sample Start: 1430
Time Sample End: 1500
Grab x Composite
# of Bottles Collected: 4
Bottle Preservatives: NONE
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1356	11.47	6.53	73.8	2.273	8.30	10.34	7.0 mL	8.40	250
1401	11.65	6.89	20.7	2.243	2.74	1.37	1.75	8.41	250
1406	11.96	7.01	-11.0	2.492	2.33	0.88	3.0	8.41	250
1411	12.23	7.11	-36.9	2.683	1.06	0.57	4.25	8.41	250
1416	12.37	7.16	-45.3	2.737	1.56	0.44	5.50	8.41	250
1421	12.42	7.20	-49.7	2.775	1.02	0.40	6.75	8.41	250
1426	12.55	7.23	-53.3	2.792	1.23	0.39	8.0	8.41	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Matthew Pdw 3/28/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: 8801-MW-42A
Sample ID: 8801-MW-42A-20703
Date: 3/28/17
Date: 3/28/17
Date: 3/28/17

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-20 ft
Starting Water Level: 5.83 ft

Well Diameter: 2"
Pump Intake: 12 ft
Final Water Level: 5.89 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1209
Time Purge End: 1255
Pump Type and ID: Peristaltic pump
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~12 (L)

MCE 3/28/17

SAMPLING INFORMATION:
Time Sample Start: 1255
Time Sample End: 1320
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate (mL/min)
1211	13.19	6.50	133.9	0.350	2.29	4.33	500 mL	5.87	250 mL/min
1216	13.48	6.52	76.4	0.363	2.25	2.00	1.75	5.88	250
1221	13.54	6.55	44.0	0.364	NM	1.33	3.0	5.89	250
1226	13.27	6.63	34.4	0.356	19.7	3.36	4.25	5.89	250
1231	13.34	6.104	23.0	0.357	13.9	1.63	5.50	5.89	250
1236	13.28	6.105	9.6	0.354	11.6	1.30	6.75	5.89	250
1241	13.31	6.106	1.2	0.355	8.42	1.09	8.0	5.89	250
1246	13.30	6.107	-5.3	0.348	8.11	1.01	9.25	5.89	250
1251	13.32	6.107	-8.8	0.347	10.0	0.98	10.50	5.89	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Manual flow 3/28/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: IDW - 8801
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: 88-01-MW-16A
Sample ID: 8801-MW16A-20170
Date:
Date: 3/28/17
Date: 3/28/17

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 2-17 ft
Starting Water Level: 3.96 ft

Well Diameter: 2"
Pump Intake: 12 ft
Final Water Level: 4.0 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1033
Time Purge End: 1115
Pump Type and ID: Peristaltic pump
Purge Rate: 280 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time: MCE 3/28/17
Water Quality Meter: YSI
Total Purge Volume (mL): ~12(L)

SAMPLING INFORMATION:
Time Sample Start: 1115 MCE 3/28
Time Sample End: 1150 4.01 ft
Grab x Composite
# of Bottles Collected: 11 + 11
Bottle Preservatives: NONE

Duplicate Sampling: NO
Laboratory: Filter
COC Form: 8801-MW-16A-20170328-F

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
* Filter sample collected MCE 3/28/17

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate (mL/min)
1034	11.13	6.36	134.0	0.160	5.33	14.17	280 mL	4.01	280.0
1039	10.72	6.28	131.8	0.160	11.16	11.49	1.68	4.01	280
1044	10.41	6.16	139.2	0.161	4.66	11.37	3.08	4.01	280
1049	10.16	6.13	141.6	0.168	6.89	11.28	4.48	4.01	280
1054	10.13	6.23	137.7	0.175	4.88	11.23	5.88	4.01	280
1059	10.07	6.29	136.3	0.179	3.54	11.18	7.28	4.01	280
1104	10.02	6.35	135.0	0.183	2.52	11.15	8.68	4.01	280
1109	9.96	6.43	133.4	0.186	2.15	11.14	10.08	4.01	280
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if ≥1	±10%			

MW 3/28/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: SA-MW-2
Sample ID: LDS-SA-MW02-20170
Date: 3/29/17
Date: 3/29/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 4-24 ft
Starting Water Level: 4.61 ft

Well Diameter: 2"
Pump Intake: 18 ft
Final Water Level: 4.79 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1226
Time Purge End: 1330
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~16 (L)

MCE 3/29/17

SAMPLING INFORMATION:
Time Sample Start: 1330
Time Sample End: 1400
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
* Low tide * Rain
split sample DOF

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1229	12.01	8.11	32.8	2.895	4.66	3.41	750 mL	4.80	250
1234	11.66	7.62	-2.3	2.712	2.75	0.74	2.0	4.79	250
1239	11.32	7.57	-21.9	1.531	3.89	0.46	3.25	4.79	250
1244	10.98	7.35	-29.0	1.336	3.66	0.38	4.50	4.79	250
1249	10.92	7.16	-33.3	1.336	3.43	0.37	5.75	4.79	250
1254	10.85	7.02	-36.1	1.505	3.22	0.35	7.0	4.79	250
1259	10.80	6.92	-36.3	1.782	3.38	0.33	8.25	4.79	250
1304	10.78	6.85	-35.5	2.127	2.55	0.28	9.50	4.79	250
1309	10.76	6.81	-35.1	2.443	2.04	0.27	10.75	4.79	250
1314	10.74	6.78	-34.2	2.686	1.74	0.26	12.0	4.79	250
1319	10.71	6.77	-34.0	2.853	1.96	0.24	13.25	4.79	250
1324	10.74	6.76	-34.3	2.901	2.07	0.22	14.50	4.79	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Maureen Cole 3/29/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - ICS
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: DOF-MW-3
Sample ID: ICS-DOF-MW3-20170321
Date: 3/21/17
Date: 3/21/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 12-22 ft
Starting Water Level: 10.60 ft

Well Diameter: 2"
Pump Intake: 17 ft
Final Water Level: 10.78 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 0933
Time Purge End: 1020
Pump Type and ID: Peristaltic
Purge Rate: 200 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~10 (L)

MS 3/29/17

SAMPLING INFORMATION:
Time Sample Start: 1020
Time Sample End: 1105
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Orange/brownish water ; no odor
Split sample w/ DOF

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
0936	14.15	8.84	119.4	2.499	29.3	4.11	600mL	10.63	200
0941	14.16	7.91	99.4	2.508	28.4	1.21	1.6	10.63	200
0946	14.20	7.46	49.2	2.598	22.8	0.67	2.6	10.63	200
0951	14.27	7.28	25.5	2.602	19.1	0.47	3.6	10.63	200
0956	14.26	7.17	8.1	2.602	15.9	0.28	4.6	10.63	200
1001	14.27	7.11	-2.6	2.602	13.8	0.25	5.6	10.64	200
1006	14.34	7.07	-11.3	2.601	8.80	0.23	6.6	10.65	200
1011	14.34	7.05	-15.6	2.596	8.82	0.18	7.6	10.66	200
1016	14.35	7.03	-21.1	2.596	8.03	0.16	8.6	10.66	200
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

NM 3/29/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - ICS
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: DOF-MW1-1
Sample ID: ICS-DOF-MW1-20170329
Date: 3/29/17
Date: 3/29/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 12-17 ft
Starting Water Level: 7.39 ft

Well Diameter: 2"
Pump Intake: 13 ft
Final Water Level: 10.47
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1427
Time Purge End: 1505
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~9.5 (L)

MCE 3/29/17

SAMPLING INFORMATION:
Time Sample Start: 1505
Time Sample End: 1600
Grab x Composite
# of Bottles Collected: 11
Bottle Preservatives: NONE
Duplicate Sampling: ~~N/D~~ MCE 3/29/17 Filter dup
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
* Filter dup collected ICS-DOF-MW1-20170329-F
* split samples w/ DOF

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
1430	11.08	7.19	161.3	8.414	5.167	8.81	600 mL	9.31	300
1435	10.72	7.10	17.5	8.710	5.87	1.38	1.350	9.43	250
1440	10.75	7.09	-11.7	8.781	4.87	1.53	3.10	10.18	250
1445	10.80	7.07	-20.2	8.923	3.99	1.55	4.35	10.34	250
1450	10.81	7.08	-27.9	9.074	3.93	1.17	5.60	10.42	250
1455	10.85	7.08	-31.8	9.148	4.01	0.96	6.85	10.42	250
1500	10.88	7.07	-33.4	9.155	4.22	0.98	8.1	10.46	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

MCE 3/29/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-15
Sample ID: DMD-MW-15-20170330
Date: 3/30/17
Date: 3/30/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 7-22 ft
Starting Water Level: 7.48 ft

Well Diameter: 2"
Pump Intake: 15 ft
Final Water Level: 8.80 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1353
Time Purge End: 1435
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~11 (L)

MCE 3/30/17

SAMPLING INFORMATION:
Time Sample Start: 1435
Time Sample End: 1510
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Overcast ; low tide @ 1356

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged (L) Quantity	Depth to (ft) Water	Purge Rate (mL/min)
1357	11.19	7.93	30.5	3.068	1.92	3.05	750 mL	8.20	250.0
1401	11.03	7.18	6.7	3.046	1.50	1.26	2.00	8.43	250
1406	10.98	6.85	-8.9	3.037	1.48	0.75	3.25	8.58	250
1411	10.85	6.65	-20.4	3.026	1.40	0.36	4.50	8.105	250
1416	10.83	6.56	-27.3	3.006	1.58	0.23	5.75	8.72	250
1421	10.90	6.48	-33.7	2.985	1.98	0.20	7.00	8.76	250
1426	10.98	6.43	-38.9	2.978	1.61	0.19	8.25	8.79	250
1431	11.03	6.39	-43.1	2.976	1.56	0.17	9.50	8.79	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Maven DMD 3/30/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-17
Sample ID: DMD-MW-17-20170330
Date: 3/30/17
Date: 3/30/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 7-22 ft
Starting Water Level: 8.73 ft

Well Diameter: 2"
Pump Intake: 17 ft
Final Water Level: 9.15 ft
Total Depth (measured after sampling): ~~DH~~

PURGE INFORMATION:
Time Purge Start: 1202
Time Purge End: 1245
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~ 11 (L)

MCE 3/30/17

SAMPLING INFORMATION:
Time Sample Start: 1245
Time Sample End: 1333
Grab x Composite
# of Bottles Collected: 11
Bottle Preservatives: NONE
Duplicate Sampling: Filter
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate (mL/min)
1204	13.78	8.216	93.2	1.989	5.34	3.77	500 mL	8.94	250
1209	14.06	7.716	-33.7	1.977	4.45	1.18	1.75	9.06	350
1214	14.07	7.54	-90.3	1.977	4.22	0.89	3.00	9.09	250
1219	14.07	7.44	-100.1	2.008	3.48	0.82	4.25	9.11	250
1224	14.12	7.34	-104.3	2.050	3.00	0.64	5.50	9.13	250
1229	14.15	7.316	-106.3	2.097	3.48	0.36	6.75	9.14	250
1234	14.27	7.35	-110.9	2.128	2.71	0.26	8.00	9.14	250
1239	14.54	7.35	-114.4	2.147	2.96	0.20	9.25	9.14	250
1244	14.82	7.33	-116.0	2.1167	2.91	0.19	10.50	9.15	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Marian Faur 3/30/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW – DHD
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-11
Sample ID: DHD-MW-11-20170331
Date: 3/30/17
Date: 3/30/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 10-20 ft
Starting Water Level: 9.52 ft

Well Diameter: 2"
Pump Intake: 15 ft
Final Water Level: 9.60 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1040
Time Purge End: 1115
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~ 9.0 (L)

MCE 3/30/17

SAMPLING INFORMATION:
Time Sample Start: 1115
Time Sample End: 1135
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate (mL/min)
1042	8.07	9.64	117.7	2.624	7.26	11.53	500 mL	9.60	250.0
1047	7.73	9.37	115.4	2.639	2.53	9.76	1.75	9.60	250
1052	7.70	9.10	115.1	2.663	9.45	9.76	3.0	9.60	250
1057	7.67	8.97	114.4	2.673	1.16	9.77	4.25	9.61	250
1102	7.62	8.88	114.1	2.671	0.63	9.72	5.50	9.63	250
1107	7.62	8.78	114.1	2.670	0.49	9.63	6.75	9.61	250
1112	7.59	8.71	114.2	2.675	0.43	9.74	8.0	9.63	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Mcelwee 3/30/17

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LNW
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: Surface Water
Sample ID: DND-SW-1-20170330
Date: 3/30/17
Date: 3/30/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: NA
Starting Water Level: 4 ft

Well Diameter: N/A
Pump Intake:
Final Water Level: NA
Total Depth (measured after sampling): NA

PURGE INFORMATION:
Time Purge Start: 1412
Time Purge End: 1430
Pump Type and ID: Peristaltic
Purge Rate: 300 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~5.0(L)

MCE 3/30/17

SAMPLING INFORMATION:
Time Sample Start: 1430
Time Sample End: 1520
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity	Depth to Water	Purge Rate
1415	9.39	—	191.1	3.607	15.7	12.35	900	~4'	300 mL/min
1418	9.40	—	184.4	3.672	15.9	11.63	1800		
1421	9.50	—	179.0	3.741	16.5	10.94	2700		
1424	9.54	—	174.2	3.737	16.0	11.14	3600		
1427	9.53	—	176.4	3.747	16.9	10.97	4500		
1430									
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

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LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - JF
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-51
Sample ID: JF-MW-51-20170331
Date: 3/31/17
Date: 3/31/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 23-27 ft
Starting Water Level: 10.1 MCE 3/31/17 15.29 ft

Well Diameter: 2"
Pump Intake: 25 ft
Final Water Level: 15.45
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1424
Time Purge End: 1505
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10.5 (L)

SAMPLING INFORMATION:
Time Sample Start: 1505
Time Sample End: 1540
Grab x Composite
# of Bottles Collected: 4
Bottle Preservatives: None
Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Brown water w/ Orange/brownish particles, no odor

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate
1426	15.50	6.75	37.1	0.408	153	6.79	500 mL	15.31	250 (mL/min)
1431	15.33	6.63	28.8	0.410	123	1.29	1.75	15.34	250
1436	15.30	6.62	19.5	0.413	100.1	0.87	3.00	15.44	250
1441	15.31	6.62	9.1	0.421	39.2	0.64	4.25	15.44	250
1446	15.31	6.62	1.0	0.424	32.7	0.54	5.50	15.45	250
1451	15.27	6.66	-11.6	0.420	24.2	0.46	6.75	15.45	250
1456	15.29	6.68	-21.4	0.415	29.8	0.41	8.00	15.45	250
1501	15.31	6.68	-24.9	0.414	24.5	0.40	9.25	15.45	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

MCE 3/31/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SHB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: LW-23
Sample ID: JF-MW-23-20170331
Date: 3/31/17
Date: 3/31/17
Date:

WELL INFORMATION:

Well Depth from Well Log: N/A
Screen Interval: 6-15.8 ft
Starting Water Level: 9.79 ft

Well Diameter: 2"
Pump Intake: 14 ft
Final Water Level: 9.82 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:

Time Purge Start: 1116
Time Purge End: 1205
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time: MCE 3/31/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~12.5(L)

SAMPLING INFORMATION:

Time Sample Start: 1205
Time Sample End: 1300
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE

Duplicate Sampling: NO
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Overcast ; T ~ 45°F

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate (mL/min)
1118	14.44	9.14	71.8	0.861	6.91	1.84	500 mL	9.82	250
1123	14.29	7.99	-2.3	0.851	6.44	1.58	1.75	9.83	250
1128	14.25	7.33	-31.0	0.810	4.40	1.21	3.00	9.83	250
1133	14.32	6.99	-43.8	0.778	4.11	0.88	4.25	9.83	250
1138	14.35	6.74	-51.9	0.739	3.83	0.59	5.50	9.83	250
1143	14.36	6.62	-55.5	0.715	3.74	0.47	6.75	9.82	250
1148	14.42	6.50	-58.1	0.694	3.29	0.40	8.00	9.82	250
1153	14.40	6.42	-59.1	0.699	3.28	0.39	9.25	9.82	250
1158	14.37	6.36	-60.6	0.659	2.17	0.34	10.50	9.82	250
1203	14.34	6.31	-61.0	0.647	2.32	0.30	11.75	9.82	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Maureen [signature] 3/31/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SMB & MCG
Sampled by: SMB & MCG
Checked by:

Well Identification: MW-48
Sample ID: JF-MW-48-20170331
Date: 3/31/17
Date: 3/31/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-17 ft
Starting Water Level: 10.10 ft

Well Diameter: 2"
Pump Intake: 14 ft
Final Water Level: 10.10 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1251
Time Purge End: 1325 1330 MCG 3/31/17
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time: MCG 3/31/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10 (L)

SAMPLING INFORMATION:
Time Sample Start: 1330
Time Sample End: 1400
Grab x Composite
# of Bottles Collected: 7
Bottle Preservatives: NONE

Duplicate Sampling: ND
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate (mL/min)
1254	12.61	6.61	39.2	0.291	3.44	3.05	750 mL	10.05	250
1259	12.55	6.36	36.5	0.278	2.56	1.55	2.0	10.06	250
1304	12.47	6.28	29.2	0.266	1.42	1.36	3.25	10.08	250
1309	12.32	6.23	19.5	0.261	1.32	1.04	4.50	10.08	250
1314	12.28	6.22	4.4	0.256	0.88	1.02	5.75	10.09	250
1319	12.26	6.21	-3.9	0.257	0.95	1.06	7.00	10.13	250
1324	12.38	6.22	-10.9	0.254	0.76	1.16	8.25	10.10	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Marker Buoy 3/31/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - GLS
Project Number:
Purged by: SMB & MCE
Sampled by: SMB & MCE
Checked by:

Well Identification: MW-K01
Sample ID: GLS-MW-K01-20170406
Date: 4/6/17
Date: 4/6/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 10-20 ft
Starting Water Level: 10.58 ft

Well Diameter: 2"
Pump Intake: 15 ft
Final Water Level: 10.65 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 0953
Time Purge End: 1040
Pump Type and ID: Peristaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~12.0(L)

MCE 4/6/17

SAMPLING INFORMATION:
Time Sample Start: 1040
Time Sample End: 1108
Grab x Composite
# of Bottles Collected:
Bottle Preservatives: NONE
Duplicate Sampling: NO ; ER
Laboratory:
COC Form: LBR-ER-1-20170406

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Rain ; clear water ; no odor

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate (mL/min)
0956	12.82	7.57	43.5	1.526	58.1	3.99	0.50 MM	10.66	250
1001	12.89	7.16	37.1	1.480	37.9	2.47	2.0	10.66	250
1006	12.93	7.01	13.2	1.463	10.0	1.606	3.25	10.65	250
1011	12.97	6.95	-7.9	1.454	5.46	1.04	4.50	10.65	250
1016	12.96	6.92	-16.6	1.446	3.85	0.73	5.75	10.65	250
1021	13.01	6.90	-34.6	1.442	3.32	0.69	7.00	10.65	250
1026	13.01	6.89	-47.7	1.439	2.66	0.89	8.25	10.65	250
1031	13.05	6.89	-54.2	1.437	2.64	0.98	9.50	10.65	250
1036	13.09	6.88	-58.0	1.435	2.21	0.95	10.75	10.65	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Marion Farr 4/6/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW-SHS
Project Number:
Purged by: MCE & SMB
Sampled by: MCE & SMB
Checked by:

Well Identification: MW-2
Sample ID: SHS-MW-02-20170406
Date: 4/6/17
Date: 4/6/17
Date:

WELL INFORMATION:

Well Depth from Well Log: N/A
Screen Interval: 10-20 ft
Starting Water Level: 6.89 ft

Well Diameter: 2"
Pump Intake: 15 ft
Final Water Level: 6.90 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:

Time Purge Start: 1332
Time Purge End: 1405
Pump Type and ID: Peristaltic pump
Purge Rate: 300 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time: MCE 4/6/17
Water Quality Meter: YSI 556
Total Purge Volume (mL): ~10.2 (L)

SAMPLING INFORMATION:

Time Sample Start: 1405
Time Sample End: 1510 ~~6.90~~ MCE 4/6/17
Grab x Composite
\# of Bottles Collected: 10
Bottle Preservatives: NONE
Duplicate Sampling: MS/MSDS
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Weather: Sunny

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged (L) Quantity	Depth to (ft) Water	Purge Rate (mL/min)
1334	13.30	8.14	19.7	0.294	7.46	4.21	600 mL	6.91	300
1339	12.94	7.63	2.6	0.283	5.73	1.53	2.1	6.90	300
1344	12.95	7.28	-20.9	0.283	4.54	1.28	3.6	6.90	300
1349	12.96	7.16	-31.5	0.283	4.79	0.94	5.1	6.90	300
1354	12.98	7.08	-44.8	0.284	4.60	0.77	6.6	6.90	300
1359	13.58	7.02	-53.3	0.284	4.90	0.74	8.1	6.90	300
1404	13.39	6.97	-56.0	0.286	4.53	0.69	9.6	6.90	300
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Maureen Zaino 4/6/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW - DOT
Project Number:
Purged by: MCE & SMB
Sampled by: MCE & SMB
Checked by:

Well Identification: DOT-MW-2
Sample ID: DOT-MW-2-20170406
Date: 4/6/17
Date: 4/6/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 5-15 ft
Starting Water Level: ~~7.84~~ ft

Well Diameter: 2"
Pump Intake: 15 ft
Final Water Level: ~~7.84~~ ft
Total Depth (measured after sampling):

PURGE INFORMATION:
Time Purge Start: 0720
Time Purge End: ~~0725~~ 0815
Pump Type and ID: Penstaltic
Purge Rate: 250 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~14.5 (L)

MCE 4/6/17

SAMPLING INFORMATION:
Time Sample Start: ~~0720~~ 0815
Time Sample End: 0855
Grab x Composite
# of Bottles Collected: 10
Bottle Preservatives: NONE

Duplicate Sampling: NO
Laboratory: MS/MSD
COC Form:

MCE 4/6/17

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
Rain ; clear water, no odor

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water	Purge Rate (mL/min)
0723	13.29	5.37	164.3	4.790	1.89	11.52	250mL	~~7.90~~	250
0728	12.69	6.29	126.5	4.167	1.90	3.20	2.0	7.90	250
0733	12.51	6.58	98.9	3.901	1.54	2.36	3.25	7.90	250
0738	12.38	6.72	78.9	3.848	1.41	1.93	4.50	7.90	250
0743	12.27	6.81	62.3	3.839	1.35	1.77	5.75	7.84	250
0748	12.27	6.87	46.8	3.847	0.98	1.52	7.00	7.84	250
0753	12.27	6.92	35.3	3.852	0.84	1.33	8.25	7.84	250
0758	12.23	6.94	24.6	3.861	0.90	0.99	9.50	7.84	250
0803	12.28	6.97	7.2	3.872	0.93	0.76	10.75	7.84	250
0808	12.35	6.99	2.4	3.890	0.78	0.71	12.00	7.84	250
0813	12.26	7.01	0.8	3.896	0.91	0.70	13.25	7.84	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

4/6/17

leidos

LOW FLOW GROUNDWATER SAMPLE LOG

Project Name: LDW
Project Number:
Purged by: SHB & MCE
Sampled by: SHB & MCE
Checked by:

Well Identification: NW-07
Sample ID: SHS-NW-07-20170106
Date: 4/6/17
Date: 4/6/17
Date:

WELL INFORMATION:
Well Depth from Well Log: N/A
Screen Interval: 10-20 ft
Starting Water Level: 6.87 ft

Well Diameter: 2"
Pump Intake: 15 ft
Final Water Level: 6.89 ft
Total Depth (measured after sampling): NM

PURGE INFORMATION:
Time Purge Start: 1201
Time Purge End: 1240
Pump Type and ID: Peristaltic
Purge Rate: 257 (mL/min)
Controller Settings: CPM:
PSI:
Discharge Time:
Recharge Time:
Water Quality Meter: YSI
Total Purge Volume (mL): ~10(L)

MCE 4/6/17

SAMPLING INFORMATION:
Time Sample Start: 1240
Time Sample End: 1310
Grab x Composite
# of Bottles Collected: 10
Bottle Preservatives: NONE

Duplicate Sampling: MS/MSD
Laboratory:
COC Form:

ADDITIONAL INFORMATION: (weather conditions, problems encountered, maintenance required, unusual color/odor, etc.)
overcast; yellowish water w/ particles

Time	Temp. °C	pH	ORP mv	Cond mS/cm	Turbidity NTU	D.O. mg/l	Purged Quantity (L)	Depth to Water (ft)	Purge Rate (mL/min)
1204	14.47	5.28	48.1	0.824	4.77	6.02	750 mL	6.88	250
1209	14.65	7.81	18.3	0.812	12.70	1.63	2.0	6.89	250
1214	14.72	7.54	-6.3	0.809	9.14	0.97	3.25	6.89	250
1219	14.98	7.41	-21.1	0.809	5.28	0.72	4.50	6.89	250
1224	15.17	7.29	-31.2	0.809	4.02	0.52	5.75	6.89	250
1229	15.09	7.21	-37.0	0.809	3.68	0.41	7.00	6.89	250
1234	15.03	7.15	-41.6	0.806	3.38	0.36	8.25	6.89	250
1239	15.17	7.10	-45.2	0.807	3.34	0.31	9.50	6.89	250
Stability Criteria	±3%	±0.1	±15 mV	±5%	<50 ±10% if >1	±10%			

Marcus Cole 4/6/17

2-23-17

1027 - S. Brown / T Dube onsite @ Crowley prop for site walk w/ Ecology. Anchor QEA rep onsite. Signed in @ Waste mgmt. Site PPE required - vest, helmet, boots. Katy Gross - Anchor, Mike Stanton - SLR onsite. Vicky - Ecology running late

1045 opened MW-135 bolts secure, H_2O in monument rust color no odor. bailed H_2O out of monument tubing in well

1120 - opened MW-65, 8 bolt monument, tubing in well

1125 DMW-3 (alternate) located under trailer, did not open gate opens @ 7am close ~~4:30~~ 4:5 pm

1145 - DMW-18 opened, no well in monument, tubing in well poly tubing and silicone tubing, silicone above GW check in @ office prior to sampling (6-6 ABTA)

1206 - Anchor / SLR offsite

1210 - leidos / Ecology offsite

1308 - leidos / Ecology onsite @ Douglas mgmt property. Chris Bailey w/ GeoEngineers onsite

1315 MW-17 tubing in well poly / silicone & silicone new GW 808-471-2260 call before entering (Tom)

1320 MW-15 - silicon / poly tubing in well. located near water collect surface sample from dock

1345 MW-11 - silicon / poly tubing in well, poly above GW vest / hard hat required on site, truck can be driven onsite. store IDW by yellow overpack in SE corner site open from 7am - 4pm call Tom 808-471-8260 to discuss times

1402 - onsite @ ICS, Dave Cooper of DOF to meet us sign in before, hat / vest / boots required PPE DOF-MW3 (keys for well 2246) reinstall tubing when done tubing in well poly / silicon. MW1, MW2, MW8 tidal influence

1415 DOF-MW-1 tubing in well poly / silicon, lock on well

1431 DOF-MW-8 tubing in well poly / silicon lock on well "

1428 SA-MW2 "

possible access to surface water through shed

1440 - off site

Rite in the Rain

2/24/17

1027 - leidos onsite at Glacier NW for site walk w/Ecology

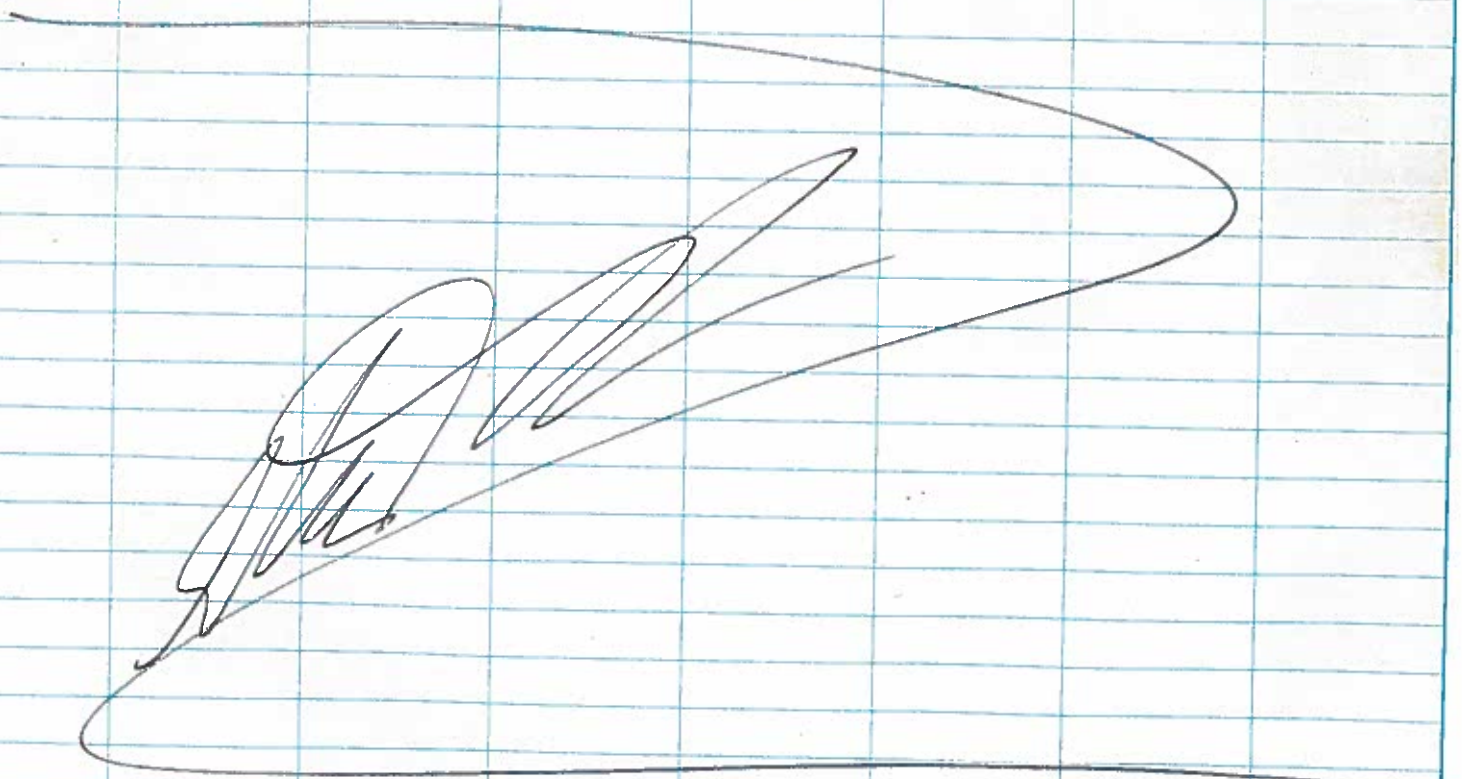
1107 - opened MW-32S, no tubing in well
opened MW-4S, no tubing, (stickup well)
Pete Stoltz said PPE is boots/vest/helmet/glasses PFD required on dock. truck can be driven to wells
opened MW-33S, no tubing in well, well is flush mount.
discuss with Pete Stoltz regarding location of IDW storage
Pete Stoltz 206-676-3036

1146 - offsite

1300 - onsite @ 8801 E Marginal Way
MW-8 possible replacement for MW-16A/MW-31 (by dumpster)
MW-30A, no tubing in well (back of site near water)
No surface water sample @ site
MW-42A no tubing (south side alongside building)

3/1/17

1030 - leidos/Ecology onsite @ Duwamish Marine Center
1038 - opened MW-10S, no tubing in well
All site wells are low tide, park
1042 - opened MW-8, no tubing
PPE - Hard hat, vest, boots, must be in site of employee at all times
1050 - opened MW-12, no tubing
Vehicle allowed onsite, site log 7-4
1053 - opened MW-16, no tubing in well
1056 - opened MW-7, no tubing in well
1115 - offsite
1230 - onsite at Boeing
1300 - met w/ Jen (Boeing) Rosemarie (Landau)
1313 - NGW-252 opened, poly/silicon tubing in well (silicon above GW)
PPE - vest, Boeing Badge displayed, drive to wells
1335 - opened NGW-520 (lid reads AGW-075), tubing in well (poly/silicon
silicon above GW
1350 - opened NGW-521, tubing in well (poly/silicon) silicon above GW
1430 - offsite
1445 - onsite @ EMF site w/ Rosemarie of Landau
opened EMF-MW-7, tubing in well (poly/silicon) above GW



3/2/17

1030- onsite @ terminal 115 w/Ecology & Port of Seattle
Brick recomends replacing MW-P w MW-20
located ~50W of MW-1
opened MW-10 1" wd tubing in well (poly/silicon in it all)
silicon below GW level, pulled tubing from well J-plug
not secured on well, possible surface water intrusion in well
opened MW-3, tubing in well (poly/silicon). tubing
~1' down bring coat hanger to fish out
opened MW-20, tubing in well, Port request to
keep tubing in MW-20
NE corner of parking lot for drum storage, No shoreline access

1115- offsite

1215- onsite @ Duwamish Shipyard
opened DSIP2-17, located under DRAIN lid, no J-plug
on well possible turbidity issue
site available 7-5 M-F
opened DSIP2-19, located under DRAIN lid
requires impact wrench/handyhook tubing in well (poly/silicon)
above GW
tubing in all wells Anchor said to throw away
opened DSI-P2-01, tubing in well, located under DRAIN
opened DSI-MW-06, tubing in well located under DRAIN
behind Ecology block
collect surface sample of floating dock SE of DSI-MW-06

1350 - offsite

3/3/17

1000- leidas onsite at Issacson-Thompson
opened MW-25, tubing in well (poly/silicone), silicone below GW "
opened MW-13, tubing in well " "
opened I-203, tubing in well " "
no access to surface water
1030- - I-203 and MW-13 are believed to be tidally influenced.
recomend standing near water and working inland.
I-203 has possible surface water intrusion go to Alternate MW-10
Tom needs to contact Carl Bach about placing UPS/EMS water @ Boeing
1125- - store wastewater by stairs undercover by MW-11
1145- offsite
1300- onsite @ Wellhead Tyree
1308- opened MW-6, Tubing in well, OKay to throw away, Well lid shuttered, plug in place & holding
1330 MW-108 lined up w/ post across st & centered between gate.
opened MW-108 no tubing in well
opened MW-110 - sample MW-110 instead of MW-109
1430- Jorgenson Forge
opened MW-23, pulled tubing in well, no bolts or lid
opened MW-40, pulled tubing
opened MW-51, pulled tubing, locked at JF27A and JF27A with welded shut

3/13/17 IDW

0850 - calibrated Turbidity meters - 030424, 20270
0910 calibrated YSI - 028184, 17506 for pH, DO, ORP, COND.
0940 - onsite @ Duwamish Marine Center 6365 1st Ave S. for PCB GW/SW sampling activities
1050 - H/S meeting, be aware of equipment, visual range of TLIC employees, lock doors
1055 - T Dube onsite
1100 - site walk w/ Clint of DMC
1218 - began purge of SW located ~30' N of dock south of MW-16
1245 - sampled DMC-SW-1-20170313
1330 - placed waste drum w/ label near dock located South of MW-16
1323 - began purge of MW-16 GW@12.39'
1354 - began sample DMC-MW-16-20170313 GW@ 13.65'
1440 - mob van to MW-8
1450 - began purge of MW-8 GW@ 8.17'
1530 - began sample DMC-MW-8-20170313 GW@ 7.90'
1555 - leidos offsite & mob to MW-10 ~~GW~~ Emp
1614 - began purge of MW-8, GW @ 5.90'
1640 - collected DMC-MW-16-20170313, collected DMC-IDW-20170313 GW@ 6.00', waste drum has ~6gal of IDW
1705 - leidos offsite

3/14/17

0810 - calibrated Turbidity meters: 030424, 20270
0832 - calibrated YSI: 028184, 17506
1030 - onsite @ Duwamish Shipyard 5658 W Marginal Way SW
1100 - met w Tom & Rick of Alaska Marine, signed in
1105 - drove ven to DSIP2-19, Rock removed DRAIN cover
1117 - DSIP2-19 GW @ 3.12', tubing set @ ~10' ~~bgs~~ below TOC
1130 - began purging @ DSIP2-19 (tubing in well disposed of)
1210 - Sampled DSIP2-19 DS-DSIP2-19-20170314
1215 - Waste drum labeled, placed near DSIP2-19
1300 - mob to ~~DSIP2-6 LAB~~ DSI-MW-6, GW @ 3.02'
removed old tubing from well, sample tubing to be set @ ~10' below TOC
1326 - began purging DSI-MW-6
1332 - mob onto floating dock
1340 - began purge of surface water
1355 - began sampling DSI-MW-6 DS-DSI-MW-6-20170314
1405 - began sampling surface water from floating dock located ~100' S of MW-6 DS-SW-1-20170314
1608 - began purging ~~DSI-MW-06 LAB~~ DSI-PZ-01
1605 - collected waste sample DS-IDW-20170314
1630 - collected DS-DSI-PZ-01-20170314
1655 SMD - waste drum contains ~6-8gal of IDW
offsite

3/15/17

0820 - calibrating Turbidity meters: 030424, 20270
0850 - calibrating YSI meters: 028184, 17506
1040 - onsite @ Isaacson-Thompson. H/S meeting,
1100 - set up on MW-25, tubing in well thrown away starting GW@ 9.79' tubing to be set @ ~14'
2060 6655-2222 (Emergency #)
1121 - began purge of MW-25
1125 - set up on incorrect well (MW-14) moved to correct well
1135 - Rosemary/Landau on site, GW@ MW-25 @ 9.27' tubing set @ ~14'
1148 began purge of MW-25
1215 - began sample of BIT-MW-25-20170315
1255 - completed MW-25, mob to MW-13
1300 - no tubing in well, purged storm from monument GW@ 9.61', tubing placed @ ~14' below TOC
1319 - began purge of GW
1405 - sampled BIT-MW-13-20170315
1420 - offsite
1440 - onsite
1450 - set up on MW-10, no tubing in well GW@ 7.80' ~~13' ft of tubing placed~~ SMB sample tubing placed @ ~13'
1504 - began purging MW-10
1555 - collected BIT-MW-10-20170315, BIT-MW-10-20170315-D
1600 - collected BIT-IDW-20170315, waste drum labeled and placed next to NE staircase of building located ~50' E of MW-10, ~15 gal of IDW collected
1650 - asked Rosemary of Landau if she had any questions or concerns regarding the days work, she said No
1655 - offsite
1810 - collected LER-SB-1-20170315

11/16 SWP

3/16/17

1104 - leidos onsite for low flow sampling H/S meeting watch for trucks.

1110 - H/S meeting w/ Waste mgmt set up on EMW-1S tubing in well disposed of. depth of GW @ 5.62 sample tubing placed @ ~13' bdw TOC

1223 - began purge of EMW-1S

1200 - collected rinsate blank w/ tubing intended for EMW-1S LER-ER-1-20170316
SLR/Anchor/Waste mgmt overseeing sampling

1250 - Anchor offsite

1305 - collected CMS-EMW-1S-20170316
moved to EMW-13S, removed old tubing from well depth to GW @ 10.96, tubing set @ ~15' below TOC

1405 - began purge of EMW-13S

1437 - beg parameter collection from surface water ~100' W of EMW-13S (floating dock

1445 - pH meter on YSI 17506 reading surface water pH as ~2.50, attempts to recalibrate failed continuous parameter collection without pH

1500 - collected CMS-SW-1-20170316, CMS-SW-1-20170316-D

1505 - collected CMS-EMW-13S-20170316, CMS-EMW-13S-20170316-F

1600 - moved to EMW-6A, removed old tubing from well GW @ 12.43, placed sample tubing @ ~17' below TOC

1640 - began purge of EMW-6A
sampled EMW-6A CMS-EMW-6A-20170317
sampled waste ~~EMW-IDW-20170316~~ SWP CMS-IDW-20170316

1820 offsite

-17-17

0945 - onsite @ 6000 West Marginal Way SW 98106
waste drum placed in parking lot immediately S of MW-10
Robert from Geo-Engineers onsite

1010 - set up on MW-10 depth to water @ 5.21'

1030 - original pump not working, switched to Masterflex sample (yellow) tubing set @ ~9' below TOC. 1" diameter well does not allow room for depth to water tape and sample tubing so no water level measurement possible during sampling

1035 - began purge of MW-10, purge rate set @ 240ml/min

1115 - began sample collection of NT115-MW-10-20170317

1150 - moved to MW-3, tubing in well. 1" diameter casing. told Robert of GeoEngineers that Pat requested tubing be saved but we have concerns that if tubing is reinserted it will fall down below TOC, Robert said to double bend the end. GW@ MW-3 ~ 9.80' below TOC. tubing to be placed @ ~14' below TOC.

1200 collected Rinsate blank LER-ER-1-20170317

1218 - began purge of MW-3

1250 - sampled NT115-MW-3-20170317

1310 - moved to MW-10, tubing in well was saved and will be reinserted. GW @ 5.62. tubing placed @ ~10' below TOC

1358 - began purge of MW-10

1445 - began collection of NT115-MW-10-20170317

1530 - offsite

* turbidity meters L-151 calibrated @ 8am at Bothell office

3/20/17

0630 - calibrated turbidity meter (3421; 20270
calibrated YSI - 02818A, 17506
0830 - onsite @ 130 S. Kenyon St. site walk to view MW locations
0920 - set up on MW-32. Bladder pump in well. bladder pump and tubing to remain in well during sampling depth to GW @ 8.90' sample tubing set to ~20' below TOC
0930 - began purge of MW-32 ~200ml/min
1015 - collected SA-MW-3-20170320, SA-MW-3-20170320-F
1100 - moved to MW-12. bladder pump/tubing in well, will remain in well during sample activities. Bladder pump string above water level. Probe malfunction depth to water @ 4.5'. sample tubing set @ ~12' below TOC
1155 - began purge of MW-12
1230 - began collection of SPL-MW-12-20170320
1310 - mob to MW-31, bladder pump/tubing in well GW@ 9.05
1325 - began purge of MW-31, tubing set @ 20' below TOC
1400 - collected SPL-MW-12-20170320
IDW drum placed @ 130 S. Kenyon St collected SPL-IDW-1-20170320
1445 - offsite

3/21/17

0800 - turbidity meters 03424, 20270 and YSI 028184 & 17506 calibrated in office

0900 - onsite & Glacier, signed in at office. No one in office moved van to MW-32S

1015 - Matt from ERM onsite verified location of 32S H/S meeting
GW @ ~2.03', no tubing in well. Sample tubing placed @ ~8' below TOC

1041 - begin purge of MW-32S

1120 - collected GNW-MW-32S-20170321

1124 - turbidity between ambers @ 116ntu

1145 - mob MW-4S, GW @ 5.4' Tubing set @ ~8' below TOC

1202 - began purge of MW-4S
waste drum placed ~50' E of MW-4S

1250 - collected GNW-4S-20170321

13 - mob to MW-33S GW @ 3.84' tubing set @ ~8'

1357 - purge start on MW-33S

1438 - begin collection of GNW-33S-20170321

1530 - collected GNW-IDW-20170321

1405 - begin purge of surface water location ~50' SE of MW-33S

1440 - collected GNW-SW-1-20170321, GNW-SW-1-20170321-F

- ~~IDW waste~~ SWB

1540 - offsite

3/22/17

0700 - calibrated YSI-03427, 20270 & YSI-028184, 17506
0936 - onsite at 7277 Perimeter Road S
0950 - Landau onsite
1000 - depth to water @ MW-7 @ 6.52' tubing set to ~12' below TOC
1014 - start purge of EMF-MW-7 purge rate ~250 ml/min
1055 - start collection of EMF-MU-7-20170322
1122 - leidos/landau offsite
1140 - onsite at NBF, mob to well NGW-252 GW @ 9.96, tubing placed @ ~12' below TOC. Monument had water/sediment inside
1208 - started purge of MW-7
1255 - collected NBF-NGW252-20170322 final depth to H2O 9.95
1352 - mob to NGW-520, GW @ 3.41', tubing set @ ~12' below TOC, start purge
1440 - collect sample NBF-NGW520-20170322
1510 - mob to NGW-521, depth to water @ 1.51', tubing set to ~12' below TOC
1532 - began purge of NGW-521
1610 - begin collecting sample NBF-NGW521-20170322
1700 - mob to Boeing non-potable waste water treatment system, non operated system, to dispose of ~15gal of purge water. No waste sample collected/needed.
1720 - offsite

3/27/17

0815 - calibrated turbidity meters - 03424 & 20270
calibrated YSI 028184 & 17506, unit 17506 would not calibrate for pH

0930 - onsite @ Whitehead - Tyee. Kristen from Floyd Snider onsite set up on MW-06.

0940 - monument lid shattered on MW-06, monument filled with water GW@ 7.11', tubing in well poly/silicon. Kristen said to throw away, copper sample tubing set to ~15' below TOC.

0957 - began purge of WT-MW-06 at rate of 250 ml/min. Kristen said that Floyd Snider will not collect a split. Floyd Snider did recent injections on upgradient fracture site

1035 - sampled WT-MW-06

1110 - mob to WT-MW-08 no tubing in well, GW@ 9.29' Sample tubing placed to ~13 below TOC

1137 - began purge of WT-MW-108 purge rate @ ~250 ml/min

1125 - collected LER-ER-1-20170317

1210 - collected WT-MW-108-20170327

1250 - mob to WT-MW-110, no tubing in well, surface water in monument GW@ ~9.15' placed tubing @ ~13' below TOC

1319 - began purge of WT-MW-110 at rate of ~250 ml/min

1400 - collected WT-MW-110-20170317

1445 - collected WT-IDW-20170327, waste drum placed on pallet in fenced area near baker tanks ~10 gal of IDW purge water.

3/28/17

0815- calibrate turbidity meters 03424, 20270
calibrate YSI - 028184, 17506. unable to calibrate pH on 17506
0948- onsite at 8801 East Marginal Way, met w/site contact Bobby 206-465-3661. give flashing vehicle light and escorted to MW-16A.
1010- water pooled on surface near MW-16A, cap not on well, very tightly. GW @ 3.96 tubing set to ~12' below TOC
1033 - began purge of MW-16A at rate of 280 mL/min
1115 - collected 8801-MW-16A-20170328, 8801-MW-16A-20170328-F
1150 - set up on MW-42A, water in monument. GW @ 5.83' tubing set to ~15' below TOC
1209- began purge of MW-42A purge rate @ ~250 mL/min
1222 - emptied/cleaned out flow cell due to large amount of flocculent material from well
1255 - collected 8801-MW-42A-20170328
1310 - mob to MW-30A, water in monument GW @ 8.41' tubing set @ ~19' below TOC
1353 - began purge of MW-30A @ rate of 250 mL/min
1430 - collected 8801-MW-30A-20170328
1510- staged ~10 gal of IDW in ~~purge~~ ever water drum near MW-16A. collected 8801-IDW-20170328
1545- offsite
1615- collected source blank LSB-SB-1-20170328

3/29/17

0630 - calibrated Turbidity meters 03424, 20270
calibrated YSI - 028184, 17506. 17506 would not calibrate for pH
0810 - onsite at 7152 1st Ave S
0855 - site walk w/ facility manager & Dave Cooper of DOF
0910 - signed in @ office. Dave said that all he needs for Eh is a copy of our ORP readings and the model # of the YSI. he has some YSI model
0920 - set up on MW-3, GW@ 10.60 tubing in well prior to sampling (poly) removed by Dave set sample tubing @ ~17' below TOC
0933 - began purge at rate of ~200 ml/min
1020 - collected ICS-DOF-MW3-20170329
1140 - unable to access surface water for sample collection
1200 - set up on MW-2, water in monument, tubing in well (tubing placed in new bag and will be reinserted at request of DOF) GW@ 4.61, sample tubing placed @ ~18' below TOC
1226 - begin purge of MW-2 rate of ~250 ml/min
1330 - collected sample ICS-SA-MW2-20170329
mob to MW-1, tubing in well (bagged for reuse under direction from Dave of DOF) GW@ 7.39', tubing placed to ~14' below TOC
1427 began purge of MW-1 @ rate of ~250 ml/min
1505 - collected ICS-DOF-MW1-20170329, ICS-DOF-MW1-20170329-F
1600 - collected ICS-IDW-20170329, waste staged near DOF-MW1
1620 - offsite

3/30/17

0810 - calibrated turbidity meter 03427, 20270
calibrated YSI - 022184, 17506. unable to calibrate pH on 17506
1020 - onsite, spoke w/ Paul set up on MW-11. removed poly/silicone tubing from well disposed of it w/ approval from GeoEngineers. water level @ 9.52' tubing set to ~15' below TOC.
1040 - begin purge of MW-11
1115 - collected DMD-MW-11-20170330
1150 - mob to MW-17, well lid cracked, monument filled w/ water. water removed, tubing (poly/silica) in well, tubing removed. GL@ 8.73. sample tubing placed to ~15' below TOC.
1202 - began purge of MW-17
1220 - GeoEngineers offsite
1245 sampled ~~17~~ DMD-MW-17-20170330, DMD-MW-17-20170330-F
1330 - mob to MW-15. tubing in well removed GL@7.98' tubing set to ~15'
1435 began purge MW-15 @ ~250 mL/min
set up on barge located ~80' NE of MW-15 for collection of Surface Water Sample
1412 began purge of Surface water
1430 - collected DMD-SW-1-20170330
1435 - collected DMD-MW-15-20170330
1530 - collected waste sample DMD-IDW-20170330
drum placed on South side of site ~10gl of purge H2O

3/31/17

0800 - calibrated turbidity meter 20270
calibrated YSI -028184
020 - onsite at 8531 East Marginal Way S, met with Chris Duke for safety walk through, gave Chris copy of HASP and contractor document
1110 - set up on MW-23 no bolts or lock on well GW@ 9.79' tubing set to ~14' below TOC
1116 - began purge of MW-23 @ rate of ~250 ml/min
1205 - collected sample JF-MW-23-20170331
1240 - mob to MW-48, water in monument pumped at depth to GW@ 10.1 tubing set to ~14' below TOC
1251 - began purge of MW-48 @ rate of ~250 ml/min
1330 - collected JF-MW-48-20170331
1410 - mob to MW-51, depth to water @ 15.29, tubing @ ~25'
1424 - begin purge of MW-51 @ rate of ~250 ml/min
Wayne Turk of Forgerson Forge stopped by, he has handed 2 filled out non-haz waste labels and said he can apply them to the waste drum and overpack once we contact him with the waste results. the drum/overpack will be placed in the haz storage house ~SE of MW-51.
1505 - collected JF-MW-51-20170331
1530 - collected JF-IDW-20170331
1550 - offsite

4/6/17

0545- calibrated turbidity meter & YSI @ office
0700 - onsite @ WA DOT 450 S. Spokane St, checked in @ office, set up on MW-2. depth to water @ 7.85' tubing set to ~15' below TOC
0720 - start purge of MW-2 @ rate of ~250 ml/min
085 - collected DOT-MW-2-20170406
0905 - offsite
0920 - onsite @ 720 S forest St, checked in @ office gw @ 10.58' in MW-KE1 tubing set @ ~15' below TOC
0940 - collected ~~DOT~~ LDW-EE-1-20170406
0953 - began purge of MW-KE1 @ rate of ~250 ml/min
1040 - collected GLS-MW-KE1-20170406
1120 - offsite
1130 - onsite @ 80 S. Hudson St checked in at office, set up on MW-~~02~~ 07, no tubing in well
1201 - began purge of MW-~~02~~ 07, tubing set @ ~15' bgs, purge rate of ~250 ml/mn
1240 - began sample collection of SHS-MW-07-20170406
1320 - mob to MW-~~02~~ 07, no tubing in well
1332 - began purge of MW-~~02~~ 07 purge rate ~300 ml/min, tubing set to ~15' bgs
1405 - collected SHS-MW-07-20170406
1545 - offsite

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Leidos	Phone: 425-482-3325	Date:	Ice Present?
Client Contact: Tom Dube		No. of Coolers:	Cooler Temps:
Client Project Name: Lower Duwamish Waterway			
Client Project #:	Samplers: SMB ME		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	PCB Aroclors	Chloride, Carbonate, Nitrate	TDS	TSS	RCRA 8 SW-846 6010 c/d SW-846 7470A				Notes/Comments
DMC-SW-1-20170313	3-13-17	1245	W	5	/	/	/	/					
DMC-GW-16-20170313		1354	W	5	/	/	/	/					
DMC-GW-8-20170313		1530	W	5	/	/	/	/					
DMC-TDW-20170313		1640	W	1					/				
DMC-MW-10-20170313		1640	W	5	/	/	/	/					
DS-DSP2-19-20170314	3-14-17	1210	W	5	/	/	/	/					
DS-SW-1-20170314		1405	W	5	/	/	/	/					
DS-DS1-MW-6-20170314		1355	W	5	/	/	/	/					
DS-TDW-20170314		1605	W	1					/				
DS-DS1-P2-01-20170314		1630	W	5	/	/	/	/					

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
1640	Printed Name: Stuart Brown	Printed Name: Paul Mork	Printed Name:	Printed Name:
	Company: Leidos	Company: ARI	Company:	Company:
	Date & Time: 3/15/17 0900	Date & Time: 3/15/2017 0900	Date & Time:	Date & Time:

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Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 1 of 3	
ARI Client Company: leidos	Phone: 425-482-3325	Date:	Ice Present?
Client Contact: Tom Dube		No. of Coolers:	Cooler Temps:
Client Project Name: Lower Duwamish Waterway			
Client Project #:	Samplers: SMB/MCF		

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Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: RCRA 8	PCB Aroclors	Chloride/Conductivity	TDS	TSS	lab to filter			Notes/Comments
BIT-IDW-20170315	3/15/17	1600	W	1	/								
BIT-MW-10-20170315-D		1555		2		/							
BIT-MW-10-20170315		1555		5		/	/	/	/				
BIT-MW-13-20170315		1355		5		/	/	/	/				
BIT-MW-25-20170315		1215		5		/	/	/	/				
LER-SB-1-20170315	3/15/17	1810	W	2		/							
LER-ER-1-20170316	3/16/17	1200	W	2		/							
CMS-EMW-1S-20170316		~~1250~~ 1205		5		/	/	/	/				
CMS-EMW-13S-20170316		1505		5		/	/	/	/				
CMS-EMW-13S-20170316-F		1505		2		/	/			/			

Comments/Special Instructions: filter CMS-EMW-13S-20170316-F prior to PCB analysis	Relinquished by: (Signature)	Received by: (Signature) Brittney Hall	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Stuart Brown	Printed Name: Brittney Hall	Printed Name:	Printed Name:
	Company: leidos	Company: ARI	Company:	Company:
	Date & Time: 3-21-17 0830	Date & Time: 3/21/17 8:30	Date & Time:	Date & Time:

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 2 of 3	
ARI Client Company: Leidos	Phone: 425-482-3325	Date:	Ice Present?
Client Contact: Tom Dube		No. of Coolers:	Cooler Temps:
Client Project Name: LDW			
Client Project #:	Samplers: SMB / MCF		

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Sample ID	Date	Time	Matrix	No. Containers	RCRA-8	PCB Aroclors	Chloride/Conductivity	TDS	TSS	Filter			Notes/Comments
CMS-SW-1-20170316	3-16-17	1500	W	5		/	/	/	/				
CMS-SW-1-20170316-D		1500	W	2		/							
CMS-DW-6A-20170316		1725	W	5		/	/	/	/				
CMS-IDW-20170316	↓	1820	W	1	/								
NT115-MW-10-20170317	3-17-17	1115	W	5		/	/	/	/				
LER-ER-1-20170317		1200	W	2		/							
NT115-MW-3-20170317		1250	W	5		/	/	/	/				
NT115-MW-20-20170317		1445	W	5		/	/	/	/				
SPL-MW-32-20170320	3-20-17	1015	W	5		/	/	/	/				
SPL-MW-32-20170320-F	3-20-17	1015	W	2		/				/			

Comments/Special Instructions
SPL-MW-32-20170320-F should be lab filtered prior to PCB analysis.

Relinquished by: (Signature)	Received by: (Signature) Brittney Hall	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Stuart Brown	Printed Name: Brittney Hall	Printed Name:	Printed Name:
Company: Leidos	Company: ARI	Company:	Company:
Date & Time: 3-21-17 0830	Date & Time: 3/21/17 8:30	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 3 of 3	
ARI Client Company: leidos	Phone: 425-482-3325	Date:	Ice Present?
Client Contact: Tom Dube		No. of Coolers:	Cooler Temps:
Client Project Name: LDW			
Client Project #:	Samplers: SMB / MCE		

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Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: RCRA-8	PCB Aroclors	Chloride/Conductivity	TDS	TSS				Notes/Comments
SPL-HW-12-20170320	3-20-17	1230	W	5		/	/	/	/				
SPL-HW-31-20170320	↓	1400	W	5		/	/	/	/				
SPL-IDW-20170320		1430	W	1	/								
D													

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Stuart Brown	Printed Name: Brittney Hall	Printed Name:	Printed Name:
	Company: leidos	Company: ARI	Company:	Company:
	Date & Time: 3-21-17 0830	Date & Time: 3/21/17 8:30	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 1 of 3	
ARI Client Company: Leidos	Phone: 425-482-3325	Date: 3-29-17	Ice Present?
Client Contact: Tom Dube		No. of Coolers:	Cooler Temps:
Client Project Name: Lower Duwamish Waterway			
Client Project #:	Samplers: SMB MEC		

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Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: RCRA 8	Filter	PCB Aroclors	TDS	TSS	Chloride / Conductivity			Notes/Comments
GNW-IOW-20170321	3-21-17	1530	W	1	/								
GNW-MW-32S-20170321		1120	W	5			/	/	/	/			
GNW-MW-4S-20170321		1250	W	5			/	/	/	/			
GNW-MW-33S-20170321		1438	W	5			/	/	/	/			
GNW-SW-1-20170321		1440	W	5			/	/	/	/			
GNW-SW-1-20170321-F		1440	W	2		/	/						
ENE-HW-7-20170322	3-22-17	1055	W	5			/	/	/	/			
NBF-NGW252-20170322		1255	W	5			/	/	/	/			
NBF-NGW520-20170322		1440	W	5			/	/	/	/			
NBF-NGW521-20170322		1610	W	5			/	/	/	/			

Comments/Special Instructions: lab to filter GNW-SW-1-20170321-F prior to PCB analysis

Relinquished by: (Signature)	Received by: (Signature) Brittney Hall	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Stuart Brown	Printed Name: Brittney Hall	Printed Name:	Printed Name:
Company: Leidos	Company: ARI	Company:	Company:
Date & Time: 3-29-17 0700	Date & Time: 3/29/17 8:21	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 2 of 3	
ARI Client Company: leidos	Phone: 425-482-3325	Date: 3-29-17	Ice Present?
Client Contact: Tom Dube		No. of Coolers:	Cooler Temps:
Client Project Name: Lower Duwamish Waterway			
Client Project #:	Samplers: SMB MEC		

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Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NCAA 8	Filter	PCB Aroclors	TDS	TSS	Chloride/ Conductivity			Notes/Comments
WT-MW-106-20170327	3-27-17	1035	W	5			/	/	/	/			
LER-ER-1-20170327		1125	W	2			/						
WT-MW-108-20170327		1210	W	5			/	/	/	/			
WT-MW-110-20170327		1400	W	5			/	/	/	/			
WT-MW-110-20170327-D		1400	W	2			/						
WT-IDW-20170327	↓	1445	W	1	/								
8801-MW-11A-20170328	3-28-17	1115	W	5			/	/	/	/			
8801-MW-16A-20170328-F		1115	W	2		/	/						
8801-MW-42A-20170328		1255	W	5			/	/	/	/			
8801-MW-30A-20170328	↓	1430	W	5			/	/	/	/			

Comments/Special Instructions: lab to filter 8801-MW-16A-20170328-F prior to PCB analysis	Relinquished by: (Signature)	Received by: (Signature) Brittney Hall	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Stuart Brown	Printed Name: Brittney Hall	Printed Name:	Printed Name:
	Company: leidos	Company: ARI	Company:	Company:
	Date & Time: 3-29-17 0700	Date & Time: 3/29/17 8:21	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 3 of 3	
ARI Client Company: leidos	Phone: 425-482-3325	Date: 3-29-17	Ice Present?
Client Contact: Tom Dube		No. of Coolers:	Cooler Temps:
Client Project Name: Lower Duwamish Waterway			
Client Project #:	Samplers: SmB, MEC		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: ACEA-8	Filter	PCB Aroclors	TDS	TSS	Chloride / Conductivity			Notes/Comments
889-IDW-20170328	3-28-17	1510	W	1	/								
LSB-SB-1-20170328	3-28-17	1615	W	2			/						
						/							

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature)	(Signature) Brittney Hall	(Signature)	(Signature)
	Printed Name: Stuart Brown	Printed Name: Brittney Hall	Printed Name:	Printed Name:
	Company: leidos	Company: ARI	Company:	Company:
	Date & Time: 3-29-17 0700	Date & Time: 3/29/17 8:21	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:
ARI Client Company: leidos	Phone: 425-482-3325
Client Contact: Tom Dube	
Client Project Name: IDW-PCB-GW-Sampling	
Client Project #:	Samplers: SMB, MCF

Page: 1	of 2
Date: 4-3-17	Ice Present?
No. of Coolers:	Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: PCB Aroclors	Chloride/ Conductivity	TDS	TSS	RCRA 8	Filter			Notes/Comments
ICS-DOF-MW3-20170329	3-29-17	1020	W	5	/	/	/	/					
ICS-SA-MW2-20170329		1330	W	5	/	/	/	/					
ICS-DOF-MW1-20170329		1505	W	5	/	/	/	/					
ICS-DOF-MW1-20170329-F		1505	W	2	/					/			
ICS-IDW-20170329		1600	W	1					/				
DMD-MW-11-20170330	3-30-17	1115	W	5	/	/	/	/					
DMD-MW-17-20170330		1245	W	5	/	/	/	/					
DMD-MW-17-20170330-F		1245	W	2	/					/			
DMD-MW-15-20170330		1435	W	5	/	/	/	/					
DMD-SW-1-20170330		1430	W	5	/	/	/	/					

Comments/Special Instructions: Filter with 1-M glass filter. ICS-DOF-MW1-20170329-F DMD-MW-17-20170330-F	Relinquished by: (Signature)	Received by: (Signature) Paul Mark	Relinquished by: (Signature)	Received by: (Signature)	
	Printed Name: Stuart Brown	Printed Name: Paul Mark	Printed Name:	Printed Name:	
	Company: leidos	Company: ARI	Company:	Company:	
	Date & Time: 4-3-17 1000	Date & Time: 4/3/2017 10:00	Date & Time:	Date & Time:	

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 2 of 2	
ARI Client Company: Leidos	Phone: 425-482-3325	Date: 4-3-17	Ice Present?
Client Contact: Tom Dube		No. of Coolers:	Cooler Temps:
Client Project Name: LDW PCB GW Sampling			
Client Project #:	Samplers: SMB, MSE		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: RCRA 8	PCB Aroclors	chloride / conductivity	TDS	TSS				Notes/Comments
DMD-IDW-20170330	3-30-17	1530	W	1	/								
JF-MW-23-20170331	3-31-17	1205	W	5		/	/	/	/				
JF-MW-46-20170331	"	1330	W	5		/	/	/	/				
JF-MW-51-20170331	"	1505	W	5		/	/	/	/				
JF-IDW-20170331	↓	1530	W	1	/								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Stuart Brown	Printed Name: Paul Mark	Printed Name:	Printed Name:
	Company: Leidos	Company: ARI	Company:	Company:
	Date & Time: 4-3-17 1000	Date & Time: 4/3/2017 10:00	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Vista CHAIN OF CUSTODY 1 of 2

FOR LABORATORY USE ONLY Storage Secured

Laboratory Project ID:_____ Yes ☐ No ☐

Storage ID_____ Temp _____°C

TAT: (Check One):
Standard: ✓ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D. Lower Duwamish Waterway GW/SW PCB Sampling P.O.#_____ Sampler: SMB, MCE (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax#
Tom Dubé	Leidos	18912 N. Creek Pkwy N #101	Bothell	WA	98011	425-482-3325	

Relinquished by: (Signature and Printed Name)	Thomas Dubé	Date: 3-17-17	Time: 1400	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)		Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: Karen / Martha

Method of Shipment: UPS

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENEKS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29
DMC-SW-1-20170313	3-13-17	1245	DMC	2	A	W											✓				
DMC-MW-16-20170313	↓	1323	↓	2	↓	↓											✓				
DMC-MW-8-20170313	↓	1530	↓	2	↓	↓											✓				
DMC-MW-10-20170313	↓	1640	↓	2	↓	↓											✓				
DS-DSIP2-19-20170314	3-14-17	1210	DS	2	↓	↓											✓				
DS-SW-1-20170314	↓	1405	↓	2	↓	↓											✓				
DS-DSI-MW16-20170314	↓	1355	↓	2	↓	↓											✓				
DS-DSI-PZ-01-20170314	↓	1630	↓	2	↓	↓											✓				
BIT-MW-25-20170315	3-15-17	1215	BIT	2	↓	↓											✓				
BIT-MW-13-20170315	↓	1355	↓	2	W	↓											✓				

Special Instructions/Comments:_____

SEND DOCUMENTATION AND RESULTS TO:

Name: Tom Dubé
Company: Leidos
Address: 18912 N. Creek Pkwy, ste 101
City: Bothell State: WA Zip: 98011
Phone: 425-482-3325 Fax:_____
Email: Thomas.E.Dube@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other W = Groundwater, SW = Surface Water

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

CHAIN OF CUSTODY 2 of 2

Vista

FOR LABORATORY USE ONLY Storage Secured

Laboratory Project ID:_____ Yes ☐ No ☐

Storage ID_____ Temp _____°C

TAT: (Check One):
Standard: ☑ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D.: Lower Duwamish Waterway GW/SW PCB Sampling P.O.#_____ Sampler: SMB, MCE (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax#
Tom Dubé	Leidos	18912 N. Creek pkwy, ste 101	Bothell	WA	98011	425-482-3325	

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Thomas Dubé Thomas Dubé	3-17-17	1400			
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: Karen / Martha

Method of Shipment: UPS

Tracking No.:_____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29	CARB429 Filter
BIT-MW-10-20170315-D	3-15-17	1555	BIT	2	A	W											/					
BIT-MW-10-20170315	↓	1555	↓	2		W											/					
LSBLER-SB-1-20170315	↓	1810		2		W											/					
LER-ER-1-20170316	3-16-17	1200		2		W											/					
CMS-EMW-15-20170316		1305	CMS	2		W											/					
CMS-EMW-13S-20170316		1505		2		W											/					
CMS-EMW-13S-20170316-F		1505		2		W											/					/
CMS-SW-1-20170316		1500		2		W											/					
CMS-SW-1-20170316-D		1500		2		W											/					
CMS-EMW-6A-20170316	↓	1725	↓	2	↓	W											/					

Special Instructions/Comments: Filter sample CMS-EMW-13S-20170316-F prior to Congener analysis, with 1-micron borosilicate glass filter

SEND DOCUMENTATION AND RESULTS TO:

Name: Tom Dubé
Company: Leidos
Address: 18912 N. Creek pkwy ste 101
City: Bothell State: WA Zip: 98011
Phone: 425-482-3325 Fax:_____
Email: Thomas.E.Dube@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MMS Train, O= Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other W = Ground water/Surface Water/Blank Water

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Vista

CHAIN OF CUSTODY

FOR LABORATORY USE ONLY Storage Secured

Laboratory Project ID:_____ Yes ☐ No ☐

Storage ID_____ Temp _____°C

TAT: (Check One):

Standard: (21 Days)

Rush (surcharge may apply):

○ 14 days ○ 7 days Specify:___

Project I.D.:_____ P.O.#_____ Sampler:_____ (Name)

Invoice to: Name Tom Dube Company leidos Address 18912 N. Creek Parkway, Ste 101 City Bothell State WA Zip 98011 Ph# 425-482-3325 Fax#

Relinquished by: (Signature and Printed Name) Stuart Brown Date: 3-23-17 Time: 1020 Received by: (Signature and Printed Name) Date: Time:

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:_____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Container(s) Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29	CARB429 Filter
NTI1S-MW-10-20170317	3-17-17	1115	NTI1S	2		W											/					
LER-FR-1-20170317	↓	1200	NTI1S	2		W											/					
NTI1S-MW-3-20170317	↓	1250	NTI1S	2		W											/					
NTI1S-MW-2-20170317	↓	1405	NTI1S	2		W											/					
SPL-MW-32-20170320	3-20-17	1015	SPL	4		W											/					
SPL-MW-32-20170320-F	↓	1015	SPL	2		W											/			/		
SPL-MW-12-20170320	↓	1230	SPL	2		W											/					
SPL-MW-31-20170320	↓	1400	SPL	2		W											/					
GNW-MW-32S-20170321	3-21-17	1120	GNW	2		W											/					
GNW-MW-4S-20170321	↓	1250	GNW	2		W											/					

Special Instructions/Comments: lab to filter SPL-MW-32-20170320-F prior to congeners analysis

SEND DOCUMENTATION AND RESULTS TO:

Name: Tom Dube
Company: leidos
Address: 18912 N. Creek parkway ste 101
City: Bothell State: WA Zip: 98011
Phone: 425-482-3325 Fax:
Email: Thomas.E.Dube@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other_____

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Vista

CHAIN OF CUSTODY

FOR LABORATORY USE ONLY Storage Secured

Laboratory Project ID:_____ Yes ☐ No ☐

Storage ID_____ Temp _____°C

TAT: (Check One):
Standard: ✓ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D.:_____ P.O.#_____ Sampler:_____ (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax#
Tom Dube	leidos	18912 North Creek Parkway Ste 101	Bothell	WA	98011	425-482-3325	

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Stuart Brown	3-23-17	1020			
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:_____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Container(s) Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29	CARB429 Filter
~~GNW-335-20170321~~	~~3-21-17~~	~~1438~~	~~GNW~~																			
GNW-SW-1-20170321	3-21-17	1440	GNW	2		W											✓					
GNW-SW-1-20170321-F	↓	1440	GNW	2		W											✓					✓
GNW-MW-335-20170321	↓	1438	GNW	2		W											✓					✓
EMF-MW-7-20170322	3-22-17	1055	EMF	2		W											✓					
NBF-NGW252-20170322	↓	1255	NBF	2		W											✓					
NBF-NGW520-20170322	↓	1410	NBF	2		W											✓					
NBF-NGW521-20170322	↓	1610	NBF	2		W											✓					

Special Instructions/Comments: sample GNW-SW-1-20170321-F needs to be filtered by lab prior to congener analysis

SEND DOCUMENTATION AND RESULTS TO:

Name: Tom Dube
Company: leidos
Address: 18912 North Creek Parkway Ste 101
City: Bothell State: WA Zip: 98011
Phone: 425-482-3325 Fax: _____
Email: Thomas.E.Dube@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other_____

Vista CHAIN OF CUSTODY

FOR LABORATORY USE ONLY Storage Secured

Laboratory Project ID:_____ Yes ☐ No ☐

Storage ID_____ Temp _____°°C

TAT: (Check One):
Standard: ◉ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D.: LDW PCB EW Sampling P.O.#_____ Sampler: SB, ME (Name)

Invoice to: Name Tom Dubé Company Leidos Address 18912 North Cr. Pkwy. City Bothell State WA Zip 98011 Ph# 425-482-3325 Fax#

Relinquished by: (Signature and Printed Name) Tom Dubé Date: 3-30-17 Time: 1400 Received by: (Signature and Printed Name) Date: Time:

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: Karen Lopez

Method of Shipment: UPS

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1614 PBDE	CARB429 PAH	CARB429 WHO-29	FILTER
WT-HW-06-20170327	3-27-17	1035	WT	2		W											/					
LER-ER-1-20170327		1125		2		W											/					
WT-HW-108-20170327		1210	WT	2		W											/					
WT-HW-110-20170327		1400	WT	2		W											/					
WT-HW-110-20170327-D	↓	1410	WT	2		W											/					
8401-HW-11A-20170328	3-28-17	1115	8401	2		W											/					
8401-HW-11A-20170328-F		1115	8401	2		W											/					/
8401-HW-42A-20170328		1255	8401	2		W											/					
8401-HW-30A-20170328		1430	8401	2		W											/					
LDB-SB-1-20170328	↓	1615		2		W											/					

Special Instructions/Comments:
Filter with 1-in glass filter for sample
8401-HW-11A-20170328-F

SEND DOCUMENTATION AND RESULTS TO:

Name: Tom Dubé
Company: Leidos
Address: 18912 North Creek Pkwy. #101
City: Bothell State: WA Zip: 98011
Phone: 425-482-3325 Fax:
Email: dubet@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other W = Groundwater/Blank Water

WHITE: ORIGINAL YELLOW: ARCHIVE PINK: COPY

Vista CHAIN OF CUSTODY

FOR LABORATORY USE ONLY Storage Secured

Laboratory Project ID:_____ Yes ☐ No ☐

Storage ID_____ Temp _____°C

TAT: (Check One):
Standard: ☑ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D.: LDW PCB GW Sampling P.O.#_____ Sampler: SMB, MEE (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax#
Tom Dube	Leidos	18912 N. Creek Pkwy	Bothell	WA	98011	425-482-3325	

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Steve Barnett	4-3-17	1000			
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: Karen Lopez

Method of Shipment: UPS

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29	CARB429 Filter
ICS-DOF-MW3-20170329	3-29-17	1020	ICS	2		W											/					
ICS-SA-MW2-20170329		1330	ICS	2		W											/					
ICS-DOF-MW1-20170329		1505	ICS	2		W											/					
ICS-DOF-MW1-20170329F	↓	1505	ICS	2		W											/				/	
DMD-MW-11-20170330	3-30-17	1115	DMD	2		W											/					
DMD-MW-17-20170330		1245	DMD	2		W											/					
DMD-MW-11-20170330F		1245	DMD	2		W											/				/	
DMD-MW-15-20170330		1435	DMD	2		W											/					
DMD-SW-1-20170330	↓	1430	DMD	2		W											/					
JF-MW-23-20170331	3-31-17	1205	JF	2		W											/					

Special Instructions/Comments:
Filter with 1-M glass filter for samples
ICS-DOF-MW1-20170329-F
DMD-MW-17-20170330-F

SEND DOCUMENTATION AND RESULTS TO:

Name: Tom Dube
Company: Leidos
Address: 18912 N. Creek Pkwy #101
City: Bothell State: WA Zip: 98011
Phone: 425-482-3325 Fax:
Email: dubet@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other Groundwater - GW
Surface water

WHITE ORIGINAL YELLOW ARCHIVE PINK COPY

CHAIN OF CUSTODY

Vista

FOR LABORATORY USE ONLY Storage Secured

Laboratory Project ID:_____ Yes ☐ No ☐

Storage ID_____ Temp _____°C

p. 2 of 2

TAT: (Check One):
Standard: ⊘ 21 Days
Rush (surcharge may apply):
○ 14 days ○ 7 days Specify:___

Project I.D.: LDW - RCB GW Sampling P.O.#_____ Sampler: SMB, MCE (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax#
Tom Dube	Leidos	18912 N. Creek Pkwy	Bothell	WA	98011	425-482-3325	

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Stuart Brown	4-3-17	1000			
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN:_____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29
JF-MW-48-20170331	3-31-17	1330	JF	2		W															
JF-MW-51-20170331	↓	1505	JF	2		W															

Special Instructions/Comments:_____

SEND DOCUMENTATION AND RESULTS TO:

Name: Tom Dube
Company: Leidos
Address: 18912 N. Creek Pkwy N Ste 201
City: Bothell State: WA Zip: 98011
Phone: 425-482-3325 Fax:_____
Email: dubet@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other Groundwater - W

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Leidos	Phone: 425-482-3325
Client Contact: Tom Dube	
Client Project Name: Lower Duwamish Waterway	
Client Project #:	Samplers: SMB MCE

Page: 1 of 1	
Date: 4-6-17	Ice Present?
No. of Coolers:	Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	PCB Aroclors	TSS	TDS	Chloride/Specific Conductance	RCRA 8				Notes/Comments
DOT-MW-2-20170406	4/6/17	0815	W	8	/	/	/	/					MS/MSD
LEI-ER-1-20170406		0940	W	2	/								
GLS-MW-KOI-20170406		1040	W	5	/	/	/	/					
SHS-MW-07-20170406		1240	W	8	/	/	/	/					MS/MSD
SHS-MW-02-20170406		1405	W	8	/	/	/	/					MS/MSD

Comments/Special Instructions MS/MSB for PCB analysis on samples DOT-MW-2-20170406 SHS-MW-07-20170406 SHS-MW-02-20170406	Relinquished by: (Signature) Stuart Brown Printed Name: Company: Leidos Date & Time: 4-7-17 1015	Received by: (Signature) Paul Mork Printed Name: Paul Mork Company: ARI Date & Time: 4/7/2017 10:15	Relinquished by: (Signature) Printed Name: Company: Date & Time:	Received by: (Signature) Printed Name: Company: Date & Time:

CHAIN OF CUSTODY

Vista

FOR LABORATORY USE ONLY

Storage Secured

Laboratory Project ID:_____ Yes ☐ No ☐

Storage ID_____ Temp _____°C

TAT: (Check One):

Standard: ✓ 21 Days

Rush (surcharge may apply):

○ 14 days ○ 7 days Specify:___

Project I.D.: LDW PCB CU Sampling P.O.#_____ Sampler: SWB, MCE (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax#
Tom Dube	leidos	18912 N. Creek pkwy	Bothell	WA	98011	425-482-3325	

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Stuart Brown	4-7-17	1015			
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

ATTN: Karen Lopez

Method of Shipment: UPS

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Container(s) Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA1613 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCB's	EPA1668 209 CONGENERS	EPA1668 PBDE	EPA1614 PAH	CARB429 WHO-29
DOT-HW-2-20170406	4-6-17	0815	DOT	2		W											/				
ER-ER-1-20170406		0940	ER	2		W											/				
GLS-HW-DUP-20170406		1040	GLS	2		W											/				
SHS-HW-07-20170406		1240	SHS	2		W											/				
SHS-HW-02-20170406	↓	1415	SHS	2		W											/				

Special Instructions/Comments: _____

SEND DOCUMENTATION AND RESULTS TO:

Name: Tom Dube
Company: leidos
Address: 18912 N. Creek pkwy #101
City: Bothell State: WA Zip: 98011
Phone: 425-482-3325 Fax: _____
Email: dubet@leidos.com

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O= Other_____

*Bottle Preservative Type: T = Thiosulfate,
O = Other_____

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper,
SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum
AQ = Aqueous, O = Other_____

WHITE - ORIGINAL YELLOW - ARCHIVE PINK - COPY

Appendix C
Laboratory Reports (Provided on Compact Disc)

Appendix D
Comprehensive Data Tables

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties											
	Duwamish Shipyard				Glacier Northwest					North Terminal 115		
Well ID	DSIP2-19	DSI-PZ-01	DSI-MW-06	DS-SW-1	MW-32S	MW-4S	MW-33S	GNW-SW-1	GNW-SW-1-F	MW-20	MW-3	MW-10
Relative Location at Site	Up	Center	Down	Surface	Up	Center	Down	Surface	Surface	Up	Center	Down
Sample Date	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/21/2017	3/21/2017	3/21/2017	3/21/2017	3/21/2017	3/17/2017	3/17/2017	3/17/2017
PCB Congeners (pg/L)												
PCB-001	1.75 J	0.384 U	2.47 J	2.31 J	0.231 U	0.703 U	3.54 J	39.2	3.26 U	1.94 J	1.93 J	1.36 U
PCB-002	2.42 J	0.424 U	0.325 U	0.536 U	0.728 U	0.218 U	1.08 J	0.231 U	2.14 U	0.703 U	2.80 U	1.78 U
PCB-003	2.43 J	0.423 U	1.59 J	0.535 U	0.267 U	0.233 U	1.81 U	16.5	2.29 U	0.276 U	1.36 U	1.18 U
Total Monochlorobiphenyls	6.60 J	0.424 U	4.06 J	2.31 J	0.728 U	0.703 U	4.62 J	55.7	3.26 U	1.94 J	1.93 J	1.78 U
PCB-004	0.727 U	0.884 U	0.711 U	1.07 U	0.798 U	0.762 U	6.96	17.7	2.93 U	17.4	1.14 U	1.49 U
PCB-005	0.611 U	0.930 U	0.703 U	1.25 U	0.719 U	0.676 U	0.483 U	2.41 J	1.93 U	1.16 U	1.25 U	2.53 U
PCB-006	0.634 U	0.966 U	0.730 U	1.30 U	0.755 U	0.710 U	1.93 J	11.3	2.02 U	1.22 U	1.31 U	2.65 U
PCB-007	0.572 U	0.871 U	0.659 U	1.17 U	0.678 U	0.638 U	0.455 U	4.16 J	1.82 U	1.09 U	1.18 U	2.38 U
PCB-008	0.613 U	0.933 U	0.705 U	5.75	0.735 U	0.691 U	5.55	38.9	1.97 U	1.18 U	5.02 J	7.33 U
PCB-009	0.658 U	1.00 U	0.758 U	1.35 U	0.777 U	0.731 U	0.522 U	4.82 J	2.08 U	1.25 U	1.35 U	2.73 U
PCB-010	0.460 U	0.560 U	0.450 U	0.676 U	0.489 U	0.467 U	0.324 U	0.392 U	1.80 U	103	0.701 U	0.915 U
PCB-011	12.1	10.5	8.44	12.4	9.40 U	8.09 U	15.2 U	8.83 U	7.32 U	13.9 U	43.9	12.0 U
PCB-012/013	0.709 U	1.00 U	0.823 U	1.25 U	0.748 U	0.654 U	0.500 U	2.89 J	1.39 U	1.27 U	1.30 U	2.44 U
PCB-014	0.574 U	0.812 U	0.665 U	1.01 U	0.584 U	0.510 U	0.390 U	0.520 U	1.08 U	0.988 U	1.01 U	1.90 U
PCB-015	0.651 U	0.921 U	0.755 U	1.15 U	0.707 U	0.618 U	0.473 U	6.69	1.31 U	112	1.23 U	2.31 U
Total Dichlorobiphenyls	12.1	10.5	8.44	18.2	9.40 U	8.09 U	14.4 J	88.9 J	7.32 U	232	48.9 J	12.0 U
PCB-016	0.591 U	0.511 U	1.15 U	2.58 J	0.432 U	0.329 U	4.36 J	5.55	0.850 U	69.8	3.83 J	9.44
PCB-017	1.02 J	0.528 J	1.23 U	2.97 J	0.339 U	0.906 U	3.65 J	6.07	2.57 U	104	3.37 J	8.53
PCB-018/030	2.12 J	1.34 J	2.64 J	6.40	0.959 U	1.21 U	9.03	11.0	4.40 U	230	5.95	16.7
PCB-019	0.525 U	0.459 U	0.323 U	2.04 J	0.369 U	0.297 U	3.35 J	2.86 J	2.44 J	356	0.450 U	5.99
PCB-020/028	4.03 U	1.21 U	1.69 U	8.36 J	1.94 U	2.29 U	5.67 U	16.1 U	7.60 J	370 J	11.0 U	14.2 U
PCB-021/033	2.54 U	0.855 U	0.880 U	2.90 U	1.88 U	1.15 U	2.70 U	6.07 U	0.418 U	15.3	6.33 U	7.82 U
PCB-022	1.84 J	0.274 U	0.622 J	2.73 J	1.04 J	0.962 J	1.85 J	5.52	2.66 U	76.1	4.82 J	5.66
PCB-023	0.309 U	0.258 U	0.210 U	0.249 U	0.254 U	0.189 U	0.167 U	0.153 U	0.432 U	0.320 U	0.289 U	0.267 U
PCB-024	0.330 U	0.285 U	0.206 U	0.264 U	0.256 U	0.195 U	0.174 U	0.310 U	0.504 U	22.3	0.312 U	0.289 U
PCB-025	0.300 U	0.250 U	0.369 U	1.37 U	0.267 U	0.198 U	0.176 U	1.76 U	0.455 U	12.1	1.03 U	1.79 U
PCB-026/029	0.573 J	0.243 U	0.198 U	2.16 J	0.934 U	0.176 U	1.50 U	3.06 U	0.403 U	37.8	2.46 U	3.25 U
PCB-027	0.306 U	0.265 U	0.191 U	1.16 J	0.236 U	0.180 U	0.891 J	1.60 J	0.465 U	87.3	0.288 U	1.84 J
PCB-031	3.01 U	0.887 U	1.40 U	6.74	1.53 U	1.65 U	5.14 U	10.7	4.82 U	131	7.32 U	10.2
PCB-032	1.15 U	0.696 U	1.12 U	3.06 U	0.970 U	0.746 U	3.26 U	4.30 U	2.06 U	360	2.11 U	8.18
PCB-034	0.294 U	0.245 U	0.200 U	0.237 U	0.244 U	0.182 U	0.161 U	0.147 U	0.417 U	0.992 U	0.278 U	0.257 U
PCB-035	0.531 U	0.377 U	0.472 U	0.575 U	0.889 U	0.332 U	0.377 U	0.512 U	0.915 U	3.62 U	2.13 U	1.83 U
PCB-036	0.468 U	0.332 U	0.416 U	0.507 U	0.327 U	0.260 U	0.295 U	0.239 U	0.717 U	0.527 U	0.467 U	1.21 U
PCB-037	2.19 J	0.354 U	0.444 U	2.06 J	1.34 J	0.957 J	1.29 J	3.08 J	2.93 J	55.7	4.19 U	3.33 J
PCB-038	0.480 U	0.341 U	0.427 U	0.520 U	0.344 U	0.274 U	0.311 U	0.252 U	0.755 U	0.555 U	0.491 U	0.737 U
PCB-039	0.436 U	0.310 U	0.388 U	0.472 U	0.326 U	0.259 U	0.294 U	0.239 U	0.715 U	0.525 U	0.466 U	0.982 U
Total Trichlorobiphenyls	7.74 J	1.87 J	3.26 J	37.2 J	2.38 J	1.92 J	24.4 J	46.4 J	13.0 J	1,930 J	18.0 J	69.9 J
PCB-040/041/071	2.62 J	0.426 J	0.263 U	3.64 J	0.534 U	0.454 U	20.2	5.70 J	2.93 U	133	6.96 J	14.6 J
PCB-042	0.961 J	0.264 J	0.399 U	1.71 J	0.542 U	0.461 U	12.0	3.68 J	2.07 J	73.7	3.32 J	7.10
PCB-043	0.345 U	0.340 U	0.283 U	0.243 U	0.561 U	0.475 U	1.13 J	0.342 U	0.975 U	11.4	0.504 U	0.395 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties											
	Duwamish Shipyard				Glacier Northwest					North Terminal 115		
Well ID	DSIP2-19	DSI-PZ-01	DSI-MW-06	DS-SW-1	MW-32S	MW-4S	MW-33S	GNW-SW-1	GNW-SW-1-F	MW-20	MW-3	MW-10
Relative Location at Site	Up	Center	Down	Surface	Up	Center	Down	Surface	Surface	Up	Center	Down
Sample Date	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/21/2017	3/21/2017	3/21/2017	3/21/2017	3/21/2017	3/17/2017	3/17/2017	3/17/2017
PCB Congeners (pg/L)												
PCB-044/047/065	6.79 J	3.97 J	9.47 J	11.4 J	4.68 J	4.17 J	146	13.2 J	9.22 U	235	31.7	41.9
PCB-045/051	0.432 U	0.481 U	0.374 U	0.421 U	0.439 U	0.470 U	9.35 J	3.38 J	0.843 U	179	8.47 J	13.6 U
PCB-046	0.485 U	0.541 U	0.421 U	0.473 U	0.515 U	0.551 U	4.26 J	0.430 U	0.988 U	42.0	0.704 U	4.04 U
PCB-048	0.836 J	0.298 U	0.332 U	1.40 J	0.480 U	0.406 U	2.90 J	1.99 J	0.834 U	30.7	1.98 J	3.15 J
PCB-049/069	1.56 U	0.626 U	0.861 U	5.87 J	0.396 U	2.65 J	64.5	8.64 J	3.98 J	135	12.4	18.1
PCB-050/053	0.408 U	0.455 U	0.354 U	1.48 U	0.432 U	0.462 U	16.2	1.87 U	0.829 U	143	2.26 U	11.9
PCB-052	3.82 J	1.91 U	2.61 U	12.8	1.83 J	6.45	429	19.1	10.0	318	29.8	44.5
PCB-054	0.327 U	0.364 U	0.284 U	0.319 U	0.329 U	0.352 U	0.282 U	0.275 U	0.631 U	3.59 U	0.449 U	0.412 U
PCB-055	0.284 U	0.274 U	0.238 U	0.320 U	0.413 U	0.340 U	0.424 U	0.372 U	0.698 U	0.555 U	0.887 U	0.437 U
PCB-056	2.42 U	0.281 U	0.243 U	2.75 U	0.431 U	0.355 U	7.62	3.86 U	2.32 J	38.3	7.62	5.59 U
PCB-057	0.259 U	0.262 U	0.228 U	0.307 U	0.414 U	0.346 U	0.415 U	0.368 U	0.647 U	0.541 U	0.531 U	0.431 U
PCB-058	0.239 U	0.242 U	0.210 U	0.284 U	0.347 U	0.290 U	30.4	0.309 U	0.543 U	3.85 U	4.38 J	0.362 U
PCB-059/062/075	0.677 U	0.225 U	0.331 U	1.01 U	0.376 U	0.319 U	3.07 U	1.21 J	0.600 U	35.0	3.22 J	3.44 J
PCB-060	1.67 J	0.269 U	0.233 U	1.39 J	1.14 U	0.334 U	2.37 U	1.49 U	0.686 U	8.32	3.53 U	2.73 U
PCB-061/070/074/076	6.71 U	1.13 U	0.212 U	11.4 U	2.64 U	2.81 U	95.2	13.7 U	6.29 J	97.9	28.1	20.4 U
PCB-063	0.229 U	0.232 U	0.202 U	0.272 U	0.347 U	0.290 U	0.711 U	0.309 U	0.543 U	1.70 U	0.445 U	0.903 U
PCB-064	1.56 U	0.293 U	0.628 U	2.93 U	0.366 U	3.02 J	22.9	4.57 J	2.15 J	81.9	5.64	10.6
PCB-066	3.97 U	0.678 U	0.244 U	5.98	1.15 U	1.35 U	34.7	9.01	3.48 J	81.7 U	16.9	12.3
PCB-067	0.230 U	0.233 U	0.202 U	0.273 U	0.376 U	0.315 U	0.378 U	0.335 U	0.589 U	2.83 J	0.483 U	0.723 J
PCB-068	0.862 J	0.590 U	1.27 U	0.274 U	0.359 U	0.665 U	2.48 U	0.319 U	0.562 U	1.27 U	2.92 U	2.58 U
PCB-072	0.239 U	0.243 U	0.211 U	0.285 U	0.399 U	0.334 U	1.03 J	0.355 U	0.625 U	0.773 J	0.899 J	0.988 J
PCB-073	0.240 U	0.237 U	0.197 U	0.169 U	0.376 U	0.318 U	0.526 U	0.229 U	0.653 U	0.450 U	0.337 U	0.265 U
PCB-077	1.07 J	0.280 U	0.230 U	1.04 J	1.29 U	0.323 U	0.411 U	0.362 U	0.547 U	6.96 U	3.80 U	2.42 U
PCB-078	0.334 U	0.323 U	0.280 U	0.377 U	0.440 U	0.363 U	0.452 U	0.397 U	0.744 U	0.592 U	0.575 U	0.465 U
PCB-079	0.251 U	0.243 U	0.210 U	0.283 U	0.337 U	0.278 U	1.30 U	0.304 U	0.570 U	0.454 U	0.440 U	1.58 U
PCB-080	0.258 U	0.250 U	0.216 U	0.291 U	0.339 U	0.279 U	0.348 U	0.305 U	0.572 U	0.455 U	0.442 U	0.358 U
PCB-081	0.292 U	0.295 U	0.254 U	0.348 U	0.468 U	0.372 U	0.452 U	0.406 U	0.635 U	0.602 U	0.581 U	0.487 U
Total Tetrachlorobiphenyls	18.6 J	4.66 J	9.47 J	45.2 J	6.51 J	16.3 J	897 J	70.5 J	30.3 J	1,570 J	161 J	169 J
PCB-082	0.717 U	0.779 U	0.647 U	1.44 J	1.29 U	1.08 U	69.9	1.68 U	1.52 U	9.07	5.28 U	4.72 J
PCB-083/099	1.57 U	2.39 J	0.571 U	7.76 J	0.954 U	2.99 J	312 J	12.4 J	1.18 U	34.7 J	39.0 J	48.7 J
PCB-084	1.83 J	0.591 U	0.494 U	3.20 J	0.880 U	0.748 U	321	6.60	1.12 U	34.6	11.4	15.2
PCB-085/116/117	8.02 J	3.39 J	0.466 U	1.45 U	0.849 U	0.709 U	82.8	2.19 J	2.47 J	8.43 J	12.2 U	8.43 J
PCB-086/087/097/109/119/125	2.27 U	0.563 U	0.468 U	8.50 J	0.828 U	0.691 U	404	11.2 J	0.974 U	35.4	73.9	29.2 J
PCB-088/091	1.17 J	0.537 U	0.448 U	2.21 J	0.736 U	0.625 U	103	2.95 J	0.934 U	16.7	7.41 J	8.22 J
PCB-089	0.670 U	0.675 U	0.588 U	0.517 U	1.04 U	0.866 U	4.81 J	0.918 U	1.28 U	3.19 J	1.17 U	0.853 U
PCB-090/101/113	4.95 U	4.10 J	0.457 U	13.3 J	0.776 U	6.24 J	630	20.8	4.97 J	46.5	74.1	82.1
PCB-092	1.07 J	0.691 U	0.517 U	2.78 J	0.874 U	0.730 U	125	4.14 J	1.08 U	12.1	11.1	15.3
PCB-093/098/100/102	0.454 U	0.502 U	0.419 U	0.373 U	0.732 U	0.622 U	17.9	0.652 U	0.929 U	5.84 U	0.819 U	1.56 J
PCB-094	0.498 U	0.551 U	0.461 U	0.410 U	0.830 U	0.705 U	2.68 J	0.739 U	1.05 U	0.958 U	0.928 U	0.407 U
PCB-095	8.40 U	1.98 J	1.16 J	10.3	0.702 U	6.86	964	17.8	5.50 U	90.4	117	67.2

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties											
	Duwamish Shipyard				Glacier Northwest					North Terminal 115		
Well ID	DSIP2-19	DSI-PZ-01	DSI-MW-06	DS-SW-1	MW-32S	MW-4S	MW-33S	GNW-SW-1	GNW-SW-1-F	MW-20	MW-3	MW-10
Relative Location at Site	Up	Center	Down	Surface	Up	Center	Down	Surface	Surface	Up	Center	Down
Sample Date	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/21/2017	3/21/2017	3/21/2017	3/21/2017	3/21/2017	3/17/2017	3/17/2017	3/17/2017
PCB Congeners (pg/L)												
PCB-096	0.142 U	0.211 U	0.109 U	0.162 U	0.248 U	0.204 U	7.06	0.108 U	0.249 U	1.95 U	0.221 U	0.663 U
PCB-103	0.408 U	0.451 U	0.377 U	0.336 U	0.684 U	0.581 U	4.50 U	0.610 U	0.869 U	0.701 U	1.59 U	1.73 J
PCB-104	0.124 U	0.184 U	0.0947 U	0.140 U	0.204 U	0.168 U	0.127 U	0.0889 U	0.204 U	0.164 U	0.182 U	0.147 U
PCB-105	1.26 U	0.198 U	0.166 U	4.61 U	1.02 U	0.840 U	71.2	4.59 U	0.338 U	8.16 U	18.0	15.2
PCB-106	0.291 U	0.244 U	0.207 U	0.339 U	0.341 U	0.412 U	0.331 U	0.430 U	0.417 U	0.412 U	0.646 U	0.465 U
PCB-107	0.254 U	0.213 U	0.180 U	0.296 U	0.308 U	0.373 U	14.9	1.08 J	0.376 U	1.68 J	3.44 J	4.38 J
PCB-108/124	0.414 J	0.246 U	0.209 U	0.342 U	0.349 U	0.421 U	11.5	0.777 U	0.426 U	0.421 U	2.68 U	4.64 U
PCB-110/115	0.493 U	0.537 U	0.446 U	18.2	0.725 U	8.86 J	695	23.4	2.78 J	95.7	66.6	48.9
PCB-111	0.424 U	0.462 U	0.383 U	0.353 U	0.701 U	0.586 U	0.652 U	0.623 U	0.825 U	0.733 U	0.806 U	0.574 U
PCB-112	0.439 U	0.443 U	0.386 U	0.339 U	0.659 U	0.551 U	0.603 U	0.584 U	0.813 U	0.681 U	0.742 U	0.543 U
PCB-114	0.248 U	0.208 U	0.174 U	0.286 U	0.287 U	0.331 U	3.52 J	0.327 U	0.345 U	0.465 U	0.727 U	1.36 J
PCB-118	1.58 U	2.48 J	0.181 U	9.91	0.330 U	2.05 J	245	12.1	2.80 J	16.8	45.7	82.6
PCB-120	0.401 U	0.436 U	0.362 U	0.334 U	0.627 U	0.523 U	0.583 U	0.557 U	0.737 U	0.655 U	0.720 U	0.513 U
PCB-121	0.437 U	0.440 U	0.384 U	0.337 U	0.670 U	0.560 U	0.613 U	0.593 U	0.826 U	0.693 U	0.754 U	0.552 U
PCB-122	0.300 U	0.252 U	0.210 U	0.347 U	0.347 U	0.399 U	3.01 U	0.394 U	0.417 U	0.561 U	0.878 U	0.454 U
PCB-123	0.279 U	0.235 U	0.199 U	0.326 U	0.344 U	0.415 U	2.48 J	0.433 U	0.419 U	0.414 U	0.650 U	1.78 J
PCB-126	0.252 U	0.226 U	0.182 U	0.304 U	0.778 U	0.292 U	0.227 U	0.293 U	0.276 U	1.09 U	1.29 U	1.31 J
PCB-127	0.212 U	0.213 U	0.174 U	0.272 U	0.264 U	0.290 U	0.229 U	0.300 U	0.296 U	0.326 U	0.478 U	0.336 U
Total Pentachlorobiphenyls	12.5 J	14.3 J	1.16 J	77.6 J	1.29 U	27.0 J	4,090 J	115 J	13.0 J	405 J	468 J	438 J
PCB-128/166	1.05 U	0.272 U	0.222 U	3.18 J	0.432 U	1.34 J	50.8	3.08 J	0.434 U	13.2	11.8	19.2
PCB-129/138/160/163	9.16 U	2.30 U	0.856 U	17.9 J	2.69 J	6.77 J	309	18.4 J	2.14 J	71.5	81.9	213
PCB-130	0.860 J	0.421 U	0.284 U	0.951 U	0.650 U	0.512 U	21.9	1.39 J	0.680 U	6.73	5.65	11.6
PCB-131	0.279 U	0.397 U	0.272 U	0.436 U	0.677 U	0.528 U	7.99	0.498 U	0.677 U	0.519 U	0.868 U	1.33 U
PCB-132	4.91 J	0.376 U	0.257 U	5.10	0.674 U	2.41 J	174	5.78 U	0.675 U	35.6	22.5	19.1
PCB-133	0.265 U	0.377 U	0.258 U	0.415 U	0.630 U	0.491 U	4.21 J	0.463 U	0.630 U	1.42 J	1.40 U	2.04 J
PCB-134/143	0.617 J	0.396 U	0.271 U	0.528 U	0.674 U	0.525 U	29.8	0.495 U	0.674 U	4.87 J	3.83 J	2.26 J
PCB-135/151	8.94 J	0.193 U	0.189 U	4.70 U	0.230 U	3.10 J	115	5.87 J	0.322 U	28.4	19.0	24.8
PCB-136	3.04 J	0.145 U	0.142 U	2.19 J	0.175 U	1.53 J	88.1	2.61 J	0.244 U	12.2	7.28	9.93
PCB-137	0.378 J	0.724 J	0.226 U	0.903 J	0.550 U	0.441 U	17.0	0.511 U	0.576 U	3.33 J	3.60 U	11.8
PCB-139/140	0.247 U	0.351 U	0.240 U	0.397 J	0.579 U	0.452 U	8.31 J	0.426 U	0.580 U	1.87 U	3.32 J	0.902 J
PCB-141	2.30 U	0.671 U	0.248 U	3.35 J	0.571 U	1.84 J	39.8	3.05 J	0.598 U	11.3	12.0	46.6
PCB-142	0.296 U	0.420 U	0.288 U	0.462 U	0.686 U	0.535 U	0.405 U	0.504 U	0.686 U	0.526 U	0.880 U	1.34 U
PCB-144	0.868 J	0.186 U	0.182 U	0.240 U	0.217 U	0.246 U	16.8	0.754 J	0.303 U	3.43 J	18.7	3.34 J
PCB-145	0.251 U	0.152 U	0.149 U	0.196 U	0.184 U	0.209 U	0.191 U	0.250 U	0.258 U	0.271 U	0.307 U	0.246 U
PCB-146	2.32 J	0.313 U	0.235 U	2.31 U	0.565 U	1.56 J	33.6	2.86 J	0.565 U	12.4	10.8	25.9
PCB-147/149	16.2	1.23 U	0.671 J	12.7	1.67 J	6.95 J	312	12.5	1.98 J	77.4	61.2	54.2
PCB-148	0.326 U	0.197 U	0.193 U	0.254 U	0.242 U	0.275 U	0.250 U	0.329 U	0.338 U	0.356 U	0.403 U	0.322 U
PCB-150	0.235 U	0.143 U	0.140 U	0.184 U	0.176 U	0.199 U	0.584 J	0.238 U	0.245 U	0.258 U	0.292 U	0.234 U
PCB-152	0.239 U	0.145 U	0.142 U	0.186 U	0.174 U	0.198 U	0.943 J	0.236 U	0.243 U	0.256 U	0.290 U	0.232 U
PCB-153/168	12.9	3.34 U	0.994 U	14.3	1.04 U	5.02 U	185	14.5	2.36 U	44.8	64.2	330

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties											
	Duwamish Shipyard				Glacier Northwest					North Terminal 115		
Well ID	DSIP2-19	DSI-PZ-01	DSI-MW-06	DS-SW-1	MW-32S	MW-4S	MW-33S	GNW-SW-1	GNW-SW-1-F	MW-20	MW-3	MW-10
Relative Location at Site	Up	Center	Down	Surface	Up	Center	Down	Surface	Surface	Up	Center	Down
Sample Date	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/21/2017	3/21/2017	3/21/2017	3/21/2017	3/21/2017	3/17/2017	3/17/2017	3/17/2017
PCB Congeners (pg/L)												
PCB-154	0.284 U	0.172 U	0.168 U	0.222 U	0.200 U	0.228 U	1.84 J	0.272 U	0.280 U	0.866 J	1.47 J	0.892 U
PCB-155	0.225 U	0.137 U	0.134 U	0.176 U	0.161 U	0.183 U	0.166 U	0.219 U	0.225 U	0.237 U	0.268 U	0.214 U
PCB-156/157	1.04 U	0.632 U	0.174 U	2.24 U	1.14 J	0.827 U	16.8	2.00 J	0.262 U	3.96 J	7.12 J	25.2
PCB-158	0.875 J	0.161 U	0.156 U	1.56 J	0.347 U	0.556 U	26.1	1.24 U	0.349 U	5.77	8.09	5.86
PCB-159	0.331 J	0.125 U	0.0940 U	0.290 U	0.411 J	0.161 U	0.170 U	0.127 U	0.195 U	0.773 J	0.587 U	0.327 U
PCB-161	0.188 U	0.267 U	0.183 U	0.294 U	0.454 U	0.354 U	0.268 U	0.334 U	0.455 U	0.348 U	0.583 U	0.890 U
PCB-162	0.133 U	0.136 U	0.104 U	0.130 U	0.495 U	0.185 U	0.494 U	0.149 U	0.177 U	0.239 U	0.682 U	1.11 U
PCB-164	0.876 U	0.266 U	0.180 U	1.03 U	0.414 U	0.465 U	16.9	1.28 J	0.433 U	6.54	4.13 U	5.26
PCB-165	0.205 U	0.291 U	0.199 U	0.320 U	0.467 U	0.364 U	0.275 U	0.343 U	0.467 U	0.357 U	0.599 U	0.914 U
PCB-167	0.474 J	0.356 U	0.107 U	0.799 J	0.704 U	0.463 U	5.12 U	0.547 U	0.206 U	2.42 U	2.41 U	13.5
PCB-169	0.308 U	0.310 U	0.242 U	0.311 U	0.888 U	0.277 U	0.284 U	0.211 U	0.283 U	0.995 U	0.684 U	1.16 U
Total Hexachlorobiphenyls	52.7 J	0.724 J	0.671 J	62.4 J	5.91 J	25.5 J	1,480 J	68.3 J	4.12 J	344 J	339 J	824 J
PCB-170	3.61 U	0.522 U	0.503 U	4.57 J	0.503 U	1.61 J	6.27	3.14 J	0.397 U	15.6	9.69	45.7
PCB-171/173	1.04 J	0.317 U	0.319 U	1.20 U	0.519 U	0.384 U	3.94 J	0.460 U	0.416 U	5.01 U	4.33 U	5.78 J
PCB-172	1.16 J	0.390 U	0.392 U	0.310 U	0.452 U	0.335 U	1.28 J	0.659 J	0.363 U	2.69 J	2.74 U	4.77 J
PCB-174	4.26 U	0.239 U	0.240 U	4.50 U	0.432 U	1.94 J	10.0 U	2.97 J	0.347 U	20.3	13.8	12.9
PCB-175	6.08	0.429 J	0.163 U	7.27	0.413 U	0.299 U	0.431 J	0.448 U	0.336 U	0.725 U	0.632 U	0.511 U
PCB-176	0.557 U	0.171 U	0.105 U	0.322 U	0.298 U	0.216 U	1.52 J	0.324 U	0.243 U	2.34 J	2.21 J	1.93 J
PCB-177	2.29 J	0.276 U	0.278 U	3.61 J	0.491 U	0.364 U	5.92	1.77 J	0.394 U	10.3	7.16	10.1
PCB-178	1.41 U	0.246 U	0.151 U	1.02 J	0.418 U	0.303 U	1.65 U	0.471 U	0.340 U	3.43 U	4.96 J	2.74 U
PCB-179	1.73 U	0.186 U	0.114 U	2.45 J	0.319 U	0.231 U	4.43 U	1.05 U	0.259 U	8.88	7.95	4.29 U
PCB-180/193	11.4	1.74 J	1.32 J	10.8	1.02 J	3.32 J	10.7 J	6.42 J	0.311 U	35.5	29.3	135
PCB-181	0.157 U	0.274 U	0.276 U	0.218 U	0.459 U	0.340 U	0.548 U	0.407 U	0.368 U	0.512 U	0.495 U	0.362 U
PCB-182	0.177 U	0.262 U	0.161 U	0.224 U	0.397 U	0.287 U	0.282 U	0.431 U	0.323 U	0.512 U	0.608 U	0.515 U
PCB-183/185	2.60 J	0.205 U	0.206 U	2.54 U	0.359 U	1.23 J	5.94 U	2.15 J	0.288 U	12.2	18.8 U	11.3
PCB-184	0.127 U	0.188 U	0.115 U	0.161 U	0.334 U	0.242 U	0.237 U	0.363 U	0.272 U	0.430 U	0.511 U	0.432 U
PCB-186	0.116 U	0.171 U	0.105 U	0.147 U	0.299 U	0.217 U	0.212 U	0.325 U	0.243 U	0.386 U	0.458 U	0.388 U
PCB-187	0.177 U	0.262 U	0.161 U	0.224 U	0.403 U	2.85 J	8.74	3.97 J	0.328 U	24.8	27.1	19.0 U
PCB-188	0.115 U	0.171 U	0.105 U	0.146 U	0.312 U	0.226 U	0.221 U	0.339 U	0.254 U	0.402 U	0.477 U	0.404 U
PCB-189	0.231 U	0.192 U	0.216 U	0.340 U	0.716 U	0.221 U	0.227 U	0.164 U	0.267 U	0.888 U	0.536 U	2.91 J
PCB-190	0.792 U	0.372 U	0.359 U	1.03 J	0.345 U	0.257 U	1.51 J	0.409 J	0.272 U	2.29 U	2.33 U	4.57 J
PCB-191	0.195 U	0.341 U	0.344 U	0.272 U	0.343 U	0.254 U	0.678 J	0.273 U	0.275 U	0.872 U	0.757 U	1.27 J
PCB-192	0.190 U	0.332 U	0.334 U	0.264 U	0.363 U	0.269 U	0.434 U	0.322 U	0.291 U	0.405 U	0.392 U	0.286 U
Total Heptachlorobiphenyls	24.6 J	2.17 J	1.32 J	30.8 J	1.02 J	11.0 J	41.0 J	21.5 J	0.416 U	133 J	102 J	236 J
PCB-194	2.56 U	1.18 U	0.279 U	3.01 U	0.604 U	1.13 U	1.84 U	1.64 U	0.248 U	8.77	7.97 U	11.7
PCB-195	1.06 J	0.334 U	0.291 U	0.416 U	0.336 U	0.378 U	0.293 U	0.487 U	0.273 U	3.24 J	2.81 J	2.83 U
PCB-196	1.25 U	0.372 U	0.331 U	1.21 U	0.466 U	0.419 U	0.873 J	0.617 J	0.238 U	4.18 U	5.48	2.70 J
PCB-197	0.113 U	0.206 U	0.183 U	0.234 U	0.309 U	0.278 U	0.202 U	0.258 U	0.158 U	1.32 U	0.936 U	0.413 U
PCB-198/199	3.22 J	0.385 U	0.342 U	3.44 U	0.474 U	1.23 U	1.53 J	1.73 U	0.242 U	12.9	16.5	5.33 U
PCB-200	0.134 U	0.244 U	0.217 U	0.277 U	0.337 U	0.303 U	0.220 U	0.281 U	0.172 U	0.309 U	1.50 U	0.450 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties											
	Duwamish Shipyard				Glacier Northwest					North Terminal 115		
Well ID	**DSIP2-19**	**DSI-PZ-01**	**DSI-MW-06**	**DS-SW-1**	**MW-32S**	**MW-4S**	**MW-33S**	**GNW-SW-1**	**GNW-SW-1-F**	**MW-20**	**MW-3**	**MW-10**
Relative Location at Site	**Up**	**Center**	**Down**	**Surface**	**Up**	**Center**	**Down**	**Surface**	**Surface**	**Up**	**Center**	**Down**
Sample Date	**3/14/2017**	**3/14/2017**	**3/14/2017**	**3/14/2017**	**3/21/2017**	**3/21/2017**	**3/21/2017**	**3/21/2017**	**3/21/2017**	**3/17/2017**	**3/17/2017**	**3/17/2017**
PCB Congeners (pg/L)												
PCB-201	0.101 U	0.184 U	0.163 U	0.209 U	0.344 U	0.309 U	0.225 U	0.287 U	0.176 U	2.05 J	2.78 J	1.45 U
PCB-202	0.443 U	0.166 U	0.147 U	1.08 J	0.371 U	0.737 J	0.242 U	1.02 J	0.189 U	3.04 J	5.31 J	2.00 J
PCB-203	0.209 U	0.380 U	0.338 U	1.33 U	0.465 U	0.418 U	1.14 J	0.786 U	0.237 U	7.77 U	12.4	3.83 J
PCB-204	0.125 U	0.228 U	0.202 U	0.259 U	0.346 U	0.311 U	0.226 U	0.289 U	0.177 U	0.318 U	0.426 U	0.462 U
PCB-205	0.470 U	0.256 U	0.223 U	0.319 U	0.246 U	0.276 U	0.214 U	0.169 U	0.200 U	0.344 U	0.405 U	0.970 J
Total Octachlorobiphenyl	4.28 J	1.18 U	0.342 U	1.08 J	0.604 U	0.737 J	3.54 J	1.64 J	0.273 U	30.0 J	45.3 J	21.2 J
PCB-206	1.07 U	1.15 U	1.10 U	1.30 U	0.988 U	1.08 U	1.15 U	1.24 U	1.51 U	5.95	6.83	1.10 U
PCB-207	0.499 U	0.532 U	0.442 U	0.568 U	0.446 U	0.456 U	0.460 U	0.446 U	0.666 U	0.375 U	1.04 U	0.504 U
PCB-208	0.511 U	0.544 U	0.452 U	0.581 U	0.455 U	0.466 U	0.469 U	0.455 U	0.680 U	1.54 U	0.570 U	0.514 U
Total Nonachlorobiphenyl	1.07 U	1.15 U	1.10 U	1.30 U	0.988 U	1.08 U	1.15 U	1.24 U	1.51 U	5.95	6.83	1.10 U
PCB-209	0.604 U	0.500 U	0.372 U	0.789 U	0.572 U	1.48 J	0.323 U	0.765 J	0.253 U	1.22 U	0.832 U	0.513 U
Total Decachlorobiphenyl	0.604 U	0.500 U	0.372 U	0.789 U	0.572 U	1.48 J	0.323 U	0.765 J	0.253 U	1.22 U	0.832 U	0.513 U
Total PCB Congeners (pg/L)	139 J	34.3 J	28.4 J	275 J	15.8 J	83.9 J	6,550 J	468 J	60.4 J	4,640 J	1,190 J	1,760 J
Total PCB Congeners (ug/L)	0.000139 J	0.0000343 J	0.0000284 J	0.000275 J	0.0000158 J	0.0000839 J	0.00655 J	0.000468 J	0.0000604 J	0.00464 J	0.00119 J	0.00176 J
PCB Congener TEQ (ug/L)	0.0175	0.0161	0.0128	0.0205	0.0524	0.0189	0.0259	0.0184	0.0183	0.0707	0.0772	0.153
PCB Aroclors (ug/L)												
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	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	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	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	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	0.010 U
Aroclor 1254	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.0080 J	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	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	0.010 U
Aroclor 1268	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	0.010 U
Total PCB Aroclors	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.0080 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties												
	Douglas Management Dock					Industrial Container Services				Duwamish Marine Center			
Well ID	MW-11	MW-17	MW-17-F	MW-15	DMD-SW-1	DOF-MW3	DOF-MW1	DOF-MW1-F	SA-MW2	MW-10	MW-8	MW-16	DMC-SW-1
Relative Location at Site	Up	Center	Center	Down	Surface	Up	Center	Center	Down	Up	Center	Down	Surface
Sample Date	3/30/2017	3/30/2017	3/30/2017	3/30/2017	3/30/2017	3/29/2017	3/29/2017	3/29/2017	3/29/2017	3/13/2017	3/13/2017	3/13/2017	3/13/2017
PCB Congeners (pg/L)													
PCB-001	0.296 U	165	131	33.5	1.36 U	0.266 U	2.47 J	4.75 U	988	0.559 U	0.397 U	319	12.2
PCB-002	0.315 U	6.67	5.78	0.641 U	0.279 U	1.09 U	0.333 U	0.875 U	26.6	0.526 U	0.457 U	33.1	0.847 U
PCB-003	0.336 U	33.2	26.3	3.53 J	0.298 U	0.289 U	0.356 U	0.935 U	153	0.525 U	0.455 U	93.2	0.845 U
Total Monochlorobiphenyls	0.336 U	205	163	37.0 J	1.36 U	1.09 U	2.47 J	4.75 U	1,170	0.559 U	0.457 U	445	12.2
PCB-004	0.986 U	529	384	61.5	0.658 U	0.973 U	195	159	4,080	1.11 U	0.996 U	1,350	121
PCB-005	0.804 U	8.61	5.28 J	1.95 J	0.579 U	0.958 U	0.946 U	0.756 U	34.3	1.05 U	0.933 U	25.2	1.64 U
PCB-006	0.845 U	169	101	43.9	2.72 J	1.01 U	7.33	4.47 J	1,690	1.09 U	0.970 U	569	71.3
PCB-007	0.759 U	17.9	11.2	3.15 J	0.547 U	0.904 U	0.893 U	0.713 U	73.0	0.985 U	0.874 U	42.2	1.54 U
PCB-008	0.822 U	864	564 J	57.6	8.07	4.47 J	39.2	36.9 J	3,480	1.06 U	3.12 U	989	104
PCB-009	0.869 U	38.2	26.2	5.58	0.626 U	1.04 U	2.11 J	1.68 U	176	1.13 U	1.01 U	78.3	1.77 U
PCB-010	0.604 U	14.7	11.4	3.43 U	0.403 U	0.596 U	6.97	4.11 U	104	0.705 U	0.630 U	67.2	1.21 U
PCB-011	8.93	11.9	7.79 U	8.59	11.3	34.6	13.4	8.02	46.1	6.66	7.63 U	22.9	10.4
PCB-012/013	0.753 U	17.3	9.38 J	2.62 J	0.515 U	0.947 U	0.773 U	4.35 J	130	0.993 U	0.974 U	106	12.2
PCB-014	0.588 U	0.420 U	0.342 U	0.301 U	0.402 U	0.739 U	0.603 U	0.525 U	0.386 U	0.803 U	0.788 U	0.322 U	1.35 U
PCB-015	0.712 U	97.9	52.2	8.67	3.09 J	0.895 U	409	235	437	0.911 U	0.894 U	286	36.6
Total Dichlorobiphenyls	8.93	1,770	1,160 J	194 J	25.2 J	39.1 J	673 J	448 J	10,300	6.66	7.63 U	3,540	356
PCB-016	0.373 U	914	453	66.9	3.85 J	4.23 J	2,120	1,200	2,800	0.363 U	3.65 J	725	32.8
PCB-017	1.02 U	806	406	69.0	4.46 J	3.34 U	1,600	911	2,710	0.268 U	2.63 U	589	69.0
PCB-018/030	1.78 U	2,310	1,310	182	8.37	6.48	4,350	2,770	6,740	0.872 J	6.55	1,400	136
PCB-019	0.364 U	270	167	28.6	2.11 J	1.09 J	944	619	1,070	0.378 U	14.4	330	31.7
PCB-020/028	3.03 U	1,370	502	77.7	14.6	10.2 J	2,940	1,220	3,540	1.14 U	7.02 U	758	136
PCB-021/033	0.198 U	756	268	27.2	5.26 J	6.56 J	209	57.7	1,390	0.764 U	2.91 U	319	44.9
PCB-022	0.619 J	475	215	23.6	4.82 J	4.74 J	124	60.4	1,150	0.610 J	2.49 J	259	28.3
PCB-023	0.205 U	0.559 U	0.341 U	0.149 U	0.239 U	0.238 U	0.363 U	0.445 U	2.56 U	0.183 U	0.179 U	1.25 J	0.302 U
PCB-024	0.221 U	9.29	5.24 J	1.54 J	0.259 U	0.241 U	1.33 J	0.464 U	51.1	0.203 U	0.208 U	17.3	1.16 U
PCB-025	0.216 U	80.7	33.9	32.9	2.46 J	0.880 J	44.2	31.6	734	0.177 U	1.53 U	116	22.9
PCB-026/029	0.191 U	247	101	93.9	3.74 J	2.06 J	277	131	1,270	0.172 U	1.48 J	233	38.0
PCB-027	0.204 U	86.9	48.9	13.2	1.25 J	0.222 U	286	163	331	0.188 U	2.36 J	125	17.2
PCB-031	1.81 U	1,530	636	86.5	12.4	8.72	1,490	702	3,670	0.920 U	4.93 J	683	113
PCB-032	1.14 U	506	234	39.8	3.37 J	2.57 J	1,410	751	1,500	0.613 U	4.60 J	288	46.7
PCB-034	0.198 U	9.57	4.14 J	1.23 J	0.230 U	0.230 U	5.66	3.06 J	30.6	0.174 U	0.170 U	7.67	0.287 U
PCB-035	0.403 U	3.91 J	0.686 U	0.494 U	0.488 U	0.426 U	6.77	1.12 U	11.2	0.328 U	0.388 U	7.42 U	3.24 U
PCB-036	0.315 U	2.52 J	0.537 U	0.387 U	0.375 U	0.334 U	8.01	0.876 U	6.51	0.289 U	0.342 U	11.6	0.814 U
PCB-037	0.628 J	125	33.7	5.57	3.08 J	2.55 U	366	117	261	0.308 U	3.85 J	114	27.2
PCB-038	0.332 U	1.05 J	0.566 U	0.407 U	0.394 U	0.352 U	2.46 J	2.00 U	0.499 U	0.296 U	0.351 U	1.50 J	0.835 U
PCB-039	0.315 U	9.09	4.91 J	0.386 U	0.374 U	0.333 U	25.2	14.8	19.8	0.269 U	0.318 U	4.65 J	0.758 U
Total Trichlorobiphenyls	1.25 J	9,510 J	4,420 J	750 J	69.8 J	47.5 J	16,200 J	8,750 J	27,300	1.48 J	44.3 J	5,980 J	744
PCB-040/041/071	3.35 J	1,050	239	64.2	8.50 J	4.85 J	3,420	731	1,650	0.247 U	10.0 J	269	53.7
PCB-042	1.57 U	461	90.0	33.7	4.16 J	2.03 J	1,450	278	813	0.252 U	5.61	123	22.3
PCB-043	0.898 U	63.5	19.0	4.02 J	0.391 U	0.371 U	236	65.9	93.8	0.261 U	0.295 U	21.6	2.55 J

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties												
	Douglas Management Dock					Industrial Container Services				Duwamish Marine Center			
Well ID	**MW-11**	**MW-17**	**MW-17-F**	**MW-15**	**DMD-SW-1**	**DOF-MW3**	**DOF-MW1**	**DOF-MW1-F**	**SA-MW2**	**MW-10**	**MW-8**	**MW-16**	**DMC-SW-1**
Relative Location at Site	**Up**	**Center**	**Center**	**Down**	**Surface**	**Up**	**Center**	**Center**	**Down**	**Up**	**Center**	**Down**	**Surface**
Sample Date	**3/30/2017**	**3/30/2017**	**3/30/2017**	**3/30/2017**	**3/30/2017**	**3/29/2017**	**3/29/2017**	**3/29/2017**	**3/29/2017**	**3/13/2017**	**3/13/2017**	**3/13/2017**	**3/13/2017**
PCB Congeners (pg/L)													
PCB-044/047/065	16.6	2,030	500	192	18.4	16.1	6,090	1,630	3,000	5.01 J	23.7	478	83.9
PCB-045/051	2.12 U	534	193	54.9	3.62 J	2.67 U	1,940	649	987	0.405 U	22.8	193	25.7
PCB-046	0.547 U	190	69.9	21.4	1.68 U	0.435 U	667	213	354	0.455 U	12.0	74.5	7.57
PCB-048	0.981 J	379	95.4	14.8	2.46 J	2.23 J	1,090	301	507	0.229 U	1.85 J	87.3	16.6
PCB-049/069	13.1	1,190	288	165	11.7	3.75 J	3,280	896	2,000	1.07 U	7.91 J	269	56.4
PCB-050/053	2.74 U	464	170	51.9	3.21 J	0.941 U	1,610	549	858	0.383 U	27.3	160	25.1
PCB-052	82.6	3,040	884	485	25.3	7.31	8,820	2,930	3,930	2.15 U	20.7	627	104
PCB-054	0.349 U	7.37	4.45 J	0.882 U	0.259 U	0.278 U	18.4	8.42	9.94	0.307 U	0.427 U	4.12 J	0.486 U
PCB-055	0.373 U	10.5	0.602 U	0.751 U	0.274 U	0.403 U	13.0	1.04 U	11.6	0.251 U	0.364 U	3.49 J	1.55 U
PCB-056	2.35 U	555	70.1	13.9	6.06	3.47 J	1,250	181	642	0.500 U	2.59 U	91.1	24.1
PCB-057	0.372 U	5.62	1.13 J	1.47 J	0.283 U	0.412 U	4.01 J	1.08 U	9.94	0.233 U	0.349 U	2.33 J	0.426 U
PCB-058	4.92 J	43.9	0.891 J	0.218 U	1.14 J	0.345 U	351	0.908 U	0.293 U	0.216 U	0.323 U	1.19 J	0.394 U
PCB-059/062/075	0.709 U	125	37.2	20.9	1.74 J	0.725 J	323	92.1	218	0.182 U	2.61 J	55.5	10.1 J
PCB-060	0.366 U	186	25.6	4.16 J	2.60 J	1.70 U	260	41.3	146	0.246 U	1.21 J	31.1	9.49
PCB-061/070/074/076	22.5	2,110	335	58.5	21.4	10.2 J	4,600	948	2,060	1.97 U	9.07 U	331	91.9
PCB-063	0.312 U	39.5	7.74	2.06 J	0.237 U	0.345 U	28.4	6.00	42.0	0.207 U	0.309 U	9.16	2.08 J
PCB-064	11.7	817	164	43.0	6.24	2.76 J	1,800	398	1,120	0.183 U	3.86 J	158	33.0
PCB-066	7.13	1,140	128	29.1	13.2	5.79	2,930	444	1,400	0.258 U	5.36	183	59.4
PCB-067	0.338 U	25.5	5.54	2.82 J	0.480 J	0.374 U	36.6	9.55	38.1	0.207 U	0.310 U	8.16	3.04 J
PCB-068	0.323 U	7.82	1.97 J	2.66 J	0.715 J	1.69 J	8.69	0.939 U	16.2	0.672 U	1.38 J	2.11 J	0.381 U
PCB-072	0.359 U	17.7	4.21 J	4.46 J	0.273 U	0.397 U	15.3	4.98 J	34.2	0.216 U	0.219 U	3.64 J	0.395 U
PCB-073	0.601 U	0.166 U	0.509 U	0.167 U	0.261 U	0.248 U	0.944 U	0.397 U	0.289 U	0.182 U	0.205 U	0.199 U	0.268 U
PCB-077	0.357 U	47.5	5.32 J	1.11 J	1.17 J	0.359 U	107	17.1	45.3	0.234 U	0.984 J	12.7	6.30
PCB-078	0.398 U	0.493 U	0.641 U	0.248 U	0.292 U	0.429 U	0.837 U	1.11 U	0.434 U	0.295 U	0.429 U	0.226 U	0.537 U
PCB-079	0.305 U	4.56 J	0.491 U	0.162 J	0.224 U	0.329 U	0.642 U	0.867 U	9.55	0.222 U	0.629 J	2.71 J	0.403 U
PCB-080	0.958 U	0.379 U	0.493 U	0.190 U	0.225 U	0.330 U	0.644 U	0.856 U	0.334 U	0.228 U	0.331 U	0.175 U	0.415 U
PCB-081	0.411 U	1.56 J	0.526 U	0.299 U	0.292 U	0.321 U	0.869 U	0.938 U	0.482 U	0.254 U	0.261 U	0.965 U	0.488 U
Total Tetrachlorobiphenyls	163 J	14,500 J	3,340 J	1,270 J	132 J	60.9 J	40,300 J	10,400 J	20,000	5.01 J	148 J	3,200 J	637 J
PCB-082	4.72 J	145	9.94	5.78	2.45 U	1.04 U	294	24.6 U	108	0.803 U	3.09 J	23.3	6.05 U
PCB-083/099	57.4	698	45.7	42.2	16.5	0.805 U	1,050	134	533	5.28 J	17.1	94.4	21.8
PCB-084	14.6	439	48.7	50.5	7.52	0.777 U	926	105	410	1.85 J	25.0	94.1	12.6
PCB-085/116/117	19.3	185	9.51 J	4.19 J	4.22 J	3.16 J	276	23.2	121	1.44 J	2.59 U	25.7	7.11 J
PCB-086/087/097/109/119/125	42.5	720	46.5	40.0	16.8 J	0.669 U	1,900	185	487	3.39 J	14.7 J	114	26.3 J
PCB-088/091	18.8	212	18.4	25.1	3.37 J	0.650 U	344	33.6 U	187	0.959 U	12.0	40.3	9.05 J
PCB-089	0.959 U	23.5	2.44 U	1.03 J	0.749 U	0.874 U	55.7	4.49 U	28.8	0.715 U	0.799 U	4.72 J	0.873 U
PCB-090/101/113	110	1,310	112	85.1	26.5	3.50 J	9,970	1,410	902	4.81 J	28.6	173	36.1
PCB-092	24.6	228	19.8	26.7	4.68 J	0.737 U	1,080	160	213	0.628 U	9.07	39.8	7.51
PCB-093/098/100/102	2.16 U	57.7	8.48	5.13	0.779 J	0.646 U	101	17.7	57.8	0.515 U	3.17 J	14.7	3.78 J
PCB-094	0.821 U	7.70	1.10 J	0.782 J	0.654 U	0.733 U	18.1	2.92 U	8.06 U	0.566 U	0.442 U	2.29 J	0.686 U
PCB-095	135	1,350	167	173	22.8	3.38 J	10,200	1,480	1,170	4.71 J	96.9	253	32.8

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Well ID	MW-11	MW-17	MW-17-F	MW-15	DMD-SW-1	DOF-MW3	DOF-MW1	DOF-MW1-F	SA-MW2	MW-10	MW-8	MW-16	DMC-SW-1
Relative Location at Site	Up	Center	Center	Down	Surface	Up	Center	Center	Down	Up	Center	Down	Surface
Sample Date	3/30/2017	3/30/2017	3/30/2017	3/30/2017	3/30/2017	3/29/2017	3/29/2017	3/29/2017	3/29/2017	3/13/2017	3/13/2017	3/13/2017	3/13/2017
PCB Congeners (pg/L)													
PCB-096	1.07 J	19.1	3.24 J	2.29 J	0.208 U	0.185 U	42.4	7.70	19.9	0.147 U	1.28 U	4.57 J	0.301 U
PCB-103	0.677 U	21.3	2.34 J	4.50 J	0.460 J	0.604 U	43.8	8.18	23.6	0.463 U	0.571 U	3.32 J	0.561 U
PCB-104	0.142 U	0.301 J	0.159 U	0.0788 U	0.139 U	0.152 U	0.142 U	0.291 U	0.125 U	0.128 U	0.127 U	0.0946 U	0.262 U
PCB-105	10.7	269	9.41	5.33	8.24	0.768 U	416	31.3	123	1.23 U	2.27 U	25.9	11.5
PCB-106	0.347 U	0.603 U	0.410 U	0.235 U	0.285 U	0.306 U	0.469 U	1.95 U	0.634 U	0.269 U	0.296 U	0.263 U	0.674 U
PCB-107	1.98 U	50.5	2.77 J	2.33 J	1.64 J	0.276 U	67.6	4.93 U	34.9	0.235 U	0.472 J	5.84	2.32 J
PCB-108/124	1.65 J	24.3	1.60 J	1.15 J	0.856 J	0.312 U	41.9	4.93 J	14.3	0.497 U	0.680 U	3.85 J	1.97 J
PCB-110/115	131	1,320	89.8	84.0	31.1	0.586 U	4,740	417	919	10.3	41.4	228	43.7
PCB-111	0.648 U	0.737 U	1.60 U	0.315 U	0.500 U	0.567 U	0.827 U	2.34 U	1.32 J	0.476 U	0.541 U	0.312 U	0.600 U
PCB-112	0.610 U	3.97 J	1.55 U	0.247 U	0.477 U	0.556 U	36.4	2.34 U	0.522 U	0.469 U	0.524 U	0.295 U	0.572 U
PCB-114	0.278 U	18.0	0.870 J	0.182 U	0.192 U	0.229 U	21.6	2.04 J	6.90	0.223 U	0.249 U	1.49 U	0.574 U
PCB-118	34.9	728	30.7	21.5	20.0	1.59 J	1,430	163	370	3.04 J	4.91 J	71.1	28.1
PCB-120	0.579 U	3.72 J	1.43 U	0.281 U	0.446 U	0.507 U	84.4	2.09 U	3.13 U	0.449 U	0.511 U	0.485 J	0.567 U
PCB-121	0.620 U	0.671 U	1.58 U	0.251 U	0.484 U	0.565 U	0.702 U	2.38 U	0.531 U	0.466 U	0.521 U	0.294 U	0.569 U
PCB-122	0.335 U	7.94	0.405 U	0.220 U	0.232 U	0.277 U	13.0	1.13 J	5.39	0.270 U	0.301 U	1.59 J	0.694 U
PCB-123	0.688 U	10.9	0.412 U	0.401 J	0.287 U	0.308 U	17.4	1.50 U	5.07 J	0.366 J	0.278 U	2.07 J	1.04 J
PCB-126	0.211 U	0.401 U	0.268 U	0.173 U	0.182 U	0.202 U	1.11 J	1.14 U	0.508 U	0.227 U	0.260 U	0.774 U	0.596 U
PCB-127	0.221 U	0.396 U	0.266 U	0.172 U	0.187 U	0.203 U	0.311 U	1.19 U	0.505 U	0.209 U	0.236 U	0.213 U	0.556 U
Total Pentachlorobiphenyls	606 J	7,850 J	628 J	581 J	165 J	11.6 J	33,200 J	4,150 J	5,740 J	35.2 J	256 J	1,230 J	246 J
PCB-128/166	9.58 J	112	1.62 U	2.53 J	5.22 J	0.258 U	601	20.3	62.0	2.08 J	6.80 J	10.3	5.29 U
PCB-129/138/160/163	81.0	1,010	18.0 J	24.8	33.2	2.81 U	10,500	522	588	17.6 J	64.0	72.0	29.2
PCB-130	4.12 J	52.9	1.83 U	1.90 J	2.20 J	0.406 U	281	14.1	35.8	1.37 J	3.35 J	5.27	2.08 U
PCB-131	0.388 U	9.68	1.67 U	0.760 U	0.442 U	0.432 U	56.2	1.97 J	6.25	0.232 U	0.905 U	1.36 U	0.583 U
PCB-132	24.3	327	8.35	14.0	9.79	0.832 U	3,670	120	255	2.92 J	32.3	34.4	10.8
PCB-133	1.28 J	16.4	0.592 U	1.37 J	0.761 J	0.402 U	117	6.79	11.8	0.343 U	1.90 J	1.31 U	0.474 U
PCB-134/143	4.25 U	44.7	1.35 J	2.44 J	1.39 J	0.429 U	445	14.9	33.8	0.244 U	5.48 J	6.43 J	0.581 U
PCB-135/151	44.1	449	19.2	17.6	12.7	1.65 U	9,940	525	292	4.25 J	75.3	40.3	10.9
PCB-136	17.5	184	7.92	11.3	4.27 J	0.625 U	3,520	143	129	1.78 J	36.4	20.2	4.38 J
PCB-137	2.38 U	29.3	2.80 J	0.880 U	1.11 J	0.343 U	1.52 UJ	7.01 J	13.1	0.196 U	3.07 J	3.60 J	1.74 J
PCB-139/140	0.332 U	13.9	1.43 U	0.640 J	0.697 J	0.369 U	11.4	0.890 U	10.8	0.205 U	0.750 J	1.57 J	0.516 U
PCB-141	16.2	208	5.95 U	8.00	5.68	1.05 U	4,050	423	124	3.23 J	16.8	15.4	5.72
PCB-142	0.394 U	0.441 U	1.69 U	0.771 U	0.448 U	0.437 U	1.77 U	1.05 U	0.620 U	0.246 U	0.246 U	0.178 U	0.618 U
PCB-144	4.78 J	52.8	2.07 J	1.45 J	1.63 J	0.232 U	1,190	62.6	29.6	0.184 U	5.99	5.54	1.59 J
PCB-145	0.188 U	0.158 U	0.359 U	0.115 U	0.111 U	0.197 U	0.222 U	0.271 U	0.140 U	0.151 U	0.185 U	0.0891 U	0.338 U
PCB-146	9.68 U	163	4.70 J	7.50	4.71 J	0.360 U	1,650	177	118	4.41 J	16.4	12.6	4.34 J
PCB-147/149	75.3	924	8.90 U	48.3	24.3	2.06 J	16,100	652	847	11.2	140	85.5	26.1
PCB-148	0.247 U	2.38 J	0.471 U	0.240 J	0.145 U	0.259 U	2.5 J	0.356 U	1.69 U	0.196 U	0.241 U	0.116 U	0.439 U
PCB-150	0.179 U	2.97 J	0.341 U	0.109 U	0.105 U	0.188 U	3.5 U	0.258 U	0.134 U	0.141 U	0.174 U	0.0836 U	0.318 U
PCB-152	0.178 U	0.409 J	0.339 U	0.364 U	0.105 U	0.186 U	0.666 U	0.256 U	1.51 J	0.143 U	0.176 U	0.0848 U	0.322 U
PCB-153/168	86.8	972	20.6	39.1	29.2	1.89 U	14,000	1,440	614	25.4	67.1	53.8	24.0

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties												
	Douglas Management Dock					Industrial Container Services				Duwamish Marine Center			
Well ID	MW-11	MW-17	MW-17-F	MW-15	DMD-SW-1	DOF-MW3	DOF-MW1	DOF-MW1-F	SA-MW2	MW-10	MW-8	MW-16	DMC-SW-1
Relative Location at Site	Up	Center	Center	Down	Surface	Up	Center	Center	Down	Up	Center	Down	Surface
Sample Date	3/30/2017	3/30/2017	3/30/2017	3/30/2017	3/30/2017	3/29/2017	3/29/2017	3/29/2017	3/29/2017	3/13/2017	3/13/2017	3/13/2017	3/13/2017
PCB Congeners (pg/L)													
PCB-154	0.204 U	15.4	0.390 U	1.07 U	0.888 J	0.214 U	0.241 U	2.21 J	11.9	0.170 U	0.762 J	1.19 J	0.548 J
PCB-155	0.164 U	0.138 U	0.313 U	0.1 U	0.0967 U	0.172 U	0.194 U	0.237 U	0.123 U	0.135 U	0.167 U	0.0801 U	0.304 U
PCB-156/157	4.00 J	83.8	1.10 U	5.01 J	3.12 J	0.325 U	584	77.8	32.2	1.66 U	1.07 U	5.27 U	3.70 U
PCB-158	4.93 J	79.6	1.86 J	1.63 U	2.88 J	0.207 U	807	31.6	38.0	0.360 U	2.53 U	6.72	2.85 J
PCB-159	0.145 U	0.139 U	0.212 U	0.265 J	0.308 J	0.164 U	12.8	4.57 J	0.577 J	0.122 U	1.47 U	0.640 U	0.652 J
PCB-161	0.261 U	0.292 U	1.12 U	0.510 U	0.297 U	0.290 U	1.18 U	0.698 U	0.410 U	0.156 U	0.156 U	0.113 U	0.393 U
PCB-162	0.130 U	1.95 J	0.169 U	0.108 U	0.0884 U	0.156 U	5.49	0.205 U	0.903 U	0.141 U	0.244 U	0.246 U	0.184 U
PCB-164	5.22	65.6	1.16 U	1.93 U	2.40 J	0.258 U	820	30.6	39.7	0.878 J	6.05	5.51	2.06 J
PCB-165	0.268 U	1.87 U	1.15 U	0.524 U	0.304 U	0.297 U	28.4	0.690 U	1.70 J	0.170 U	0.170 U	0.123 U	0.428 U
PCB-167	2.00 J	24.3	0.529 J	1.40 J	0.956 U	0.181 U	169	18.8	12.2	1.28 U	1.30 U	2.02 J	1.34 U
PCB-169	0.235 U	3.21 U	0.320 U	0.191 U	0.154 U	0.288 U	19.8 U	1.24 J	2.12 U	0.315 U	0.569 U	0.576 U	0.438 U
Total Hexachlorobiphenyls	381 J	4,850 J	87.4 J	188 J	146 J	2.06 J	68,700 J	4,300 J	3,310 J	75.1 J	482 J	382 J	125 J
PCB-170	11.5	271	2.85 U	4.87 J	8.43	1.01 J	2,630	179	157	4.10 J	11.7	7.08	5.45 U
PCB-171/173	3.56 J	109	0.194 U	1.57 J	3.22 J	0.418 U	1,140	15.4	65.8	0.290 U	5.13 J	2.58 U	2.19 U
PCB-172	2.14 J	44.9	0.169 U	1.26 J	1.63 J	0.364 U	515	27.4	26.0	0.732 U	2.70 J	1.44 U	0.857 U
PCB-174	17.2	432	3.69 U	7.13	10.8	1.27 J	5,520	102	299	3.39 J	29.2	12.3	8.85
PCB-175	0.603 U	14.3	5.72	0.242 U	0.313 U	0.339 U	171	2.19 U	7.07	5.31	1.22 J	0.287 U	10.2
PCB-176	1.65 U	42.9	0.662 U	0.688 U	0.820 U	0.245 U	652	8.93	30.1	0.313 U	3.77 U	1.39 U	0.250 U
PCB-177	7.30	253	2.77 J	4.85 J	7.87	0.395 U	2,750	30.3	151	1.52 U	13.7	6.12	3.85 U
PCB-178	2.67 U	63.6	1.00 U	1.70 J	2.23 U	0.343 U	956	20.6	41.0	0.625 U	7.00	2.21 J	1.87 J
PCB-179	7.00 U	144	1.47 U	3.58 J	3.71 J	0.262 U	2,400	26.9	112	1.38 U	20.3	5.76	3.75 J
PCB-180/193	31.0	700	8.12 J	25.5	17.9	2.99 J	7,650	745	409	20.2	35.8	14.8	18.2
PCB-181	0.237 U	1.60 U	0.171 U	0.338 U	0.197 U	0.369 U	6.02	0.369 U	0.262 U	0.251 U	0.236 U	0.128 U	0.586 U
PCB-182	0.228 U	1.15 U	0.950 U	0.233 U	0.176 U	0.326 U	0.332 U	0.260 U	0.133 U	0.236 U	0.258 U	0.118 U	0.382 U
PCB-183/185	8.49 J	247	2.29 J	3.94 J	6.11 J	0.876 J	2,970	44.1	136	0.187 U	14.2	6.38 J	4.50 J
PCB-184	0.192 U	0.173 U	0.799 U	0.196 U	0.148 U	0.274 U	0.279 U	0.219 U	0.112 U	0.169 U	0.185 U	0.0847 U	0.274 U
PCB-186	0.172 U	0.155 U	0.716 U	0.175 U	0.133 U	0.246 U	0.250 U	0.196 U	0.101 U	0.155 U	0.169 U	0.0773 U	0.250 U
PCB-187	22.1	478	0.964 U	7.96	13.2	0.995 U	6,220	204	280	0.236 U	35.0	12.1	0.382 U
PCB-188	0.179 U	0.162 U	0.746 U	0.183 U	0.138 U	0.256 U	0.644 J	0.204 U	0.105 U	0.154 U	0.168 U	0.0770 U	0.249 U
PCB-189	0.276 U	8.89	0.359 U	0.655 J	0.226 U	0.300 U	89.7	19.5	5.32	0.294 U	0.333 U	0.462 U	0.425 U
PCB-190	1.61 U	50.4	0.523 U	0.734 J	1.63 J	0.286 U	512	20.8	26.5	0.325 U	2.58 J	1.57 U	0.923 U
PCB-191	0.177 U	9.60	0.128 U	0.253 U	0.294 J	0.276 U	81.6	3.10 J	5.24 J	0.312 U	0.293 U	0.160 U	0.728 U
PCB-192	0.187 U	0.310 U	0.136 U	0.267 U	0.156 U	0.292 U	0.607 U	0.292 U	0.207 U	0.303 U	0.286 U	0.156 U	0.709 U
Total Heptachlorobiphenyls	103 J	2,870	18.9 J	63.7 J	74.8 J	6.15 J	34,300 J	1,450 J	1,750 J	33.0 J	179 J	66.8 J	47.4 J
PCB-194	4.72 J	134	1.83 J	2.47 J	5.06	0.301 U	982	124	76.1	5.78 U	5.04 U	2.16 U	6.08 U
PCB-195	1.46 J	61.0	0.879 U	0.340 U	2.05 J	0.332 U	362	6.15	34.6	0.325 U	1.86 U	0.706 U	1.63 U
PCB-196	1.33 J	55.2	0.960 U	0.693 J	1.58 J	0.355 U	366	8.20 U	30.9	1.03 U	2.19 U	1.08 U	1.70 U
PCB-197	0.320 U	4.48 J	0.226 U	0.131 U	0.105 U	0.235 U	28.2	0.422 U	2.87 J	0.170 U	1.10 J	0.414 U	0.436 U
PCB-198/199	2.95 J	111	1.52 U	1.35 U	4.50 J	0.361 U	812	15.8	69.8	1.97 U	6.94 U	2.69 J	3.46 U
PCB-200	0.269 U	14.8	0.246 U	0.143 U	0.425 U	0.257 U	116	1.43 U	10.5	0.202 U	0.218 U	0.0927 U	0.516 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties												
	Douglas Management Dock					Industrial Container Services				Duwamish Marine Center			
Well ID	**MW-11**	**MW-17**	**MW-17-F**	**MW-15**	**DMD-SW-1**	**DOF-MW3**	**DOF-MW1**	**DOF-MW1-F**	**SA-MW2**	**MW-10**	**MW-8**	**MW-16**	**DMC-SW-1**
Relative Location at Site	**Up**	**Center**	**Center**	**Down**	**Surface**	**Up**	**Center**	**Center**	**Down**	**Up**	**Center**	**Down**	**Surface**
Sample Date	**3/30/2017**	**3/30/2017**	**3/30/2017**	**3/30/2017**	**3/30/2017**	**3/29/2017**	**3/29/2017**	**3/29/2017**	**3/29/2017**	**3/13/2017**	**3/13/2017**	**3/13/2017**	**3/13/2017**
PCB Congeners (pg/L)													
PCB-201	0.275 U	16.0	0.251 U	0.146 U	0.592 U	0.262 U	132	1.15 U	10.8	0.152 U	0.702 U	0.617 J	0.389 U
PCB-202	0.714 U	23.1	0.271 U	0.395 J	0.944 J	0.282 U	204	1.32 U	16.5	0.137 U	1.98 J	0.808 U	1.07 U
PCB-203	1.68 J	65.2	0.863 U	0.419 U	2.77 J	0.354 U	465	17.3	35.9	2.28 J	3.97 J	2.23 J	2.92 J
PCB-204	0.276 U	0.119 U	0.253 U	0.147 U	0.101 U	0.263 U	0.192 U	0.412 U	0.154 U	0.188 U	0.203 U	0.0865 U	0.482 U
PCB-205	0.170 U	6.28	0.202 U	0.249 U	0.327 U	0.243 U	34.3	3.01 J	3.38 J	0.249 U	0.236 U	0.140 U	0.280 U
Total Octachlorobiphenyl	12.1 J	491 J	1.83 J	3.56 J	16.9 J	0.361 U	3,500	166 J	291 J	2.28 J	7.05 J	5.54 J	2.92 J
PCB-206	0.781 U	31.6	1.27 U	0.872 U	2.73 J	1.50 U	88.0	3.36 U	17.3	0.916 U	1.13 U	0.550 U	1.53 U
PCB-207	0.383 U	4.08 J	0.586 U	0.418 U	0.304 U	0.567 U	11.3	0.481 U	2.13 U	0.511 U	0.466 U	0.255 U	0.769 U
PCB-208	0.391 U	5.25 J	0.598 U	0.427 U	0.310 U	0.578 U	14.9	0.491 U	3.95 J	0.522 U	0.477 U	0.778 J	0.786 U
Total Nonachlorobiphenyl	0.781 U	40.9 J	1.27 U	0.872 U	2.73 J	1.50 U	114	3.36 U	21.3 J	0.916 U	1.13 U	0.778 J	1.53 U
PCB-209	0.358 U	4.15 J	0.309 U	0.393 U	1.21 U	0.713 U	1.23 J	0.276 U	2.30 J	0.500 U	0.344 U	0.851 U	0.393 U
Total Decachlorobiphenyl	0.358 U	4.15 J	0.309 U	0.393 U	1.21 U	0.713 U	1.23 J	0.276 U	2.30 J	0.500 U	0.344 U	0.851 U	0.393 U
Total PCB Congeners (pg/L)	1,280 J	42,100 J	9,830 J	3,090 J	633 J	167 J	197,000 J	29,700 J	69,800 J	159 J	1,120 J	14,800 J	2,170 J
Total PCB Congeners (ug/L)	0.00128 J	0.0421 J	0.00983 J	0.00309 J	0.000633 J	0.000167 J	0.197 J	0.0297 J	0.0698 J	0.000159 J	0.00112 J	0.0148 J	0.00217 J
PCB Congener TEQ (ug/L)	0.0157	0.108	0.0201	0.0127	0.0125	0.0146	0.501	0.105	0.0784	0.0163	0.0219	0.0519	0.0384
PCB Aroclors (ug/L)													
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	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 UJ	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	0.010 U
Aroclor 1232	0.010 U	0.010 U	0.010 UJ	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	0.010 U
Aroclor 1242	0.010 U	0.010 U	0.010 UJ	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	0.010 U
Aroclor 1248	0.010 U	0.039 J	0.032 J	0.010 U	0.010 U	0.010 U	0.111 J	0.040 UJ	0.067	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1254	0.010 U	0.017 J	0.011 J	0.010 U	0.010 U	0.010 U	0.099	0.027 J	0.018	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1260	0.010 U	0.0070 J	0.010 UJ	0.010 U	0.010 U	0.010 U	0.056	0.0090 J	0.0060 J	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1262	0.010 U	0.010 U	0.010 UJ	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	0.010 U
Aroclor 1268	0.010 U	0.010 U	0.010 UJ	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	0.010 U
Total PCB Aroclors	0.010 U	0.063 J	0.043 J	0.010 U	0.010 U	0.010 U	0.27 J	0.036 J	0.091 J	0.010 U	0.010 U	0.010 U	0.010 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties												
	Crowley Marine Services						Jorgensen Forge			Boeing Isaacson/Thompson			
Well ID	EMW-1S	DMW-6A	EMW-13S	EMW-13S-F	CMS-SW-1	CMS-SW-1-D	MW-23	MW-48	MW-51	MW-25	MW-13	MW-10	MW-10-D
Relative Location at Site	Up	Center	Down	Down	Surface	Surface	Up	Center	Down	Up	Center	Down	Down
Sample Date	3/16/2017	3/16/2017	3/16/2017	3/16/2017	3/16/2017	3/16/2017	3/31/2017	3/31/2017	3/31/2017	3/15/2017	3/15/2017	3/15/2017	3/15/2017
PCB Congeners (pg/L)													
PCB-001	0.315 U	0.393 U	9.42 J	21.1 J	2.86 U	0.439 U	3.61 J	0.175 U	1.00 U	0.285 U	2.02 J	0.513 U	0.470 U
PCB-002	0.366 U	0.420 U	0.473 U	3.34 J	0.469 U	0.463 U	0.883 J	0.177 U	0.849 U	0.317 U	0.340 U	0.613 U	0.526 U
PCB-003	0.365 U	0.419 U	0.472 U	5.18 U	0.467 U	0.462 U	0.436 J	0.189 U	0.692 U	0.316 U	0.339 U	0.612 U	0.524 U
Total Monochlorobiphenyls	0.366 U	0.420 U	9.42 J	24.4 J	2.86 U	0.463 U	4.93 J	0.189 U	1.00 U	0.317 U	2.02 J	0.613 U	0.526 U
PCB-004	0.622 U	0.793 U	18.8	18.9	18.5	18.0	0.922 U	1.18 U	1.42 U	12.5	0.682 U	0.913 U	1.01 U
PCB-005	0.703 U	0.732 U	0.791 U	1.10 U	0.724 U	0.745 U	1.03 U	1.40 U	1.47 U	0.578 U	0.701 U	1.10 U	1.06 U
PCB-006	0.730 U	0.761 U	0.822 U	1.14 U	11.8	13.7	1.08 U	1.47 U	1.55 U	0.601 U	0.729 U	1.14 U	1.10 U
PCB-007	0.659 U	0.686 U	0.741 U	1.03 U	0.679 U	0.698 U	0.968 U	1.32 U	1.39 U	0.542 U	0.657 U	1.03 U	0.990 U
PCB-008	0.705 U	0.735 U	13.1	13.4	12.7	14.3	1.05 U	1.43 U	1.51 U	6.76	0.704 U	1.10 U	1.06 U
PCB-009	0.758 U	0.790 U	0.853 U	1.18 U	0.781 U	0.803 U	1.11 U	1.51 U	1.59 U	0.624 U	0.691 U	1.18 U	1.14 U
PCB-010	0.393 U	0.502 U	0.519 U	0.613 U	0.456 U	0.560 U	0.105 U	0.725 U	0.869 U	0.352 U	0.432 U	0.578 U	0.639 U
PCB-011	6.03	6.23	5.65	9.76	8.86	8.76	6.28 U	1.35 U	5.98 U	8.72	9.42	6.63	10.2
PCB-012/013	0.766 U	0.703 U	0.895 U	1.19 U	0.769 U	3.48 J	1.03 U	1.31 U	1.25 U	0.588 U	0.780 U	1.15 U	1.07 U
PCB-014	0.619 U	0.568 U	0.724 U	0.962 U	0.622 U	0.600 U	0.806 U	1.02 U	0.976 U	0.476 U	0.631 U	0.933 U	0.869 U
PCB-015	0.703 U	0.645 U	9.37	7.66	5.47	5.54	0.976 U	1.24 U	1.18 U	9.08	0.716 U	1.06 U	0.986 U
Total Dichlorobiphenyls	6.03	6.23	46.9	49.7	57.3	63.8 J	6.28 U	1.51 U	5.98 U	37.1	9.42	6.63	10.2
PCB-016	0.258 U	0.293 U	7.93	3.41 J	2.55 U	2.97 J	2.58 J	0.349 U	0.916 J	4.81 J	0.867 J	0.506 U	0.473 U
PCB-017	0.258 U	0.216 U	7.18	2.68 J	11.3	12.3	1.61 U	0.822 U	0.679 U	4.17 J	1.04 J	0.373 U	0.349 U
PCB-018/030	0.559 U	0.980 U	17.4	6.97	22.3	23.4	3.04 J	1.26 U	1.20 U	13.6	1.69 J	0.322 U	0.843 J
PCB-019	0.229 U	0.276 U	11.1	9.91	6.94	7.55	0.447 U	0.328 U	0.342 U	19.6	0.847 J	0.449 U	0.460 U
PCB-020/028	0.955 U	1.44 U	17.2	4.51 U	23.7	23.4	5.28 J	1.55 U	1.96 U	12.6	2.32 U	1.42 U	1.80 U
PCB-021/033	0.510 U	0.779 U	9.36 J	2.12 U	5.23 U	5.09 U	3.68 U	1.45 U	1.49 U	3.63 U	2.92 U	0.258 U	0.538 U
PCB-022	0.532 J	0.361 U	6.09	1.55 J	4.76 J	4.52 J	2.55 J	0.810 U	0.821 J	4.05 J	0.812 U	0.279 U	0.742 J
PCB-023	0.135 U	0.162 U	0.241 U	0.225 U	0.151 U	0.153 U	0.149 U	0.189 U	0.184 U	0.134 U	0.167 U	0.263 U	0.250 U
PCB-024	0.144 U	0.164 U	0.250 U	0.201 J	0.157 U	0.155 U	0.153 U	0.207 U	0.209 U	0.138 U	0.184 U	0.282 U	0.264 U
PCB-025	0.255 U	0.158 U	2.76 J	1.26 J	8.76	9.30	0.760 J	0.199 U	0.194 U	1.66 U	0.641 U	0.255 U	0.333 U
PCB-026/029	0.127 U	0.153 U	2.97 J	1.46 J	14.4	16.0	1.05 U	0.177 U	0.424 U	2.46 J	0.450 U	0.247 U	0.236 U
PCB-027	0.134 U	0.152 U	2.94 J	2.32 J	5.30	5.25	0.141 U	0.191 U	0.193 U	2.26 J	0.424 J	0.262 U	0.245 U
PCB-031	0.735 U	1.22 U	16.2	3.68 U	21.1	22.8	4.28 J	1.22 U	1.81 U	8.64	2.50 U	0.933 U	0.950 U
PCB-032	0.645 U	0.853 U	6.72	4.00 J	8.40	9.14	1.46 J	0.889 J	0.856 J	8.64	1.33 J	0.723 J	0.689 U
PCB-034	0.128 U	0.154 U	0.229 U	0.214 U	0.144 U	0.380 J	0.143 U	0.183 U	0.178 U	0.127 U	0.158 U	0.250 U	0.238 U
PCB-035	0.246 U	0.243 U	0.416 U	1.20 U	0.280 U	0.557 U	0.224 U	0.364 U	0.273 U	0.705 U	0.253 U	0.456 U	0.392 U
PCB-036	0.217 U	0.214 U	4.17 J	0.435 J	1.01 U	0.919 U	0.175 U	0.285 U	0.214 U	0.211 U	2.43 U	0.402 U	0.346 U
PCB-037	0.231 U	0.228 U	6.27	1.51 U	4.29 J	3.85 J	1.94 J	0.318 U	0.807 J	4.85 J	1.15 J	1.32 J	1.73 J
PCB-038	0.223 U	0.220 U	0.374 U	0.290 U	0.254 U	0.230 U	0.185 U	0.300 U	0.225 U	0.351 J	0.229 U	0.412 U	0.355 U
PCB-039	0.202 U	0.200 U	0.340 U	0.264 U	0.230 U	0.209 U	0.175 U	0.284 U	0.213 U	0.186 U	0.208 U	0.374 U	0.322 U
Total Trichlorobiphenyls	0.532 J	1.44 U	118 J	34.2 J	131 J	141 J	21.9 J	0.889 J	3.40 J	86.0 J	7.35 J	2.04 J	3.32 J
PCB-040/041/071	0.282 U	3.50 J	32.6	4.53 J	11.8 J	11.9 J	2.65 J	0.301 U	1.44 J	12.3 J	18.1	0.328 U	0.416 U
PCB-042	0.287 U	1.34 J	14.4	2.29 J	4.73 J	4.84 J	1.29 J	0.364 J	0.577 J	7.33	8.00	0.333 U	0.57 U
PCB-043	0.299 U	0.214 U	0.281 U	0.306 U	0.201 U	0.255 U	0.210 U	0.324 U	0.375 U	0.443 J	0.259 U	0.353 U	0.444 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties												
	Crowley Marine Services						Jorgensen Forge			Boeing Isaacson/Thompson			
Well ID	**EMW-1S**	**DMW-6A**	**EMW-13S**	**EMW-13S-F**	**CMS-SW-1**	**CMS-SW-1-D**	**MW-23**	**MW-48**	**MW-51**	**MW-25**	**MW-13**	**MW-10**	**MW-10-D**
Relative Location at Site	**Up**	**Center**	**Down**	**Down**	**Surface**	**Surface**	**Up**	**Center**	**Down**	**Up**	**Center**	**Down**	**Down**
Sample Date	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/31/2017**	**3/31/2017**	**3/31/2017**	**3/15/2017**	**3/15/2017**	**3/15/2017**	**3/15/2017**
PCB Congeners (pg/L)													
PCB-044/047/065	2.96 U	17.1	179	29.9	25.8	24.3	7.18 J	10.6 J	11.2 J	34.6	116	9.15 J	9.52 J
PCB-045/051	0.374 U	0.323 U	26.0	11.7	4.62 U	5.09 J	1.42 J	11.6 U	3.27 J	28.9	4.92 U	0.527 U	0.505 U
PCB-046	0.420 U	0.363 U	7.54	2.55 J	0.459 U	0.498 U	0.259 U	0.365 U	0.374 U	6.90 U	1.82 J	0.592 U	0.568 U
PCB-048	0.262 U	0.188 U	5.27	0.669 J	2.23 J	2.58 J	0.892 J	0.277 U	0.320 U	1.90 J	1.82 U	0.308 U	0.388 U
PCB-049/069	0.219 U	5.84 J	80.3	10.4 J	22.6	21.5	1.78 J	1.49 J	0.974 J	9.18 J	51.4	3.05 J	3.77 J
PCB-050/053	0.354 U	0.306 U	36.5	19.6	7.77 J	6.88 U	0.634 J	0.240 U	0.313 U	27.1	11.5	0.498 U	0.478 U
PCB-052	1.07 U	36.8	471	66.1	43.5	45.3	3.47 U	1.19 U	1.47 U	42.1	309	7.82	7.72
PCB-054	0.283 U	0.245 U	2.00 J	0.809 J	0.309 U	0.335 U	0.166 U	0.233 U	0.238 U	1.46 U	0.320 U	0.399 U	0.383 U
PCB-055	0.187 U	0.296 U	0.533 U	0.384 U	0.245 U	0.277 U	0.367 J	0.233 U	0.208 U	0.232 U	0.317 U	0.399 U	0.409 U
PCB-056	0.191 U	2.56 U	28.2	1.59 J	6.20	6.55	2.26 J	0.477 J	0.929 J	1.54 U	6.26	1.38 U	1.55 U
PCB-057	0.180 U	0.278 U	0.509 U	0.344 U	0.237 U	0.263 U	0.196 U	0.224 U	0.204 U	0.218 U	0.305 U	0.374 U	0.399 U
PCB-058	0.167 U	0.257 U	0.471 U	0.318 U	0.219 U	0.243 U	0.164 U	0.188 U	0.171 U	0.260 J	0.282 U	0.346 U	0.369 U
PCB-059/062/075	0.208 U	0.149 U	3.95 J	1.77 J	2.06 U	2.40 U	0.668 J	0.211 U	0.248 U	4.52 J	2.16 U	0.242 U	0.307 U
PCB-060	0.183 U	0.290 U	10.4	0.376 U	2.82 J	2.67 J	1.38 J	0.229 U	0.561 J	0.725 J	1.64 U	0.391 U	1.84 J
PCB-061/070/074/076	1.30 U	15.3 J	281	12.5 J	28.6	27.2	5.58 J	1.75 U	2.23 U	9.67 U	62.0	10.8 U	12.7 J
PCB-063	0.160 U	0.175 J	2.25 J	0.305 U	0.746 J	0.596 U	0.164 U	0.188 U	0.171 U	0.193 U	0.506 J	0.331 U	0.353 U
PCB-064	0.405 U	3.54 J	42.6	3.97 J	7.99	7.67	1.53 J	0.484 U	0.764 J	13.7	19.1	1.62 U	2.25 J
PCB-066	0.582 U	5.42 J	69.0	3.80 J	16.3	16.6	3.15 J	1.15 J	1.57 J	6.01	27.2	8.54	10.1
PCB-067	0.160 U	0.247 U	0.452 U	0.306 U	0.629 J	0.569 U	0.178 U	0.204 U	0.185 U	0.275 J	0.517 J	0.332 U	0.354 U
PCB-068	0.420 U	0.452 J	2.20 J	0.975 U	0.824 J	0.578 U	0.711 J	4.56 J	1.70 J	1.20 J	1.26 J	0.971 J	1.03 J
PCB-072	0.167 U	0.257 U	1.11 J	0.319 U	0.629 J	0.540 J	0.189 U	0.216 U	0.196 U	0.451 J	0.859 J	0.346 U	0.369 U
PCB-073	0.208 U	0.149 U	0.195 U	0.212 U	0.140 U	0.178 U	0.140 U	0.217 U	0.251 U	0.133 U	0.180 U	0.245 U	0.308 U
PCB-077	0.181 U	1.01 J	4.07 J	1.11 U	1.90 J	1.65 J	0.756 J	0.222 U	0.206 U	1.03 U	1.20 J	3.24 J	3.14 U
PCB-078	0.220 U	0.349 U	0.628 U	0.452 U	0.288 U	0.327 U	0.214 U	0.249 U	0.222 U	0.273 U	0.373 U	0.470 U	0.482 U
PCB-079	0.165 U	0.262 U	11.1	0.339 U	0.216 U	0.410 J	0.446 J	0.191 U	0.170 U	0.205 U	3.23 J	0.353 U	0.362 U
PCB-080	0.170 U	0.269 U	0.484 U	0.349 U	0.222 U	0.252 U	0.164 U	0.191 U	0.171 U	0.211 U	0.288 U	0.363 U	0.372 U
PCB-081	0.196 U	0.305 U	0.782 U	0.395 U	0.259 U	0.279 U	0.420 J	0.254 U	0.237 U	0.572 U	0.549 U	0.420 U	0.424 U
Total Tetrachlorobiphenyls	2.96 U	90.5 J	1,310 J	172 J	185 J	179 J	33.1 J	18.6 J	23.0 J	191 J	638 J	32.8 J	48.9 J
PCB-082	0.521 U	11.4	120	7.62	3.38 U	3.07 U	0.659 U	0.641 U	0.465 U	4.51 U	26.3	0.845 U	1.99 U
PCB-083/099	0.441 U	48.0	509	42.7	24.1	23.4	0.492 U	0.476 U	0.336 U	28.0	133	34.3	44.3
PCB-084	0.395 U	26.9	479	96.7	9.63	8.83	0.456 U	0.446 U	0.321 U	37.5	106	1.75 U	2.24 J
PCB-085/116/117	4.88 U	13.6 J	131	7.19 J	5.69 J	5.68 J	0.433 U	0.422 U	1.38 U	11.0 J	34.8	9.22 J	10.8 J
PCB-086/087/097/109/119/125	0.377 U	64.8	603	40	22.3 J	22.7 J	0.423 U	0.411 U	0.298 U	25.8 J	169	19.6 U	21.2 U
PCB-088/091	0.359 U	12.8	198	30.3	6.48 J	7.67 J	0.381 U	0.543 J	0.269 U	18.8	42.3	4.29 J	4.10 U
PCB-089	0.454 U	0.795 U	10.8	2.11 J	0.607 U	0.794 U	0.535 U	0.518 U	0.365 U	0.646 J	2.53 J	0.749 U	1.14 U
PCB-090/101/113	1.39 J	87.4	832	51.3	37.2	36.6	1.68 J	1.12 J	1.24 U	26.5	244	40.7	47.0
PCB-092	0.399 U	15.7	189	20.0	7.46	7.74	0.451 U	0.436 U	0.308 U	10.8	45.8	7.58	6.72 U
PCB-093/098/100/102	0.336 U	1.82 U	48.8	8.32 U	1.21 J	2.25 J	0.379 U	0.371 U	0.267 U	5.23	7.96	0.544 U	0.824 U
PCB-094	0.368 U	0.499 U	6.44	1.01 U	0.504 U	0.341 U	0.430 U	0.421 U	0.303 U	0.761 U	1.20 U	0.598 U	0.905 U
PCB-095	1.28 J	72.5	1,260	279	28.4	31.8	0.364 U	0.871 J	0.857 J	115	285	13.6	14.3 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties												
	Crowley Marine Services						Jorgensen Forge			Boeing Isaacson/Thompson			
Well ID	EMW-1S	DMW-6A	EMW-13S	EMW-13S-F	CMS-SW-1	CMS-SW-1-D	MW-23	MW-48	MW-51	MW-25	MW-13	MW-10	MW-10-D
Relative Location at Site	Up	Center	Down	Down	Surface	Surface	Up	Center	Down	Up	Center	Down	Down
Sample Date	3/16/2017	3/16/2017	3/16/2017	3/16/2017	3/16/2017	3/16/2017	3/31/2017	3/31/2017	3/31/2017	3/15/2017	3/15/2017	3/15/2017	3/15/2017
PCB Congeners (pg/L)													
PCB-096	0.126 U	0.330 U	10.2	2.80 J	0.151 U	0.134 U	0.141 U	0.116 U	0.142 U	2.73 J	2.65 J	0.207 U	0.145 U
PCB-103	0.302 U	0.409 U	10.0	2.05 U	0.716 U	0.531 U	0.355 U	0.347 U	0.250 U	0.639 U	1.93 U	0.489 U	0.741 U
PCB-104	0.110 U	0.111 U	0.320 U	0.134 U	0.131 U	0.116 U	0.116 U	0.0958 U	0.117 U	0.110 U	0.123 U	0.180 U	0.126 U
PCB-105	0.856 U	19.7	215	3.73 J	10.4	11.4	0.788 J	0.177 U	0.463 J	8.17	38.8	15.1	17.5
PCB-106	0.238 U	0.299 U	0.371 U	0.382 U	0.475 U	0.313 U	0.232 U	0.219 U	0.182 U	0.308 U	0.587 U	0.529 U	0.375 U
PCB-107	0.208 U	4.12 J	40.9	0.928 J	2.62 J	2.36 J	0.210 U	0.198 U	0.164 U	1.71 U	7.34	3.51 J	3.74 J
PCB-108/124	0.240 U	2.75 U	35.5	1.48 J	1.12 J	1.18 U	0.237 U	0.340 U	0.185 U	1.66 J	5.85 J	0.926 U	1.38 J
PCB-110/115	0.359 U	126	1,450	150	47.5	51.7	1.28 U	1.20 J	0.261 U	126	264	66.1	77.3
PCB-111	0.309 U	0.405 U	0.812 U	0.663 U	0.411 U	0.514 U	0.358 U	0.348 U	0.253 U	0.664 U	0.478 U	0.500 U	0.741 U
PCB-112	0.298 U	0.392 U	0.811 U	0.627 U	0.398 U	0.521 U	0.340 U	0.329 U	0.232 U	0.651 U	0.455 U	0.491 U	0.747 U
PCB-114	0.200 U	0.814 U	13.5	0.315 U	0.909 J	0.583 U	0.210 U	0.185 U	0.145 U	0.429 U	1.63 J	1.11 J	0.926 U
PCB-118	1.40 J	53.9	561	12.4	28.6	30.1	1.07 U	0.670 J	0.703 J	22.5	120	47.0	54.2
PCB-120	0.292 U	0.382 U	15.2	0.626 U	0.388 U	0.485 U	0.320 U	0.311 U	0.226 U	0.627 U	0.653 U	0.473 U	0.700 U
PCB-121	0.296 U	0.390 U	0.807 U	0.624 U	0.396 U	0.518 U	0.346 U	0.335 U	0.236 U	0.648 U	0.452 U	0.488 U	0.742 U
PCB-122	0.242 U	0.897 U	10.5	0.866 U	0.374 U	0.321 U	0.254 U	0.223 U	0.175 U	0.589 U	1.35 J	0.523 U	0.374 U
PCB-123	0.228 U	1.17 J	15.5	0.745 U	0.423 J	0.624 U	0.234 U	0.221 U	0.183 U	0.826 U	2.05 J	0.652 U	0.975 J
PCB-126	0.196 U	0.251 U	0.758 J	0.577 U	0.416 U	0.311 U	0.187 U	0.164 U	0.143 U	0.597 U	0.481 U	0.325 U	0.526 U
PCB-127	0.183 U	0.236 U	0.285 U	0.301 U	0.406 U	0.251 U	0.193 U	0.165 U	0.144 U	0.248 U	0.444 U	0.410 U	0.301 U
Total Pentachlorobiphenyls	4.07 J	558 J	6770 J	748 J	234 J	242 J	2.47 J	4.40 J	2.02 J	440 J	1,540 J	243 J	259 J
PCB-128/166	2.63 J	14.4	264	10.2 J	8.28 J	8.11 J	0.186 U	0.225 U	0.150 U	18.9	16.7	11.1 U	11.6
PCB-129/138/160/163	13.0 J	85.4	1,270	54	48.2	51.1	1.05 U	0.859 U	0.952 U	69.3	103	68.5	73.3
PCB-130	1.23 J	6.44	106	5.66	2.54 J	3.43 J	0.297 U	0.342 U	0.226 U	5.34 U	7.12	3.08 J	2.97 U
PCB-131	0.321 U	1.74 U	25.5	0.849 U	0.694 J	0.499 J	0.305 U	0.352 U	0.233 U	1.31 J	2.24 U	0.359 U	0.727 U
PCB-132	2.88 J	33.7	513	30.6	13.8	15.0	0.303 U	0.351 U	0.232 U	29.5	42.1	12.5	13.5
PCB-133	0.350 U	1.58 J	17.6	0.868 J	1.14 J	1.01 J	0.283 U	0.328 U	0.217 U	1.62 J	1.65 J	1.37 J	1.15 J
PCB-134/143	0.302 U	5.11 J	80.1	5.86 J	2.06 J	2.39 J	0.303 U	0.350 U	0.232 U	4.41 J	7.47 J	0.358 U	0.725 U
PCB-135/151	3.05 J	23.8	345	33.8	15.4	17.9	0.114 U	0.138 U	0.452 U	34.3	29.9	14.0	19.2
PCB-136	1.01 U	10.9 U	171	17.0	6.20	6.38	0.0863 U	0.105 U	0.0834 U	14.9	19.1	1.86 J	2.57 J
PCB-137	0.248 U	4.35 J	77.6	3.25 J	1.25 U	2.05 U	0.367 J	0.289 U	0.191 U	4.98 J	6.78	2.03 J	1.71 J
PCB-139/140	0.284 U	1.96 J	30.7	1.17 U	0.973 J	0.815 J	0.261 U	0.301 U	0.200 U	1.87 J	2.71 J	1.12 J	1.28 J
PCB-141	1.16 J	15.5	199	8.87	7.98	8.20	0.575 J	0.300 U	0.198 U	10.2	14.9	2.34 J	1.95 U
PCB-142	0.340 U	0.239 U	0.741 U	0.425 U	0.386 U	0.197 U	0.309 U	0.357 U	0.236 U	0.332 U	0.398 U	0.381 U	0.771 U
PCB-144	0.137 U	4.32 J	54.9	4.34 J	2.01 J	2.80 J	0.107 U	0.130 U	0.103 U	2.78 J	5.44	0.647 J	0.889 J
PCB-145	0.111 U	0.147 U	0.150 U	0.302 U	0.112 U	0.127 U	0.0910 U	0.111 U	0.0879 U	0.124 U	0.119 U	0.187 U	0.210 U
PCB-146	3.12 J	10.1	166	8.34	7.57 U	8.13	0.254 U	0.294 U	0.195 U	12.6	11.0	7.49	7.34 U
PCB-147/149	9.60 J	61.9	879	64.8	36.9	38.6	0.884 J	0.742 J	0.825 U	68.4	80.3	45.4	51.0
PCB-148	0.145 U	0.191 U	1.06 U	0.392 U	0.146 U	0.165 U	0.119 U	0.146 U	0.115 U	0.162 U	0.155 U	0.242 U	0.272 U
PCB-150	0.105 U	0.138 U	2.21 J	0.284 U	0.105 U	0.119 U	0.0866 U	0.106 U	0.0837 U	0.117 U	0.112 U	0.175 U	0.197 U
PCB-152	0.106 U	0.140 U	1.55 U	0.288 U	0.107 U	0.121 U	0.0860 U	0.105 U	0.0831 U	0.119 U	0.114 U	0.178 U	0.200 U
PCB-153/168	6.46 J	53.4	745	38.5	38.9	40.4	1.13 U	0.730 U	0.653 U	52.6	67.3	40.3	43.9

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Site	LDW Adjacent Properties												
	Crowley Marine Services						Jorgensen Forge			Boeing Isaacson/Thompson			
Well ID	**EMW-1S**	**DMW-6A**	**EMW-13S**	**EMW-13S-F**	**CMS-SW-1**	**CMS-SW-1-D**	**MW-23**	**MW-48**	**MW-51**	**MW-25**	**MW-13**	**MW-10**	**MW-10-D**
Relative Location at Site	**Up**	**Center**	**Down**	**Down**	**Surface**	**Surface**	**Up**	**Center**	**Down**	**Up**	**Center**	**Down**	**Down**
Sample Date	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/31/2017**	**3/31/2017**	**3/31/2017**	**3/15/2017**	**3/15/2017**	**3/15/2017**	**3/15/2017**
PCB Congeners (pg/L)													
PCB-154	0.126 U	0.839 J	13.1	1.09 U	1.14 J	1.31 U	0.0989 U	0.121 U	0.0956 U	1.69 J	1.13 J	0.729 J	1.19 U
PCB-155	0.1 U	0.132 U	0.134 U	0.272 U	0.101 U	0.114 U	0.0795 U	0.0968 U	0.0768 U	0.112 U	0.107 U	0.168 U	0.188 U
PCB-156/157	0.982 U	8.37 J	134	2.44 U	4.80 U	5.79 U	0.845 U	0.622 U	0.258 U	4.77 U	10.7	5.73 U	6.61 U
PCB-158	0.994 U	7.79 U	127	3.85 J	4.20 J	4.48 J	0.150 U	0.181 U	0.121 U	6.26	11.1	3.67 U	4.30 J
PCB-159	0.0737 U	0.301 U	7.28	0.449 J	0.897 J	0.849 J	0.270 J	0.101 U	0.0866 U	1.49 U	0.351 J	0.600 J	0.310 U
PCB-161	0.216 U	0.152 U	0.471 U	0.270 U	0.245 U	0.125 U	0.204 U	0.236 U	0.157 U	0.211 U	0.253 U	0.242 U	0.490 U
PCB-162	0.0837 U	0.109 U	5.77	0.418 J	0.189 U	0.122 U	0.200 J	0.0889 U	0.0750 U	0.753 U	0.412 J	0.368 U	0.167 U
PCB-164	1.41 U	6.19	98.9	5.67	3.15 J	2.62 U	0.189 U	0.217 U	0.144 U	5.90	5.63 U	3.93 J	3.40 U
PCB-165	0.236 U	0.166 U	0.514 U	0.294 U	0.267 U	0.137 U	0.210 U	0.243 U	0.161 U	0.230 U	0.276 U	0.264 U	0.534 U
PCB-167	0.448 J	3.23 J	55.9	2.07 U	1.67 J	1.89 J	0.232 J	0.296 J	0.0870 U	3.09 J	4.39 J	2.58 J	3.07 J
PCB-169	0.187 U	0.256 U	1.69 J	0.280 U	0.403 U	0.288 U	0.379 U	0.389 U	0.229 U	0.756 J	0.195 U	0.308 U	0.376 U
Total Hexachlorobiphenyls	43.6 J	341 J	5,390 J	296 J	196 J	212 J	2.53 J	1.04 J	0.952 U	345 J	444 J	208 J	227 J
PCB-170	7.13 U	6.16	177	3.74 J	11.9	12.5	0.582 J	0.465 J	0.182 U	10.8	4.15 J	4.99	5.61
PCB-171/173	1.34 J	2.08 J	57.3	1.16 J	2.81 U	3.35 U	0.449 U	0.302 U	0.186 U	3.24 J	1.71 U	2.12 J	1.50 J
PCB-172	1.52 J	1.01 U	26.6	0.792 U	1.96 U	1.81 U	0.159 U	0.294 J	0.162 U	3.85 J	0.708 J	0.911 U	0.488 U
PCB-174	6.09	7.68	172	4.65 J	13.3	14.9	0.123 U	0.194 U	0.155 U	31.5	5.76	8.04	7.03
PCB-175	10.0	7.69	7.29	6.33 U	0.364 U	0.467 U	0.177 U	0.165 U	0.128 U	0.833 U	5.61	13.8	15.4
PCB-176	0.345 U	1.05 U	20.7	0.699 U	1.88 J	1.55 J	0.175 U	0.152 U	0.0926 U	3.25 J	0.774 U	0.179 U	0.532 J
PCB-177	3.62 J	3.13 U	93.5	2.63 J	8.38	7.74 U	0.448 J	0.221 U	0.176 U	9.23 U	2.75 J	4.08 J	4.47 J
PCB-178	1.66 U	1.22 J	27.9	1.00 U	3.20 J	2.91 U	0.179 U	0.167 U	0.130 U	10.1	0.834 J	2.04 J	2.79 J
PCB-179	2.54 J	3.35 J	66.8	2.89 J	6.17	6.45	0.137 U	0.127 U	0.0990 U	24.8	2.08 U	3.15 J	2.65 J
PCB-180/193	24.4	11.3	312	7.63 U	24.6	28.4	0.756 U	0.451 U	0.594 U	69.5	7.31 U	8.98 J	9.20 J
PCB-181	0.207 U	0.170 U	2.82 J	0.209 U	0.271 U	0.164 U	0.256 J	0.206 U	0.164 U	0.151 U	0.135 U	0.641 U	0.344 U
PCB-182	0.191 U	0.134 U	1.49 J	0.256 U	0.202 U	0.293 U	0.170 U	0.158 U	0.123 U	0.549 J	0.155 U	0.274 U	0.178 U
PCB-183/185	2.88 J	4.32 J	94.4	1.40 U	8.04 J	7.52 J	0.102 U	0.161 U	0.128 U	21.5	2.36 U	2.88 U	3.08 J
PCB-184	0.137 U	0.0963 U	0.193 U	0.183 U	0.145 U	0.210 U	0.143 U	0.133 U	0.104 U	0.0888 U	0.111 U	0.196 U	0.127 U
PCB-186	0.125 U	0.0880 U	0.176 U	0.167 U	0.132 U	0.191 U	0.128 U	0.119 U	0.0929 U	0.0811 U	0.101 U	0.179 U	0.116 U
PCB-187	0.191 U	0.134 U	176	0.256 U	18.4	20.6	0.660 J	0.161 U	0.391 J	106	0.154 U	0.273 U	0.178 U
PCB-188	0.125 U	0.0876 U	0.160 U	0.167 U	0.132 U	0.191 U	0.134 U	0.124 U	0.0968 U	0.0808 U	0.101 U	0.178 U	0.116 U
PCB-189	0.164 U	0.240 U	8.42	0.332 U	0.207 U	0.759 U	0.444 J	0.396 U	0.183 U	1.01 J	0.154 U	0.143 U	0.292 U
PCB-190	0.799 J	0.728 U	35.0	0.682 J	2.32 U	2.54 J	0.385 U	0.154 U	0.125 U	1.58 U	0.166 U	1.21 U	1.45 J
PCB-191	0.257 U	0.212 U	7.00 U	0.260 U	0.337 U	0.204 U	0.241 J	0.258 J	0.123 U	0.641 U	0.168 U	0.798 U	0.428 U
PCB-192	0.251 U	0.206 U	0.446 U	0.253 U	0.328 U	0.199 U	0.336 J	0.273 J	0.130 U	0.183 U	0.163 U	0.777 U	0.416 U
Total Heptachlorobiphenyls	53.2 J	43.8 J	1,280 J	15.8 J	95.9 J	94.5 J	2.97 J	1.29 J	0.391 J	286 J	19.8 J	47.2 J	53.7 J
PCB-194	4.39 U	2.68 U	67.8	1.44 U	7.04 U	8.78	0.861 U	0.717 J	0.724 J	48.9	1.54 U	2.12 U	2.46 U
PCB-195	1.09 J	0.332 U	22.9	1.15 U	1.46 U	1.85 U	1.03 U	0.444 J	0.198 U	8.57	0.208 U	0.852 U	0.293 U
PCB-196	0.986 U	2.59 J	39.3	0.301 U	2.75 U	3.68 U	0.290 U	0.237 U	0.147 U	24.3 U	0.929 J	3.02 J	1.02 J
PCB-197	0.0840 U	0.266 U	10.3	0.166 U	1.14 J	0.299 U	0.193 U	0.158 U	0.0974 U	1.63 U	0.150 U	0.313 U	0.174 U
PCB-198/199	6.05 J	3.07 J	82.3	1.19 U	11.2	11.4	0.295 U	0.275 J	0.149 U	124	1.53 U	3.00 J	3.76 J
PCB-200	0.0995 U	0.314 U	0.304 U	0.197 U	0.291 U	0.354 U	0.210 U	0.172 U	0.106 U	11.1	0.177 U	0.370 U	0.205 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties												
	Crowley Marine Services						Jorgensen Forge			Boeing Isaacson/Thompson			
Well ID	**EMW-1S**	**DMW-6A**	**EMW-13S**	**EMW-13S-F**	**CMS-SW-1**	**CMS-SW-1-D**	**MW-23**	**MW-48**	**MW-51**	**MW-25**	**MW-13**	**MW-10**	**MW-10-D**
Relative Location at Site	**Up**	**Center**	**Down**	**Down**	**Surface**	**Surface**	**Up**	**Center**	**Down**	**Up**	**Center**	**Down**	**Down**
Sample Date	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/16/2017**	**3/31/2017**	**3/31/2017**	**3/31/2017**	**3/15/2017**	**3/15/2017**	**3/15/2017**	**3/15/2017**
PCB Congeners (pg/L)													
PCB-201	0.375 U	0.237 U	8.06	0.148 U	0.687 U	0.814 U	0.214 U	0.175 U	0.108 U	13.2	0.134 U	0.279 U	0.479 J
PCB-202	1.28 J	0.214 U	13.8	0.134 U	2.37 J	1.81 J	0.231 U	0.189 U	0.117 U	38.0	0.480 J	1.08 U	1.07 U
PCB-203	4.61 J	0.491 U	59.0	0.307 U	6.42	5.37 U	0.290 U	0.237 U	0.146 U	83.7	0.811 J	0.578 U	2.05 U
PCB-204	0.0929 U	0.294 U	0.284 U	0.184 U	0.272 U	0.331 U	0.216 U	0.176 U	0.109 U	0.118 U	0.165 U	0.346 U	0.192 U
PCB-205	0.223 U	0.254 U	2.79 U	0.254 U	0.277 U	0.189 U	0.397 U	0.319 J	0.145 U	1.37 J	0.159 U	0.222 U	0.224 U
Total Octachlorobiphenyl	13.0 J	5.66 J	303	1.44 U	21.1 J	22.0 J	1.03 U	1.76 J	0.724 J	329 J	2.22 J	6.02 J	5.26 J
PCB-206	3.99 J	1.03 U	29.7	1.20 U	11.6 J	4.11 J	0.408 U	0.547 U	0.517 U	84.6	0.722 U	1.49 U	1.23 U
PCB-207	0.320 U	0.539 U	3.86 J	0.607 U	1.17 U	0.439 U	0.185 U	0.260 U	0.275 U	10.1	0.452 U	0.640 U	0.588 U
PCB-208	1.29 U	0.551 U	6.81	0.621 U	3.75 J	1.57 J	0.189 U	0.265 U	0.280 U	26.1	0.462 U	0.654 U	0.601 U
Total Nonachlorobiphenyl	3.99 J	1.03 U	40.4 J	1.20 U	15.4 J	5.68 J	0.408 U	0.547 U	0.517 U	121	0.722 U	1.49 U	1.23 U
PCB-209	0.730 U	0.557 U	7.86	0.222 U	2.76 U	2.09 J	0.245 J	0.175 U	0.190 U	7.63	0.288 U	0.552 U	0.398 U
Total Decachlorobiphenyl	0.730 U	0.557 U	7.86	0.222 U	2.76 U	2.09 J	0.245 J	0.175 U	0.190 U	7.63	0.288 U	0.552 U	0.398 U
Total PCB Congeners (pg/L)	124 J	1,040 J	15,270 J	1,340 J	936 J	962 J	68.1 J	28.0 J	29.5 J	1,840 J	2,660 J	546 J	608 J
Total PCB Congeners (ug/L)	0.000124 J	0.00104 J	0.01527 J	0.00134 J	0.000936 J	0.000962 J	0.0000681 J	0.0000280 J	0.0000295 J	0.00184 J	0.00266 J	0.000546 J	0.000608 J
PCB Congener TEQ (ug/L)	0.0127	0.0191	0.157	0.0337	0.0284	0.0215	0.0153	0.0141	0.0107	0.0538	0.03251	0.0233	0.0346
PCB Aroclors (ug/L)													
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	0.010 U	0.010 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 UJ	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 UJ	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 UJ	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 UJ	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 UJ	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 UJ	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 UJ	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 1268	0.010 U	0.010 U	0.010 U	0.010 UJ	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 PCB Aroclors	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	0.010 U	0.010 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties				LDW Inland Properties							
	8801 Site/PACCAR				South Park Landfill				Whitehead Tyee			
Well ID	**MW-16A**	**MW-16A-F**	**MW-42A**	**MW-30A**	**MW-12**	**MW-32**	**MW-32-F**	**MW-31**	**WT-MW-110**	**WT-MW-110-D**	**WT-MW-108**	**WT-MW-06**
Relative Location at Site	**Up**	**Up**	**Center**	**Down**	**Up**	**Center**	**Center**	**Down**	**Up**	**Up**	**Center**	**Down**
Sample Date	**3/28/2017**	**3/28/2017**	**3/28/2017**	**3/28/2017**	**3/20/2017**	**3/20/2017**	**3/20/2017**	**3/20/2017**	**3/27/2017**	**3/27/2017**	**3/27/2017**	**3/27/2017**
PCB Congeners (pg/L)												
PCB-001	4.91 J	7.81	1.45 J	5.66	0.177 U	1.74 U	0.623 U	1.05 U	3.32 U	1.24 U	3.55 U	2.08 J
PCB-002	0.173 U	0.760 U	0.277 U	1.49 J	0.195 U	0.283 U	0.714 U	0.257 U	1.49 J	0.416 U	1.44 J	1.81 U
PCB-003	0.185 U	0.812 U	0.296 U	2.45 J	0.208 U	0.302 U	0.762 U	0.274 U	2.79 J	0.444 U	0.269 U	0.390 U
Total Monochlorobiphenyls	4.91 J	7.81	1.45 J	9.60 J	0.208 U	1.74 U	0.762 U	1.05 U	4.28 J	1.24 U	1.44 J	2.08 J
PCB-004	0.889 U	1.48 U	0.922 U	7.46 U	0.732 U	1.48 U	1.22 U	1.03 U	15.4 U	1.65 U	1.51 U	2.05 U
PCB-005	0.752 U	1.03 U	0.846 U	0.858 U	0.723 U	1.82 U	1.09 U	0.976 U	1.21 U	1.46 U	1.15 U	1.88 U
PCB-006	0.790 U	1.08 U	0.889 U	14.8	0.760 U	1.91 U	1.14 U	1.02 U	12.4 J	1.54 UJ	1.21 U	1.98 U
PCB-007	0.710 U	0.973 U	0.798 U	0.809 U	0.683 U	1.72 U	1.03 U	0.921 U	1.15 U	1.38 U	1.08 U	1.77 U
PCB-008	4.24 J	6.48 U	0.865 U	7.12	0.739 U	1.86 U	1.11 U	0.997 U	55.7 J	1.50 UJ	1.17 U	8.80 U
PCB-009	0.813 U	1.11 U	0.914 U	0.927 U	0.782 U	1.97 U	1.18 U	1.05 U	4.35 J	1.58 U	1.24 U	2.03 U
PCB-010	0.545 U	0.906 U	0.565 U	0.593 U	0.449 U	0.906 U	0.746 U	0.632 U	0.809 U	1.01 U	0.925 U	1.26 U
PCB-011	9.75	7.45 U	10.9	15.2	8.75 U	9.13 U	7.43 U	10.5 U	11.8	9.69	7.67 U	7.68 U
PCB-012/013	0.754 U	1.04 U	0.741 U	0.785 U	0.712 U	1.73 U	1.10 U	1.06 U	8.64 J	1.41 U	1.02 U	1.57 U
PCB-014	0.588 U	0.809 U	0.578 U	0.613 U	0.556 U	1.35 U	0.856 U	0.827 U	0.892 U	1.10 U	0.794 U	1.22 U
PCB-015	0.713 U	0.980 U	2.73 U	0.742 U	0.673 U	1.63 U	1.04 U	1.00 U	64.3 J	1.33 UJ	0.961 U	1.48 U
Total Dichlorobiphenyls	14.0 J	7.45 U	10.9	37.1	8.75 U	9.13 U	7.43 U	10.5 U	157 J	9.69	7.67 U	8.80 U
PCB-016	2.00 J	0.717 U	2.18 J	5.51	0.559 J	0.482 U	0.628 U	0.408 U	45.7 J	4.06 J	2.59 J	4.31 J
PCB-017	1.35 U	0.563 U	1.86 U	7.20 U	0.532 U	0.379 U	0.493 U	0.714 U	34.3 J	2.55 UJ	2.18 U	3.76 U
PCB-018/030	3.85 J	3.25 J	3.70 J	16.5	0.874 J	0.319 U	0.415 U	1.29 U	78.5 J	5.47 J	4.33 J	7.67
PCB-019	1.70 J	2.05 J	0.363 U	4.11 J	0.273 U	0.475 U	0.571 U	0.347 U	8.85	0.954 J	0.359 U	0.413 U
PCB-020/028	3.92 U	2.23 U	6.92 J	25.2	1.52 U	2.01 U	0.365 U	2.17 U	203 J	11.7 J	5.54 J	9.78 J
PCB-021/033	3.04 U	0.384 U	4.12 U	4.14 U	0.824 U	0.259 U	0.341 U	1.70 U	87.8 J	5.97 J	2.57 U	5.75 J
PCB-022	1.72 J	0.443 U	2.77 J	3.19 J	0.921 J	0.769 U	0.394 U	0.988 J	73.9 J	5.54 J	2.09 J	4.40 J
PCB-023	0.147 U	0.397 U	0.198 U	0.193 U	0.182 U	0.268 U	0.353 U	0.239 U	0.233 U	0.254 U	0.210 U	0.229 U
PCB-024	0.154 U	0.425 U	0.218 U	0.207 U	0.190 U	0.286 U	0.372 U	0.242 U	1.55 J	0.265 U	0.221 U	0.252 U
PCB-025	0.306 J	5.86 J	0.616 J	63.1	0.343 U	0.282 U	0.372 U	0.251 U	12.9 J	1.15 J	0.221 U	0.732 J
PCB-026/029	0.669 U	0.370 U	1.21 U	129	0.447 U	0.581 U	0.330 U	0.629 U	23.4 J	1.73 UJ	1.02 U	1.95 J
PCB-027	0.412 U	0.392 U	0.201 U	13.0	0.175 U	0.264 U	0.343 U	0.223 U	7.40	0.613 J	0.204 U	0.797 J
PCB-031	3.19 J	2.11 U	5.55 U	23.0	1.13 U	1.21 U	0.334 U	1.66 U	135 J	9.26 J	4.14 J	8.47
PCB-032	1.65 J	1.34 U	1.93 J	8.58	0.595 U	0.248 U	0.323 U	0.827 U	32.9 J	2.35 UJ	2.01 J	2.74 J
PCB-034	0.142 U	0.383 U	0.191 U	0.979 J	0.176 U	0.259 U	0.341 U	0.230 U	0.225 U	0.244 U	0.202 U	0.221 U
PCB-035	0.388 U	0.680 U	0.428 U	0.416 U	0.283 U	0.442 U	0.432 U	0.922 U	4.09 J	0.453 U	0.297 U	0.443 U
PCB-036	0.304 U	0.532 U	0.200 U	1.63 J	0.221 U	0.346 U	0.339 U	0.363 U	0.556 U	0.355 U	0.233 U	0.347 U
PCB-037	1.56 U	0.593 U	2.32 J	0.983 J	1.05 J	0.386 U	0.377 U	0.982 U	78.5 J	4.49 J	1.58 J	2.70 J
PCB-038	0.320 U	0.561 U	0.210 U	0.343 U	0.233 U	0.365 U	0.357 U	0.382 U	0.586 U	0.374 U	0.245 U	0.365 U
PCB-039	0.303 U	0.531 U	0.199 U	1.81 J	0.221 U	0.345 U	0.338 U	0.362 U	0.998 J	0.354 U	0.232 U	0.346 U
Total Trichlorobiphenyls	14.4 J	11.2 J	20.4 J	297 J	3.40 J	2.01 U	0.628 U	0.988 J	829 J	49.2 J	22.3 J	49.3 J
PCB-040/041/071	23.8	20.4	7.72 J	52.5	0.283 U	0.392 U	0.422 U	0.418 U	119 J	7.91 J	2.63 U	4.53 J
PCB-042	18.9	14.8	3.27 J	48.5	0.287 U	0.398 U	0.429 U	0.424 U	49.6 J	3.01 J	0.983 U	2.41 J
PCB-043	0.616 U	0.682 U	0.456 J	0.421 U	0.295 U	0.436 U	0.452 U	0.443 U	7.48	0.522 U	0.295 U	0.397 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties				LDW Inland Properties							
	8801 Site/PACCAR				South Park Landfill				Whitehead Tyee			
Well ID	MW-16A	MW-16A-F	MW-42A	MW-30A	MW-12	MW-32	MW-32-F	MW-31	WT-MW-110	WT-MW-110-D	WT-MW-108	WT-MW-06
Relative Location at Site	Up	Up	Center	Down	Up	Center	Center	Down	Up	Up	Center	Down
Sample Date	3/28/2017	3/28/2017	3/28/2017	3/28/2017	3/20/2017	3/20/2017	3/20/2017	3/20/2017	3/27/2017	3/27/2017	3/27/2017	3/27/2017
PCB Congeners (pg/L)												
PCB-044/047/065	114	96.4	39.9	222	15.2 J	3.50 J	0.362 U	7.07 J	177 J	11.8 J	5.97 J	8.55 J
PCB-045/051	33.3	27.7	10.5 J	8.84 J	3.03 J	0.431 U	0.664 U	0.430 U	35.1 J	2.68 UJ	1.80 J	1.72 U
PCB-046	8.26	6.72 U	1.13 J	6.66	0.391 U	0.505 U	0.779 U	0.504 U	15.4 J	1.12 UJ	0.452 U	0.563 U
PCB-048	0.527 U	0.583 U	1.68 J	0.359 U	0.252 U	0.373 U	0.387 U	0.379 U	36.2 J	2.59 J	1.24 J	2.03 J
PCB-049/069	136	109	7.60 J	292	0.951 J	0.768 U	0.319 U	0.313 U	90.6 J	5.17 J	2.77 J	3.81 J
PCB-050/053	237	198	2.64 J	18.3	0.328 U	0.423 U	0.653 U	0.422 U	25.8 J	1.28 UJ	0.379 U	1.35 J
PCB-052	3,800	3,100	49.1	544	1.46 J	1.96 J	0.399 U	2.63 J	220 J	11.9 J	5.71	8.11
PCB-054	1.70 J	0.525 U	0.225 U	0.243 U	0.249 U	0.322 U	0.497 U	0.322 U	0.305 U	0.307 U	0.288 U	0.359 U
PCB-055	0.480 U	0.624 U	0.316 U	0.367 U	0.255 U	0.366 U	0.447 U	0.451 U	2.66 J	0.336 U	0.256 U	0.363 U
PCB-056	2.84 J	0.651 U	3.31 U	8.63	0.266 U	0.382 U	0.466 U	0.786 U	52.7 J	3.79 J	1.19 J	1.78 J
PCB-057	0.488 U	0.585 U	0.323 U	1.67 U	0.254 U	0.360 U	0.424 U	0.434 U	0.448 U	0.343 U	0.259 U	0.357 U
PCB-058	315	0.491 U	14.0	14.8	0.213 U	0.302 U	0.355 U	0.364 U	0.376 U	0.288 U	0.217 U	0.299 U
PCB-059/062/075	1.84 J	2.20 U	1.15 J	24.6	0.199 U	0.276 U	0.297 U	0.294 U	16.6	0.344 U	0.534 J	0.840 J
PCB-060	0.472 U	0.613 U	1.92 J	0.361 U	0.250 U	0.359 U	0.439 U	0.444 U	26.8 J	2.09 J	0.725 U	1.50 J
PCB-061/070/074/076	50.2	27.1	12.7 J	75.8	1.94 U	1.89 U	0.363 U	2.47 U	200 J	12.0 J	4.65 J	7.14 J
PCB-063	0.409 U	0.491 U	0.271 U	1.79 U	0.213 U	0.302 U	0.355 U	0.364 U	4.04 J	0.288 U	0.217 U	0.299 U
PCB-064	7.38	5.65	5.33 J	21.5	0.468 J	0.269 U	0.289 U	0.493 J	83.0 J	4.93 J	1.97 J	2.86 J
PCB-066	81.9	0.606 U	11.9	56.3	0.774 U	0.356 U	0.435 U	1.36 U	104 J	6.79 J	2.70 J	4.06 J
PCB-067	0.444 U	0.532 U	0.293 U	2.62 J	0.231 U	0.327 U	0.385 U	0.395 U	5.03 J	0.312 U	0.236 U	0.324 U
PCB-068	0.423 U	0.508 U	3.21 J	8.64	2.82 U	0.312 U	0.368 U	0.754 U	0.593 J	0.298 U	0.225 U	0.481 J
PCB-072	0.471 U	0.565 U	0.311 U	15.1	0.245 U	0.348 U	0.409 U	0.419 U	1.07 J	0.331 U	0.250 U	0.344 U
PCB-073	0.412 U	0.457 U	0.276 U	0.281 U	0.198 U	0.292 U	0.303 U	0.297 U	0.227 U	0.349 U	0.197 U	0.266 U
PCB-077	3.85 J	1.44 U	1.71 J	1.23 J	0.581 U	0.357 U	0.351 U	0.449 U	13.9 J	1.06 UJ	0.240 U	0.359 U
PCB-078	0.512 U	0.665 U	0.337 U	0.391 U	0.271 U	0.390 U	0.476 U	0.481 U	0.479 U	0.358 U	0.273 U	0.387 U
PCB-079	14.1	7.80	2.40 J	1.81 J	0.208 U	0.299 U	0.365 U	0.369 U	0.368 U	0.275 U	0.209 U	0.297 U
PCB-080	0.394 U	0.511 U	0.259 U	2.11 J	0.209 U	0.300 U	0.366 U	0.370 U	1.09 J	0.276 U	0.210 U	0.298 U
PCB-081	0.494 U	0.551 U	0.313 U	0.392 U	0.282 U	0.399 U	0.393 U	0.495 U	0.424 U	0.331 U	0.264 U	0.399 U
Total Tetrachlorobiphenyls	4,850 J	3,610	178 J	1,430 J	21.1 J	5.46 J	0.779 U	10.2 J	1,290 J	72.0 J	28.5 J	49.5 J
PCB-082	178	81.8	27.5	8.51 U	0.750 U	0.860 U	1.40 U	2.24 U	28.2 J	1.39 UJ	0.546 U	1.56 U
PCB-083/099	1,710	812	121	132	0.560 U	0.634 U	1.12 U	1.64 U	95.9 J	4.8 UJ	1.30 U	3.45 J
PCB-084	1,730	1,050	121	98.0	0.515 U	0.590 U	1.05 U	1.53 U	52.9 J	3.14 J	0.392 U	1.18 U
PCB-085/116/117	458	201	36.7	18.1	0.493 U	0.565 U	0.918 U	1.90 J	32.2 J	0.775 UJ	0.359 U	1.18 U
PCB-086/087/097/109/119/125	1,170	562	122	86.8	0.481 U	0.551 U	0.896 U	1.44 U	124 J	5.93 J	0.350 U	3.81 J
PCB-088/091	756	421	54.5	48.4	0.430 U	0.493 U	0.877 U	1.28 U	24.6 J	1.83 J	0.328 U	0.903 J
PCB-089	14.4	9.24 U	1.21 U	1.06 U	0.608 U	0.689 U	1.21 U	1.79 U	2.10 J	0.978 U	0.444 U	1.29 U
PCB-090/101/113	2,900	1,540	228	195	1.23 U	3.22 J	0.908 U	3.06 J	173 J	8.12 J	3.06 J	5.56 J
PCB-092	924	496	54.3	58.1	0.513 U	0.581 U	1.02 U	1.51 U	26.7 J	0.652 UJ	0.896 J	0.941 U
PCB-093/098/100/102	96.6	56.7	8.81	8.96	0.428 U	0.490 U	0.872 U	1.28 U	5.25 J	0.735 U	0.326 U	0.921 U
PCB-094	21.8	14.4	1.24 U	0.931 U	0.485 U	0.556 U	0.989 U	1.45 U	0.841 U	0.834 U	0.369 U	1.04 U
PCB-095	8,690	5,560	418	324	1.40 J	1.55 U	0.836 U	1.94 U	142 J	9.45 J	2.69 U	4.50 J

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties				LDW Inland Properties							
	8801 Site/PACCAR				South Park Landfill				Whitehead Tyee			
Well ID	MW-16A	MW-16A-F	MW-42A	MW-30A	MW-12	MW-32	MW-32-F	MW-31	WT-MW-110	WT-MW-110-D	WT-MW-108	WT-MW-06
Relative Location at Site	Up	Up	Center	Down	Up	Center	Center	Down	Up	Up	Center	Down
Sample Date	3/28/2017	3/28/2017	3/28/2017	3/28/2017	3/20/2017	3/20/2017	3/20/2017	3/20/2017	3/27/2017	3/27/2017	3/27/2017	3/27/2017
PCB Congeners (pg/L)												
PCB-096	54.0	38.0	2.70 J	2.36 J	0.152 U	0.171 U	0.213 U	0.210 U	1.54 U	0.222 U	0.131 U	0.145 U
PCB-103	17.7	11.7	1.31 U	6.97	0.400 U	0.459 U	0.815 U	1.19 U	0.924 J	0.687 U	0.305 U	0.861 U
PCB-104	0.0943 U	0.189 U	0.111 U	0.140 U	0.125 U	0.140 U	0.175 U	0.173 U	0.142 U	0.183 U	0.108 U	0.120 U
PCB-105	40.7	11.2	12.3	10.9	0.506 U	0.198 U	0.392 U	0.728 U	69.6 J	3.21 J	0.747 J	2.07 J
PCB-106	0.483 U	1.04 U	0.443 U	0.396 U	0.252 U	0.239 U	0.491 U	0.436 U	0.476 U	0.336 U	0.389 U	0.268 U
PCB-107	9.30	2.28 J	3.41 J	8.82	0.228 U	0.216 U	0.444 U	0.394 U	9.61	0.304 U	0.352 U	0.242 U
PCB-108/124	42.0	14.3	6.17 J	2.49 J	0.258 U	0.245 U	0.502 U	0.446 U	7.31 J	0.544 U	0.398 U	0.273 U
PCB-110/115	4,700	2,310	459	329	1.90 J	0.483 U	0.784 U	2.55 J	237 J	11.9 J	3.19 J	6.65 J
PCB-111	1.56 U	1.39 U	0.811 U	0.728 U	0.408 U	0.467 U	0.759 U	1.22 U	0.627 U	0.641 U	0.296 U	0.850 U
PCB-112	1.43 U	1.43 U	0.779 U	0.671 U	0.387 U	0.438 U	0.772 U	1.14 U	0.602 U	0.622 U	0.282 U	0.821 U
PCB-114	1.53 J	0.864 U	0.320 U	0.292 U	0.202 U	0.207 U	0.412 U	0.345 U	3.65 J	0.236 U	0.311 U	0.206 U
PCB-118	316	135	52.7	65.8	1.05 J	0.963 J	0.411 U	2.54 J	163 J	7.27 J	2.06 J	4.55 J
PCB-120	10.4	1.24 U	0.724 U	2.16 U	0.364 U	0.417 U	0.678 U	1.09 U	0.560 U	0.572 U	0.265 U	0.759 U
PCB-121	1.46 U	1.45 U	0.792 U	0.682 U	0.393 U	0.446 U	0.784 U	1.16 U	0.612 U	0.632 U	0.287 U	0.835 U
PCB-122	8.56	2.60 U	0.386 U	0.352 U	0.244 U	0.249 U	0.497 U	0.416 U	2.26 J	0.285 U	0.375 U	0.249 U
PCB-123	18.3	6.74 U	2.02 U	0.888 J	0.254 U	0.241 U	0.495 U	0.439 U	2.51 J	0.338 U	0.392 U	0.269 U
PCB-126	1.28 J	0.255 J	0.610 J	0.515 J	0.190 U	0.183 U	0.328 U	0.324 U	1.10 J	0.239 U	0.285 U	0.198 U
PCB-127	0.372 U	0.728 U	0.318 U	0.261 U	0.184 U	0.179 U	0.352 U	0.319 U	0.332 U	0.240 U	0.279 U	0.198 U
Total Pentachlorobiphenyls	23,900 J	13,300 J	1,730 J	1,400 J	4.35 J	4.18 J	1.40 U	10.1 J	1,200 J	50.9 J	9.95 J	31.5 J
PCB-128/166	209	37.7	38.6	13.7	0.254 U	0.331 U	0.274 U	0.522 U	31.0 J	1.84 J	0.351 U	1.05 U
PCB-129/138/160/163	1,260	287	211	87.1	2.82 U	1.39 J	0.297 U	3.37 J	188 J	9.13 J	2.29 J	5.27 J
PCB-130	79.0	17.5	16.3	8.13	0.379 U	0.485 U	0.420 U	0.781 U	11.0 J	0.624 J	0.320 U	0.428 U
PCB-131	16.9	3.41 U	4.93 J	1.07 U	0.397 U	0.501 U	0.448 U	0.818 U	2.46 J	0.412 U	0.335 U	0.452 U
PCB-132	577	135	99.4	43.8	0.839 J	0.499 U	0.446 U	1.45 U	57.9 J	3.29 J	0.935 J	1.63 J
PCB-133	15.5	4.94 J	3.40 U	2.83 J	0.369 U	0.466 U	0.417 U	0.761 U	1.93 J	0.383 U	0.312 U	0.420 U
PCB-134/143	101	26.3	17.7	7.21 J	0.395 U	0.498 U	0.446 U	0.814 U	7.22 J	0.410 U	0.333 U	0.450 U
PCB-135/151	498	176	81.1	43.3	0.190 U	1.27 J	0.301 U	0.250 U	44.1 J	2.77 J	0.146 U	1.60 J
PCB-136	286	96.3	44.3	24.5	0.144 U	0.250 U	0.229 U	0.190 U	17.6 J	1.06 UJ	0.111 U	0.870 J
PCB-137	64.8	13.4	14.6	4.38 J	0.320 U	0.410 U	0.355 U	0.661 U	10.4 J	0.744 J	0.271 U	0.362 U
PCB-139/140	30.2	7.23 J	6.13 J	3.04 J	0.340 U	0.428 U	0.383 U	0.700 U	3.33 J	0.353 U	0.287 U	0.373 J
PCB-141	193	49.4	30.2	10.1	0.552 U	0.426 U	0.369 U	0.577 U	28.1 J	1.63 J	0.480 U	0.850 J
PCB-142	0.450 U	0.559 U	0.292 U	0.411 U	0.403 U	0.507 U	0.454 U	0.829 U	0.314 U	0.418 U	0.339 U	0.458 U
PCB-144	53.6	17.9	11.8	2.99 J	0.179 U	0.31 U	0.284 U	0.236 U	7.17	0.194 U	0.138 U	0.149 U
PCB-145	1.14 J	0.321 U	0.316 U	0.141 U	0.152 U	0.263 U	0.241 U	0.200 U	0.138 U	0.164 U	0.117 U	0.127 U
PCB-146	137	34.4	25.5	17.1	0.332 U	0.418 U	0.374 U	0.683 U	18.3 J	1.17 J	0.280 U	0.589 J
PCB-147/149	1,260	320	190	99.8	2.24 J	2.92 J	0.409 U	1.72 U	99.3 J	6.32 J	1.30 U	4.36 J
PCB-148	0.620 U	0.422 U	0.415 U	0.185 U	0.200 U	0.346 U	0.317 U	0.263 U	0.182 U	0.216 U	0.154 U	0.167 U
PCB-150	1.44 J	0.306 U	0.301 U	0.134 U	0.145 U	0.251 U	0.230 U	0.191 U	0.132 U	0.157 U	0.112 U	0.121 U
PCB-152	2.23 J	0.304 U	0.299 U	0.133 U	0.144 U	0.249 U	0.228 U	0.189 U	0.131 U	0.155 U	0.111 U	0.120 U
PCB-153/168	837	218	134	67.8	2.91 U	1.98 U	0.298 U	3.23 J	117 J	6.04 J	1.55 U	4.29 J

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties				LDW Inland Properties							
	8801 Site/PACCAR				South Park Landfill				Whitehead Tyee			
Well ID	**MW-16A**	**MW-16A-F**	**MW-42A**	**MW-30A**	**MW-12**	**MW-32**	**MW-32-F**	**MW-31**	**WT-MW-110**	**WT-MW-110-D**	**WT-MW-108**	**WT-MW-06**
Relative Location at Site	**Up**	**Up**	**Center**	**Down**	**Up**	**Center**	**Center**	**Down**	**Up**	**Up**	**Center**	**Down**
Sample Date	**3/28/2017**	**3/28/2017**	**3/28/2017**	**3/28/2017**	**3/20/2017**	**3/20/2017**	**3/20/2017**	**3/20/2017**	**3/27/2017**	**3/27/2017**	**3/27/2017**	**3/27/2017**
PCB Congeners (pg/L)												
PCB-154	7.48	3.37 J	1.26 U	1.70 J	0.165 U	0.286 U	0.262 U	0.218 U	0.150 U	0.179 U	0.128 U	0.138 U
PCB-155	0.119 U	0.281 U	0.276 U	0.123 U	0.133 U	0.230 U	0.211 U	0.175 U	0.121 U	0.144 U	0.102 U	0.111 U
PCB-156/157	38.4	6.06 J	9.13 J	5.58 J	0.649 U	0.312 U	0.144 U	0.445 U	25.0 J	1.08 UJ	0.485 U	1.04 U
PCB-158	89.5	21.9	18.0	6.54	0.278 U	0.266 U	0.220 U	0.420 U	18.1 J	1.01 J	0.358 J	0.524 J
PCB-159	0.232 J	0.481 J	0.182 U	0.101 U	0.176 U	0.155 U	0.109 U	0.211 U	0.722 J	0.122 U	0.0946 U	0.118 U
PCB-161	0.298 U	0.370 U	0.194 U	0.273 U	0.267 U	0.336 U	0.301 U	0.549 U	0.208 U	0.277 U	0.225 U	0.303 U
PCB-162	2.91 J	0.162 U	0.584 U	0.0876 U	0.200 U	0.173 U	0.101 U	0.244 U	0.448 J	0.126 U	0.0873 U	0.114 U
PCB-164	82.6	22.2	15.2	8.13	0.241 U	0.309 U	0.267 U	0.497 U	11.8 J	0.625 UJ	0.204 U	0.272 U
PCB-165	0.821 U	0.380 U	0.199 U	0.280 U	0.274 U	0.345 U	0.309 U	0.564 U	0.214 U	0.284 U	0.231 U	0.311 U
PCB-167	34.1	6.98	6.91	2.63 J	0.232 U	0.200 U	0.117 U	0.284 U	7.12 J	0.445 UJ	0.194 U	0.338 U
PCB-169	0.288 U	0.248 U	0.209 U	0.161 U	0.409 U	0.256 U	0.155 U	0.351 U	0.970 U	0.208 U	0.160 U	0.210 U
Total Hexachlorobiphenyls	5,880 J	1,500 J	975 J	460 J	3.08 J	5.58 J	0.454 U	6.60 J	708 J	34.6 J	3.58 J	20.4 J
PCB-170	69.2	5.04 U	9.92	5.37	1.83 J	0.363 U	0.238 U	0.636 U	22.3 J	1.53 J	0.351 U	0.934 J
PCB-171/173	27.4	2.38 U	5.25 J	2.59 J	0.450 U	0.392 U	0.251 U	0.688 U	8.55 J	0.337 U	0.352 U	0.389 U
PCB-172	9.68	0.164 U	1.55 U	1.18 J	0.392 U	0.342 U	0.219 U	0.600 U	3.68 U	0.294 U	0.306 U	0.339 U
PCB-174	81.3	9.17	13.6	7.90	1.43 J	0.327 U	0.210 U	0.573 U	26.4 J	1.08 UJ	0.293 U	0.957 J
PCB-175	2.37 J	10.8 U	0.633 J	0.185 U	1.76 U	0.672 U	0.319 U	0.449 U	0.660 U	1.72 U	0.163 U	1.22 J
PCB-176	7.51	1.18 U	1.61 J	0.986 J	0.189 U	0.241 U	0.231 U	0.325 U	2.57 J	0.212 U	0.118 U	0.197 U
PCB-177	43.1	2.79 U	6.44 U	5.85	0.773 U	0.371 U	0.238 U	0.651 U	13.2 J	0.721 J	0.333 U	1.00 J
PCB-178	11.2	1.62 U	1.69 U	1.83 U	0.264 U	0.337 U	0.323 U	0.455 U	4.26 J	0.297 U	0.165 U	0.276 U
PCB-179	24.9	2.57 U	3.51 U	3.46 J	0.571 U	0.352 U	0.246 U	0.347 U	7.83	0.645 J	0.126 U	0.211 U
PCB-180/193	116	13.3	17.2	10.6	4.31 J	0.899 U	0.188 U	1.61 J	51.5 J	3.36 UJ	0.915 J	2.04 J
PCB-181	1.87 J	0.166 U	0.238 U	0.357 U	0.398 U	0.347 U	0.222 U	0.608 U	0.359 U	0.298 U	0.311 U	0.344 U
PCB-182	0.197 U	0.229 U	0.187 U	0.178 U	0.251 U	0.321 U	0.307 U	0.432 U	0.255 J	0.282 U	0.157 U	0.262 U
PCB-183/185	41.4	3.73 J	7.69 J	3.12 U	0.869 U	0.271 U	0.174 U	0.476 U	15.8	0.983 J	0.243 U	0.269 U
PCB-184	0.165 U	0.193 U	0.157 U	0.149 U	0.211 U	0.269 U	0.258 U	0.363 U	0.184 U	0.237 U	0.132 U	0.221 U
PCB-186	0.148 U	0.173 U	0.141 U	0.134 U	0.189 U	0.242 U	0.231 U	0.326 U	0.165 U	0.213 U	0.118 U	0.198 U
PCB-187	67.5	0.233 U	12.4	8.39 U	0.255 U	0.325 U	0.311 U	0.857 U	29.3 J	0.286 UJ	0.545 U	0.266 U
PCB-188	0.154 U	0.180 U	0.147 U	0.140 U	0.197 U	0.252 U	0.241 U	0.339 U	0.172 U	0.221 U	0.123 U	0.206 U
PCB-189	2.39 U	0.162 U	0.817 J	0.568 U	0.203 U	0.354 U	0.200 U	0.278 U	1.15 J	0.276 U	0.152 U	0.258 U
PCB-190	9.75	1.17 J	1.57 J	0.864 J	0.286 U	0.249 U	0.163 U	0.436 U	3.44 U	0.295 U	0.241 U	0.265 U
PCB-191	2.24 U	0.124 U	0.293 U	0.267 U	0.297 U	0.259 U	0.166 U	0.455 U	1.01 J	0.223 U	0.233 U	0.257 U
PCB-192	0.201 U	0.131 U	0.188 U	0.282 U	0.314 U	0.274 U	0.176 U	0.481 U	0.170 U	0.236 U	0.246 U	0.272 U
Total Heptachlorobiphenyls	513 J	27.4 J	70.7 J	38.8 J	7.57 J	0.899 U	0.323 U	1.61 J	184 J	3.88 J	0.915 J	6.15 J
PCB-194	15.8	0.244 U	1.77 J	1.76 U	1.73 U	0.288 U	0.596 U	0.428 U	15.6 J	1.27 J	0.668 U	1.00 J
PCB-195	6.03	0.269 U	0.628 U	0.968 J	0.314 U	0.318 U	0.187 U	0.472 U	4.90 J	0.238 U	0.186 U	0.262 U
PCB-196	4.27 U	0.219 U	0.842 J	0.355 U	0.738 J	0.345 U	0.175 U	0.527 U	6.11	0.481 J	0.158 U	0.181 U
PCB-197	0.495 J	0.145 U	0.197 U	0.115 U	0.248 U	0.229 U	0.116 U	0.350 U	0.404 U	0.159 U	0.105 U	0.120 U
PCB-198/199	12.6	0.223 U	1.59 U	1.38 J	1.47 U	0.351 U	0.178 U	0.536 U	15.0 J	1.21 UJ	0.161 U	0.348 U
PCB-200	1.46 J	0.158 U	0.420 J	0.264 J	0.270 U	0.250 U	0.127 U	0.381 U	1.45 U	0.173 U	0.115 U	0.131 U

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Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Adjacent Properties				LDW Inland Properties							
	8801 Site/PACCAR				South Park Landfill				Whitehead Tyee			
Well ID	**MW-16A**	**MW-16A-F**	**MW-42A**	**MW-30A**	**MW-12**	**MW-32**	**MW-32-F**	**MW-31**	**WT-MW-110**	**WT-MW-110-D**	**WT-MW-108**	**WT-MW-06**
Relative Location at Site	**Up**	**Up**	**Center**	**Down**	**Up**	**Center**	**Center**	**Down**	**Up**	**Up**	**Center**	**Down**
Sample Date	**3/28/2017**	**3/28/2017**	**3/28/2017**	**3/28/2017**	**3/20/2017**	**3/20/2017**	**3/20/2017**	**3/20/2017**	**3/27/2017**	**3/27/2017**	**3/27/2017**	**3/27/2017**
PCB Congeners (pg/L)												
PCB-201	1.42 J	0.161 U	0.327 J	0.229 U	0.276 U	0.255 U	0.129 U	0.389 U	2.06 U	0.177 U	0.117 U	0.134 U
PCB-202	3.10 J	0.174 U	0.420 U	0.491 U	0.297 U	0.275 U	0.139 U	0.420 U	3.73 U	0.458 J	0.126 U	0.144 U
PCB-203	6.43 U	0.218 U	1.02 J	0.486 U	0.373 U	0.345 U	0.175 U	0.526 U	10.1 J	0.607 UJ	0.158 U	0.181 U
PCB-204	0.211 U	0.162 U	0.107 U	0.129 U	0.278 U	0.256 U	0.130 U	0.392 U	0.209 U	0.178 U	0.118 U	0.135 U
PCB-205	1.10 J	0.197 U	0.382 J	0.267 U	0.230 U	0.232 U	0.136 U	0.345 U	0.950 J	0.174 U	0.136 U	0.191 U
Total Octachlorobiphenyl	42.0 J	0.269 U	4.76 J	2.61 J	0.738 J	0.351 U	0.596 U	0.536 U	52.7 J	2.21 J	0.668 U	1.00 J
PCB-206	6.53	1.13 U	0.615 U	0.753 U	0.992 U	1.14 U	0.967 U	1.58 U	14.1 J	0.655 UJ	0.720 U	0.981 U
PCB-207	0.517 U	0.688 U	0.248 U	0.369 U	0.399 U	0.420 U	0.485 U	0.546 U	1.56 J	0.366 U	0.406 U	0.406 U
PCB-208	1.33 J	0.702 U	0.253 U	0.376 U	0.407 U	0.429 U	0.494 U	0.557 U	3.29 J	0.373 U	0.415 U	0.415 U
Total Nonachlorobiphenyl	7.86 J	1.13 U	0.615 U	0.753 U	0.992 U	1.14 U	0.967 U	1.58 U	19.0 J	0.655	0.720 U	0.981 U
PCB-209	2.35 J	0.196 U	0.364 U	0.271 U	0.364 U	0.410 U	0.317 U	0.464 U	6.79	0.346 U	0.324 U	0.348 U
Total Decachlorobiphenyl	2.35 J	0.196 U	0.364 U	0.271 U	0.364 U	0.410 U	0.317 U	0.464 U	6.79	0.346 U	0.324 U	0.348 U
Total PCB Congeners (pg/L)	35,200 J	18,500 J	2,990 J	3,670 J	40.3 J	15.2 J	7.43 U	29.4 J	4,450 J	223 J	66.7 J	160 J
Total PCB Congeners (ug/L)	0.0352 J	0.0185 J	0.00299 J	0.00367 J	0.0000403 J	0.0000152 J	0.00000743 U	0.0000294 J	0.00445 J	0.000223 J	0.0000667 J	0.000160 J
PCB Congener TEQ (ug/L)	0.146	0.0343	0.0668	0.0567	0.0158	0.0131	0.0188	0.0217	0.134	0.0155	0.0168	0.0134
PCB Aroclors (ug/L)												
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	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 UJ	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 UJ	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 UJ	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 UJ	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1254	0.024	0.023	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	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 UJ	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 UJ	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Aroclor 1268	0.010 U	0.010 U	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	0.010 U
Total PCB Aroclors	0.024	0.023	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

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Inland Properties							
	North Boeing Field			EMF at KCIA	80 S Hudson Street		Gray Line of Seattle	WA DOT Spokane Street
Well ID	NGW521	NGW520	NGW252	MW-7	MW-07	MW-02	MW-K01	MW-2
Relative Location at Site	Up	Center	Down		Up	Down		
Sample Date	3/22/2017	3/22/2017	3/22/2017	3/22/2017	4/6/2017	4/6/2017	4/6/2017	4/6/2017
PCB Congeners (pg/L)								
PCB-001	1,640	1.51 J	0.431 U	0.517 U	0.435 U	0.992 U	57.7	0.864 U
PCB-002	5.98	0.158 U	0.354 U	0.240 U	0.512 U	1.19 U	26.8	0.994 U
PCB-003	50.9	0.169 U	0.378 U	0.257 U	0.547 U	1.27 U	24.9	1.06 U
Total Monochlorobiphenyls	1,700	1.51 J	0.431 U	0.517 U	0.547 U	1.27 U	109	1.06 U
PCB-004	52,500	41.6	0.983 U	0.619 U	0.346 U	0.694 U	21.0	1.10 U
PCB-005	720	0.368 U	0.807 U	0.585 U	0.368 U	0.749 U	0.996 U	1.06 U
PCB-006	19,900	12.7	0.847 U	0.615 U	0.386 U	0.787 U	114	1.11 U
PCB-007	1,250	0.347 U	0.761 U	0.552 U	0.347 U	0.707 U	0.940 U	0.998 U
PCB-008	52,100	35.0	3.14 J	2.24 J	2.14 J	0.766 U	52.1 J	1.08 U
PCB-009	3,180	2.21 J	0.872 U	0.632 U	0.397 U	0.810 U	5.25 J	1.14 U
PCB-010	5,070	4.00 J	0.603 U	0.379 U	0.212 U	0.425 U	0.735 U	0.675 U
PCB-011	253	9.01 U	8.81 U	8.69 U	8.88	10.3	37.5	16.6
PCB-012/013	1,380	1.64 J	0.659 U	0.567 U	0.373 U	0.764 U	14.8 J	1.04 U
PCB-014	0.715 U	0.290 U	0.514 U	0.443 U	0.291 U	0.596 U	1.01 U	0.810 U
PCB-015	12,900	8.83	0.622 U	0.536 U	0.352 U	3.03 U	15.5	0.981 U
Total Dichlorobiphenyls	149,000	106 J	3.14 J	2.24 J	11.0 J	10.3	260 J	16.6
PCB-016	31,200	25.0	1.31 J	1.64 J	1.01 U	1.34 U	30.2	0.970 U
PCB-017	34,300	41.3	1.32 U	1.45 U	1.05 J	1.05 U	21.2	0.762 U
PCB-018/030	79,700	69.2	2.84 J	3.05 J	1.79 U	0.885 U	51.8	3.00 J
PCB-019	36,900	52.0	0.979 U	0.938 J	0.313 U	1.05 U	9.11 J	0.862 U
PCB-020/028	71,700 J	72.9 J	2.28 U	2.88 U	2.72 U	4.39 U	37.6	3.96 U
PCB-021/033	13,900	13.2	0.577 U	1.64 U	2.02 U	0.676 U	17.9 J	2.59 U
PCB-022	18,400	11.3	0.726 J	1.28 J	1.96 J	0.780 U	18.3	2.08 U
PCB-023	32.3	0.159 U	0.220 U	0.198 U	0.207 U	0.700 U	0.489 U	0.528 U
PCB-024	1,260	1.17 J	0.234 U	0.205 U	0.210 U	0.794 U	0.506 U	0.575 U
PCB-025	8,520	6.21 U	0.231 U	0.209 U	0.528 J	0.737 U	9.30 J	0.556 U
PCB-026/029	16,200	11.2	0.724 U	0.824 U	0.884 U	0.653 U	14.1 J	0.767 U
PCB-027	8,740	8.23	0.216 U	0.189 U	0.194 U	0.732 U	4.30 J	0.530 U
PCB-031	54,400	42.3	1.77 U	2.72 U	2.18 U	3.01 U	35.2	2.99 U
PCB-032	36,700	105	1.55 U	1.51 U	1.17 J	0.688 U	12.9	1.66 J
PCB-034	232	0.511 J	0.212 U	0.191 U	0.200 U	0.675 U	0.471 U	0.509 U
PCB-035	120	0.305 U	0.366 U	0.327 U	1.00 U	1.12 U	3.68 U	0.882 U
PCB-036	73.3	0.239 U	0.287 U	0.256 U	0.522 U	0.874 U	1.72 U	0.691 U
PCB-037	4,760	2.68 J	0.756 J	0.782 U	1.78 U	0.974 U	9.69 J	2.69 J
PCB-038	27.1	0.252 U	0.302 U	0.270 U	0.742 J	0.920 U	0.791 U	0.728 U
PCB-039	201	0.238 U	0.286 U	0.256 U	0.756 U	0.872 U	0.749 U	0.690 U
Total Trichlorobiphenyls	417,000 J	456 J	5.63 J	6.91 J	5.45 J	4.39 U	272 J	7.35 J
PCB-040/041/071	23,300	136	1.60 J	0.313 U	0.497 U	1.05 U	9.88 J	0.688 U
PCB-042	12,000	88.8	0.389 U	0.318 U	0.504 U	1.07 U	5.07 J	0.698 U
PCB-043	1,890	3.33 J	0.402 U	0.324 U	0.565 U	1.18 U	2.17 U	0.763 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Inland Properties							
	North Boeing Field			EMF at KCIA	80 S Hudson Street		Gray Line of Seattle	WA DOT Spokane Street
Well ID	NGW521	NGW520	NGW252	MW-7	MW-07	MW-02	MW-K01	MW-2
Relative Location at Site	Up	Center	Down		Up	Down		
Sample Date	3/22/2017	3/22/2017	3/22/2017	3/22/2017	4/6/2017	4/6/2017	4/6/2017	4/6/2017
PCB Congeners (pg/L)								
PCB-044/047/065	50,900	426	5.08 J	4.70 J	5.89 J	4.68 U	22.8 U	9.04 J
PCB-045/051	16,600	131	0.361 U	0.419 U	0.553 U	2.05 U	6.44 J	0.911 U
PCB-046	7,360	84.5	0.423 U	0.491 U	0.649 U	2.40 U	1.46 U	1.07 U
PCB-048	6,750	4.57 J	0.344 U	0.277 U	0.483 U	1.01 U	2.24 U	0.652 U
PCB-049/069	31,600	325	2.37 J	1.14 J	1.54 U	0.830 U	14.3 J	1.80 U
PCB-050/053	18,400	320	0.880 J	0.411 U	0.544 U	2.01 U	4.18 J	0.895 U
PCB-052	88,800	683	10.7	3.03 J	2.36 U	1.04 U	33.3	4.27 U
PCB-054	307	9.91	0.270 U	0.313 U	0.414 U	1.53 U	0.932 U	0.682 U
PCB-055	159	0.337 U	0.367 U	0.277 U	0.491 U	1.13 U	1.04 U	0.773 U
PCB-056	6,090	6.00 U	0.920 U	0.289 U	1.39 J	1.18 U	4.65 U	0.806 U
PCB-057	176	0.329 U	0.379 U	0.279 U	0.485 U	1.05 U	1.02 U	0.755 U
PCB-058	676	16.0	1.89 U	0.234 U	0.407 U	0.879 U	0.856 U	0.633 U
PCB-059/062/075	2,960	7.78 J	0.270 U	0.221 U	0.790 U	0.739 U	2.34 J	0.484 U
PCB-060	2,970	1.14 U	0.361 U	0.272 U	1.31 U	1.11 U	1.85 U	0.759 U
PCB-061/070/074/076	27,200	89.8	5.90 U	1.99 U	4.58 U	7.04 U	21.9 J	5.02 U
PCB-063	598	1.49 U	0.318 U	0.234 U	0.407 U	0.879 U	0.856 U	0.633 U
PCB-064	14,900	18.8	1.22 J	0.215 U	0.340 U	0.720 U	6.38 J	1.37 U
PCB-066	16,300	72.3	2.77 U	0.832 U	1.90 J	2.81 J	10.5 J	0.751 U
PCB-067	515	0.299 U	0.345 U	0.254 U	0.441 U	0.953 U	0.928 U	0.687 U
PCB-068	107	5.79 U	0.329 U	0.242 U	1.03 J	0.909 U	0.886 U	0.655 U
PCB-072	223	4.41 J	0.366 U	0.269 U	0.468 U	1.01 U	0.985 U	0.729 U
PCB-073	1.26 U	3.70 J	0.269 U	0.217 U	0.378 U	0.788 U	1.45 U	0.511 U
PCB-077	293	1.04 U	0.359 U	0.270 U	1.76 J	0.827 U	5.35 J	0.596 U
PCB-078	1.31 U	0.360 U	0.391 U	0.296 U	0.524 U	1.20 U	1.11 U	0.823 U
PCB-079	23.4	0.702 U	0.300 U	0.227 U	0.401 U	0.923 U	0.850 U	0.631 U
PCB-080	1.01 U	0.277 U	0.301 U	0.227 U	0.403 U	0.926 U	0.853 U	0.633 U
PCB-081	15.2	0.369 U	0.401 U	0.302 U	0.419 U	0.910 U	0.925 U	0.679 U
Total Tetrachlorobiphenyls	331,000	2,430 J	21.9 J	8.87 J	12.0 J	2.81 J	120 J	9.04 J
PCB-082	1,080	24.4	4.62 J	0.731 U	1.37 U	2.68 U	3.84 U	1.94 U
PCB-083/099	7,270 J	154 J	41.5 J	2.58 U	1.11 U	2.10 U	8.41 U	1.52 U
PCB-084	6,250	138	8.73 U	0.520 U	0.989 U	2.00 U	4.94 J	1.42 U
PCB-085/116/117	1,540	31.7	8.92 J	0.481 U	2.10 U	1.76 U	2.53 U	1.28 U
PCB-086/087/097/109/119/125	7,600	175	43.8	0.469 U	0.879 U	1.72 U	15.4 J	1.24 U
PCB-088/091	2,880	80.5	5.89 J	0.435 U	0.827 U	1.68 U	2.02 U	1.18 U
PCB-089	178	2.42 J	1.08 U	0.593 U	1.20 U	2.28 U	3.13 U	1.65 U
PCB-090/101/113	12,900	320	63.2	2.98 J	2.06 U	1.71 U	21.8 U	1.23 U
PCB-092	2,710	73.5	11.3	0.500 U	1.01 U	1.92 U	3.42 U	1.39 U
PCB-093/098/100/102	736	15.5	0.770 U	0.433 U	0.823 U	1.67 U	2.01 U	1.18 U
PCB-094	140	6.00 U	0.873 U	0.491 U	0.933 U	1.89 U	2.28 U	1.34 U
PCB-095	17,300	480	43.8	1.19 U	0.789 U	1.60 U	18.3	1.13 U

Table D-1
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Site	LDW Inland Properties							
	North Boeing Field			EMF at KCIA	80 S Hudson Street		Gray Line of Seattle	WA DOT Spokane Street
Well ID	NGW521	NGW520	NGW252	MW-7	MW-07	MW-02	MW-K01	MW-2
Relative Location at Site	Up	Center	Down		Up	Down		
Sample Date	3/22/2017	3/22/2017	3/22/2017	3/22/2017	4/6/2017	4/6/2017	4/6/2017	4/6/2017
PCB Congeners (pg/L)								
PCB-096	347	8.54	0.182 U	0.202 U	0.213 U	0.678 U	0.518 U	0.319 U
PCB-103	169	5.37 U	0.720 U	0.405 U	0.769 U	1.56 U	1.88 U	1.10 U
PCB-104	2.81 J	0.0921 U	0.150 U	0.166 U	0.176 U	0.557 U	0.426 U	0.263 U
PCB-105	1,410	21.6	11.9	0.779 U	1.21 U	0.628 U	5.80 J	0.538 U
PCB-106	0.731 U	0.373 U	0.418 U	0.352 U	0.581 U	0.856 U	1.27 U	0.655 U
PCB-107	363	6.47	2.24 J	0.318 U	0.525 U	0.773 U	2.02 J	0.592 U
PCB-108/124	192	6.85 U	6.45 U	0.360 U	0.993 U	0.874 U	1.72 U	0.669 U
PCB-110/115	13,900	342	67.7	5.85 J	0.770 U	1.50 U	21.7 J	1.09 U
PCB-111	1.53 U	0.628 U	0.720 U	0.397 U	0.745 U	1.45 U	2.09 U	1.05 U
PCB-112	21.7	0.581 U	0.686 U	0.377 U	0.764 U	1.45 U	1.99 U	1.05 U
PCB-114	73.0	0.847 J	0.783 J	0.268 U	0.585 U	0.681 U	1.07 U	0.543 U
PCB-118	5,960	99.3	90.1	3.18 J	1.27 U	0.669 U	12.2 U	0.574 U
PCB-120	31.4	0.561 U	0.643 U	0.355 U	0.665 U	1.30 U	1.86 U	0.941 U
PCB-121	1.38 U	0.591 U	0.697 U	0.383 U	0.777 U	1.47 U	2.02 U	1.07 U
PCB-122	37.3	1.46 U	0.391 U	0.323 U	0.453 U	0.822 U	1.53 J	0.655 U
PCB-123	54.0	1.59 U	1.51 J	0.355 U	0.585 U	0.862 U	1.28 U	0.660 U
PCB-126	2.75 J	0.285 U	1.66 U	0.247 U	1.17 U	0.457 U	2.09 U	0.453 U
PCB-127	0.521 U	0.279 U	0.300 U	0.250 U	0.624 U	0.484 U	1.30 U	0.448 U
Total Pentachlorobiphenyls	83,100 J	1,970 J	397 J	12.0 J	2.10 U	2.68 U	69.7 J	1.94 U
PCB-128/166	273	19.5	45.5	0.209 U	0.776 U	0.594 U	3.53 U	0.291 U
PCB-129/138/160/163	2,280	136	526	6.55 J	1.70 U	0.643 U	22.2 J	1.29 J
PCB-130	131	9.74	38.9	0.318 U	0.782 U	0.948 U	1.84 U	0.447 U
PCB-131	34.9	3.45 J	0.873 J	0.326 U	0.795 U	1.06 U	2.02 U	0.457 U
PCB-132	1,030	59.5	55.2	0.325 U	0.792 U	1.06 U	6.78 J	0.455 U
PCB-133	31.8	2.84 J	3.50 J	0.303 U	0.740 U	0.985 U	1.88 U	0.425 U
PCB-134/143	194	11.8	4.93 J	0.324 U	0.791 U	1.05 U	2.01 U	0.455 U
PCB-135/151	920	47.4	91.5	0.166 U	0.276 U	0.642 U	13.8 J	0.341 U
PCB-136	609	28.2	19.9	0.126 U	0.210 U	0.488 U	4.28 J	0.259 U
PCB-137	113	8.39	7.90	0.269 U	0.662 U	0.802 U	2.74 U	0.378 U
PCB-139/140	44.7	3.44 J	1.38 J	0.279 U	0.681 U	0.906 U	1.73 U	0.391 U
PCB-141	300	23.2	147	0.279 U	0.687 U	0.834 U	5.69 J	0.393 U
PCB-142	0.817 U	0.655 U	1.48 U	0.330 U	0.806 U	1.07 U	2.05 U	0.463 U
PCB-144	94.3	6.54	6.98	0.156 U	0.260 U	0.605 U	1.80 J	0.321 U
PCB-145	1.04 J	0.203 U	0.138 U	0.133 U	0.221 U	0.514 U	0.586 U	0.273 U
PCB-146	308	17.4	88.8	0.272 U	0.664 U	0.884 U	5.18 U	0.381 U
PCB-147/149	2,410	123	174	1.16 J	0.727 U	0.968 U	24.0	1.20 U
PCB-148	2.99 J	0.266 U	0.181 U	0.175 U	0.291 U	0.675 U	0.769 U	0.358 U
PCB-150	5.31	0.193 U	0.131 U	0.127 U	0.211 U	0.489 U	0.558 U	0.260 U
PCB-152	4.82 J	0.191 U	0.130 U	0.126 U	0.209 U	0.486 U	0.553 U	0.258 U
PCB-153/168	1,740	102	735	9.23 J	1.66 J	0.705 U	24.2	1.38 U

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Relative Location at Site	Up	Center	Down		Up	Down		
Sample Date	3/22/2017	3/22/2017	3/22/2017	3/22/2017	4/6/2017	4/6/2017	4/6/2017	4/6/2017
PCB Congeners (pg/L)								
PCB-154	23.8	1.01 J	0.686 J	0.145 U	0.241 U	0.559 U	1.42 J	0.297 U
PCB-155	0.157 U	0.177 U	0.121 U	0.116 U	0.193 U	0.449 U	0.512 U	0.238 U
PCB-156/157	160	8.96 J	27.4	0.667 J	1.29 U	0.295 U	3.99 U	0.761 U
PCB-158	185	11.5	19.2	0.168 U	0.660 J	0.478 U	2.29 J	0.233 U
PCB-159	0.151 U	0.149 U	1.44 J	0.160 U	0.215 U	0.253 U	0.994 U	0.197 U
PCB-161	0.541 U	0.434 U	0.981 U	0.219 U	0.534 U	0.711 U	1.36 U	0.307 U
PCB-162	3.92 U	0.386 U	1.12 U	0.183 U	0.203 U	0.346 U	0.665 U	0.187 U
PCB-164	131	9.39	16.6	0.202 U	0.498 U	0.604 U	1.22 U	0.285 U
PCB-165	0.556 U	0.446 U	1.32 J	0.225 U	0.548 U	0.730 U	1.39 U	0.315 U
PCB-167	59.9	4.73 U	29.3	0.360 U	0.556 U	0.401 U	1.34 U	0.217 U
PCB-169	0.248 U	0.259 U	3.97 U	0.284 U	1.03 U	0.368 U	0.729 U	0.293 U
Total Hexachlorobiphenyls	11,100 J	633 J	2,040 J	17.6 J	2.32 J	1.07 U	106 J	1.29 J
PCB-170	43.5	7.26	810	0.709 U	0.374 U	0.244 U	6.15 J	0.559 U
PCB-171/173	17.6	3.09 J	39.1	0.282 U	0.379 U	0.263 U	3.62 J	0.578 U
PCB-172	6.55	1.17 U	64.4	0.245 U	0.330 U	0.230 U	1.70 U	0.504 U
PCB-174	52.2	7.60	193	0.235 U	0.315 U	0.219 U	13.1 U	0.482 U
PCB-175	2.13 J	0.273 U	5.92	0.202 U	0.282 U	0.496 U	38.2	0.474 U
PCB-176	6.85	0.785 J	13.3	0.146 U	0.204 U	0.359 U	2.02 J	0.343 U
PCB-177	27.2	3.20 U	108	0.267 U	0.358 U	0.249 U	6.68 U	0.547 U
PCB-178	9.01	1.16 J	23.3 U	0.205 U	0.285 U	0.503 U	3.90 J	0.480 U
PCB-179	23.6	2.62 U	50.3	0.156 U	0.218 U	0.383 U	9.19 J	0.366 U
PCB-180/193	78.0	15.7	2,250	3.00 J	1.19 U	0.197 U	32.5	2.01 J
PCB-181	1.28 J	0.361 U	0.510 U	0.249 U	0.335 U	0.233 U	0.757 U	0.511 U
PCB-182	0.603 J	0.263 U	0.293 U	0.195 U	0.271 U	0.478 U	0.486 U	0.456 U
PCB-183/185	30.8	5.33 J	130	0.195 U	0.262 U	0.182 U	9.56 J	0.400 U
PCB-184	0.138 U	0.221 U	0.246 U	0.164 U	0.228 U	0.401 U	0.408 U	0.383 U
PCB-186	0.123 U	0.198 U	0.220 U	0.147 U	0.204 U	0.360 U	0.366 U	0.344 U
PCB-187	48.7	6.68	266	0.501 U	0.275 U	0.485 U	0.493 U	0.463 U
PCB-188	0.129 U	0.206 U	0.230 U	0.153 U	0.213 U	0.375 U	0.381 U	0.358 U
PCB-189	1.89 J	0.481 J	19.9	0.273 U	0.586 U	0.140 U	1.72 U	0.479 U
PCB-190	6.21	1.30 J	50.1	0.180 U	0.256 U	0.167 U	3.25 J	0.384 U
PCB-191	1.62 J	0.270 U	6.96	0.186 U	0.250 U	0.174 U	0.566 U	0.382 U
PCB-192	0.224 U	0.286 U	0.403 U	0.197 U	0.265 U	0.184 U	0.598 U	0.404 U
Total Heptachlorobiphenyls	358 J	49.4 J	4,010	3.00 J	1.19 U	0.503 U	108 J	2.01 J
PCB-194	4.50 U	1.46 U	427	1.00 U	0.200 U	0.298 U	19.1	0.333 U
PCB-195	0.975 U	0.344 U	47.0	0.317 U	0.221 U	0.329 U	5.32 J	0.368 U
PCB-196	1.51 J	0.529 U	54.1	0.269 U	0.246 U	0.308 U	10.2 J	0.273 U
PCB-197	0.384 J	0.236 U	2.56 J	0.179 U	0.163 U	0.205 U	0.956 J	0.181 U
PCB-198/199	3.54 J	1.13 U	118	0.274 U	0.250 U	0.313 U	23.0 U	0.278 U
PCB-200	0.169 U	0.257 U	11.5	0.195 U	0.178 U	0.223 U	2.46 U	0.197 U

Table D-1
Groundwater Analytical Results: PCB Congeners and Aroclors

Site	LDW Inland Properties							
	North Boeing Field			EMF at KCIA	80 S Hudson Street		Gray Line of Seattle	WA DOT Spokane Street
Well ID	NGW521	NGW520	NGW252	MW-7	MW-07	MW-02	MW-K01	MW-2
Relative Location at Site	Up	Center	Down		Up	Down		
Sample Date	3/22/2017	3/22/2017	3/22/2017	3/22/2017	4/6/2017	4/6/2017	4/6/2017	4/6/2017
PCB Congeners (pg/L)								
PCB-201	0.172 U	0.263 U	9.59	0.199 U	0.181 U	0.227 U	5.08 J	0.202 U
PCB-202	0.832 U	0.277 U	11.9 U	0.214 U	0.195 U	0.245 U	10.1 J	0.217 U
PCB-203	1.84 J	0.355 U	79.9	0.269 U	0.245 U	0.308 U	15.5 U	0.273 U
PCB-204	0.173 U	0.264 U	0.196 U	0.20 U	0.182 U	0.229 U	0.618 U	0.203 U
PCB-205	0.148 U	0.251 U	7.47	0.232 U	0.162 U	0.241 U	0.493 U	0.269 U
Total Octachlorobiphenyl	7.27 J	1.46 U	757 J	1.00 U	0.250 U	0.329 U	50.8 J	0.368 U
PCB-206	0.862 U	1.03 U	27.0	0.804 U	1.03 U	1.08 U	73.1	2.22 U
PCB-207	0.414 U	0.539 U	2.49 U	0.451 U	0.522 U	0.538 U	7.07 J	0.900 U
PCB-208	0.423 U	0.550 U	3.54 J	0.461 U	0.532 U	0.549 U	27.5	0.918 U
Total Nonachlorobiphenyl	0.862 U	1.03 U	30.5 J	0.804 U	1.03 U	1.08 U	108 J	2.22 U
PCB-209	0.292 U	0.530 U	1.39 U	0.391 U	0.162 U	0.194 U	169	0.606 U
Total Decachlorobiphenyl	0.292 U	0.530 U	1.39 U	0.391 U	0.162 U	0.194 U	169	0.606 U
Total PCB Congeners (pg/L)	994,000 J	5,640 J	7,270 J	50.6 J	30.8 J	13.1 J	1,370 J	36.3 J
Total PCB Congeners (ug/L)	0.994 J	0.0056400 J	0.0072700 J	0.0000506 J	0.0000308 J	0.0000131 J	0.0013700 J	0.0000363 J
PCB Congener TEQ (ug/L)	0.544	0.0223	0.148	0.0168	0.0743	0.0286	0.117	0.0272
PCB Aroclors (ug/L)								
Aroclor 1016	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Aroclor 1221	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Aroclor 1232	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Aroclor 1242	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Aroclor 1248	0.892	0.010 U	0.010 U	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Aroclor 1254	0.010 U	0.0050 J	0.010 U	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Aroclor 1260	0.010 U	0.010 U	0.012	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Aroclor 1262	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Aroclor 1268	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U
Total PCB Aroclors	0.89	0.0050 J	0.012	0.010 U	0.010 U	0.011 U	0.010 U	0.011 U

Wells are ordered from upgradient to downgradient for each site. Surface water samples follow the downgradient well samples for sites where a surface water sample was collected.

Up = Upgradient well.
Center = Center well.
Down = Downgradient well.
Surface = Surface water.
ug/L = Micrograms per liter.
pg/L = Picograms per liter.
-D = Field duplicate sample.
-F = Laboratory filtered sample.
J = Estimated concentration.
U = Not detected at or above the reporting limit.
UJ = Not detected at or above the estimated reporting limit.
EMF = Electronics Manufacturing Facility.
KCIA = King County International Airport.
LDW = Lower Duwamish Waterway.
PCB = Polychlorinated biphenyl.
TEQ = Toxic equivalent.
WA DOT = Washington State Department of Transportation.

Table D-2
Analytical Results - Conventional Parameters

Site	Sample	Sample Date	Tidal Influence at Well	Chloride (mg/L)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)
LDW Adjacent Sites							
Duwamish Shipyard	DS-DS1P2-19-20170314	3/14/2017	No	584	2,080	1,190	8.2
	DS-DS1-PZ-01-20170314	3/14/2017	Yes	1,330	4,260	2,440	61.3
	DS-DS1-MW-6-20170314	3/14/2017	Yes	2,370	6,680	4,080	18.6
	DS-SW-1-20170314	3/14/2017	--	1,680	5,110	2,910	13.2
Glacier Northwest	GNW-MW-32S-20170321	3/21/2017	No	11.2	653	346 J	66.5 J
	GNW-MW-4S-20170321	3/21/2017	No	44.1	386	257 J	1.2 UJ
	GNW-MW-33S-20170321	3/21/2017	No	2.68	2,390	650 J	3.0 J
	GNW-SW-1-20170321	3/21/2017	--	1,310	4,090	2,240 J	15.3 J
North Terminal 115	NT115-MW-20-20170317	3/17/2017	No	13.6	645	396	4.7
	NT115-MW-3-20170317	3/17/2017	No	636	5,150	3,500	220
	NT115-MW-10-20170317	3/17/2017	No	2.22	422	264	1.1 U
Douglas Management Dock	DMD-MW-11-20170330	3/30/2017	No	752	2,470	1,320	1.1 U
	DMD-MW-17-20170330	3/30/2017	No	94.4	2,110	1,370	1.1 UJ
	DMD-MW-15-20170330	3/30/2017	Yes	669	2,940	1,680	54.4
	DMD-SW-1-20170330	3/30/2017	--	776	2,530	1,400	18.4
Industrial Container Services	ICS-DOF-MW3-20170329	3/29/2017	No	252	2,330	1,560	1.2 UJ
	ICS-DOF-MW1-20170329	3/29/2017	Yes	2,190	7,560	4,380	72.1
	ICS-SA-MW2-20170329	3/29/2017	Yes	851	3,110	1,730	2.9
Duwamish Marine Center	DMC-MW-10-20170313	3/13/2017	Yes	14.1	242	147	1.1 U
	DMC-MW-8-20170313	3/13/2017	Yes	25.5	583	360	1.1 U
	DMC-MW-16-20170313	3/13/2017	Yes	3,050	9,030	5,020	8.3
	DMC-SW-1-20170313	3/13/2017	--	2,140	6,520	3,750	4.6
Crowley Marine Services	CMS-EMW-1S-20170316	3/16/2017	No	1.56	374	242	2.4
	CMS-DMW-6A-20170316	3/16/2017	Yes	12.6	351	210	69.7
	CMS-EMW-13S-20170316	3/16/2017	Yes	1,670	4,280	2,460	2.7
	CMS-SW-1-20170316	3/16/2017	--	71.9	238	133	56.3
Jorgensen Forge	JF-MW-23-20170331	3/31/2017	No	64.6	518	263	61.0
	JF-MW-48-20170331	3/31/2017	No	1.63	202	134	3.9
	JF-MW-51-20170331	3/31/2017	Yes	9.22	377	262	10.0
Boeing Isaacson/Thompson	BIT-MW-25-20170315	3/15/2017	No	3.42	475	299	1.1 U
	BIT-MW-13-20170315	3/15/2017	No	7.81	641	448	32.2
	BIT-MW-10-20170315	3/15/2017	Yes	1.73	70.1	44.0	1.1 U
8801 Site/PACCAR	8801-MW-16A-20170328	3/28/2017	No	1.35	190	111	1.1 U
	8801-MW-42A-20170328	3/28/2017	No	7.86	306	194	10.1
	8801-MW-30A-20170328	3/28/2017	Yes	660	2,620	1,440	1.1 U

Table D-2
Analytical Results - Conventional Parameters

Site	Sample	Sample Date	Tidal Influence at Well	Chloride (mg/L)	Conductivity (uS/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)
Inland Sites							
South Park Landfill	SPL-MW-12-20170320	3/20/2017	No	6.55	148	104	3.2
	SPL-MW-32-20170320	3/20/2017	No	22.3	988	606	52.0
	SPL-MW-31-20170320	3/20/2017	No	13.1	349	257	2.2
Whitehead Tyee	WT-MW-110-20170327	3/27/2017	No	8.85	388	243	1.4
	WT-MW-108-20170327	3/27/2017	No	13.1	665	416	55.5
	WT-MW-06-20170327	3/27/2017	No	9.92	343	186	18.4
North Boeing Field	NBF-NGW521-20170322	3/22/2017	No	4.25	780	478 J	1.2 UJ
	NBF-NGW520-20170322	3/22/2017	No	4.02	410	254 J	21.4 J
	NBF-NGW252-20170322	3/22/2017	No	14.4	457	296 J	1.2 UJ
EMF at KCIA	EMF-MW-7-20170322	3/22/2017	No	16.1	328	186 J	1.1 UJ
80 S Hudson Street	SHS-MW-07-20170406	4/6/2017	No	24.3	802	534	1.1 UJ
	SHS-MW-02-20170406	4/6/2017	No	2.37	232	155	50.7
Gray Line of Seattle	GLS-MW-K01-20170406	4/6/2017	No	23.3	1,090	614	68.0
WA DOT Spokane Street	DOT-MW-2-20170406	4/6/2017	No	1,290	3,860	2,080	15.1

Wells are ordered from upgradient to downgradient for each site. Where a surface water sample was collected, it follows the downgradient well.

uS/cm - microSiemens per centimeter
mg/L - milligrams per Liter
pg/L - picograms per Liter
J - estimated concentration
U - not detected at or above the reporting limit
UJ - not detected at or above the estimated reporting limit
EMF - Electronics Manufacturing Facility
KCIA - King County International Airport
LDW - Lower Duwamish Waterway
PCB - polychlorinated biphenyl
WA DOT - Washington State Department of Transportation

Table D-3
Quality Assurance Sample Results

	Equipment Rinse[1]				Source Water Blank[1]	
Sample ID	LER-ER-1	LER-ER-2	LER-ER-3	LER-ER-4	LSB-SB-1	LSB-SB-2
Sample Date	3/16/2017	3/17/2017	3/27/2017	4/6/2017	3/15/2017	3/28/2017
PCB Congeners (pg/L)						
PCB-001	4.71 U	1.92 U	1.26 U	0.345 U	2.74 J	0.152 U
PCB-002	11.5 U	1.72 U	0.186 U	4.08 U	6.31	0.169 U
PCB-003	6.65 U	1.92 U	0.198 U	3.18 U	3.37 J	0.18 U
Total Monochlorobiphenyls	11.5 U	1.92 U	1.26 U	4.08 U	12.4 J	0.18 U
PCB-004	0.687 U	1.92 U	1.01 U	2.94 U	0.395 U	0.557 U
PCB-005	0.657 U	1.73 U	0.937 U	0.35 U	0.441 U	0.534 U
PCB-006	0.683 U	1.82 U	0.984 U	2.24 U	0.458 U	0.561 U
PCB-007	0.616 U	1.63 U	0.884 U	0.33 U	0.413 U	0.504 U
PCB-008	2.13 U	1.77 U	0.958 U	3.64 U	2.2 J	0.546 U
PCB-009	0.709 U	1.87 U	1.01 U	0.378 U	0.475 U	0.578 U
PCB-010	0.435 U	1.18 U	0.621 U	0.247 U	0.25 U	0.342 U
PCB-011	7.67 U	7.89 U	6.85 U	10.6 U	7.95	8.04
PCB-012/013	0.658 U	1.76 U	0.93 U	0.355 U	0.466 U	0.535 U
PCB-014	0.532 U	1.37 U	0.726 U	0.277 U	0.377 U	0.418 U
PCB-015	0.604 U	1.66 U	0.879 U	2.02 J	0.428 U	0.506 U
Total Dichlorobiphenyls	7.67 U	7.89 U	6.85 U	2.02 J	10.2 J	8.04
PCB-016	0.266 U	0.817 U	1.19 U	0.378 U	0.698 J	0.626 J
PCB-017	0.509 U	0.579 J	0.763 J	0.83 U	0.508 U	0.173 U
PCB-018/030	1.06 U	0.808 U	2.08 U	1.62 U	1.12 J	0.752 U
PCB-019	0.26 U	0.57 U	0.242 U	0.326 U	0.196 U	0.188 U
PCB-020/028	0.852 U	2.55 U	1.37 U	2.25 J	0.947 U	1.23 U
PCB-021/033	0.769 U	1.91 J	0.939 J	1.7 J	0.738 U	0.525 U
PCB-022	0.588 U	1.15 U	0.611 U	1.21 U	0.455 J	0.503 J
PCB-023	0.138 U	0.351 U	0.157 U	0.224 U	0.13 U	0.128 U
PCB-024	0.149 U	0.35 U	0.16 U	0.224 U	0.127 U	0.131 U
PCB-025	0.134 U	0.777 U	0.165 U	0.467 U	0.126 U	0.135 U
PCB-026/029	0.13 U	1.19 U	0.368 J	0.969 J	0.122 U	0.119 U

Table D-3
Quality Assurance Sample Results

	Equipment Rinse[1]				Source Water Blank[1]	
Sample ID	LER-ER-1	LER-ER-2	LER-ER-3	LER-ER-4	LSB-SB-1	LSB-SB-2
Sample Date	3/16/2017	3/17/2017	3/27/2017	4/6/2017	3/15/2017	3/28/2017
PCB-027	0.138 U	0.323 U	0.148 U	0.206 U	0.118 U	0.12 U
PCB-031	0.729 U	1.53 J	1.45 U	1.65 J	0.751 U	0.962 U
PCB-032	0.845 U	0.889 U	0.893 U	0.802 U	0.447 U	0.752 J
PCB-034	0.131 U	0.339 U	0.151 U	0.216 U	0.124 U	0.123 U
PCB-035	0.204 U	1.81 U	0.236 U	1.58 J	0.17 U	0.245 U
PCB-036	0.18 U	0.867 U	0.185 U	0.859 J	0.15 U	0.192 U
PCB-037	0.192 U	2.23 U	0.396 U	1.90 U	0.477 J	0.214 U
PCB-038	0.185 U	0.447 U	0.195 U	0.715 U	0.154 U	0.202 U
PCB-039	0.168 U	1.17 U	0.185 U	0.722 J	0.139 U	0.192 U
Total Trichlorobiphenyls	1.06 U	4.02 J	2.07 J	9.73 J	2.75 J	1.88 J
PCB-040/041/071	0.37 U	0.467 U	0.311 U	0.778 U	0.262 U	0.332 U
PCB-042	0.175 U	0.474 U	0.316 U	0.384 U	0.266 U	0.337 U
PCB-043	0.182 U	0.515 U	0.333 U	0.412 U	0.275 U	0.367 U
PCB-044/047/065	2.79 U	1.95 U	3.4 U	4.12 U	15.0	7.41 J
PCB-045/051	0.37 U	0.518 U	0.637 U	0.422 U	1.44 U	1.48 J
PCB-046	0.415 U	0.607 U	0.321 U	0.495 U	0.273 U	0.240 U
PCB-048	0.160 U	0.440 U	0.285 U	0.352 U	0.176 J	0.314 U
PCB-049/069	0.339 U	0.363 U	0.235 U	1.03 J	0.378 U	0.259 U
PCB-050/053	0.35 U	0.509 U	0.269 U	0.415 U	0.229 U	0.201 U
PCB-052	0.898 U	1.01 U	0.862 U	1.45 U	0.724 U	1.17 U
PCB-054	0.28 U	0.387 U	0.205 U	0.316 U	0.184 U	0.153 U
PCB-055	0.178 U	0.492 U	0.207 U	0.618 U	0.147 U	0.237 U
PCB-056	0.182 U	0.927 U	0.216 U	0.645 U	0.15 U	0.247 U
PCB-057	0.165 U	0.482 U	0.209 U	0.604 U	0.139 U	0.241 U
PCB-058	0.152 U	0.404 U	0.175 U	0.507 U	0.129 U	0.202 U
PCB-059/062/075	0.127 U	0.328 U	0.219 U	0.571 U	0.193 U	0.234 U
PCB-060	0.174 U	1.11 J	0.203 U	1.04 J	0.144 U	0.233 U
PCB-061/070/074/076	1.02 U	2.38 U	0.728 U	3.37 J	0.76 U	0.988 U

Table D-3
Quality Assurance Sample Results

	Equipment Rinse[1]				Source Water Blank[1]	
Sample ID	LER-ER-1	LER-ER-2	LER-ER-3	LER-ER-4	LSB-SB-1	LSB-SB-2
Sample Date	3/16/2017	3/17/2017	3/27/2017	4/6/2017	3/15/2017	3/28/2017
PCB-063	0.146 U	0.404 U	0.175 U	0.507 U	0.123 U	0.202 U
PCB-064	0.118 U	0.32 U	0.213 U	0.78 U	0.18 U	0.449 J
PCB-066	0.183 U	1.24 U	0.201 U	1.21 U	0.47 U	0.736 J
PCB-067	0.146 U	0.438 U	0.19 U	0.549 U	0.124 U	0.219 U
PCB-068	0.518 U	0.418 U	0.56 U	0.524 U	2.55 J	1.16 U
PCB-072	0.153 U	0.465 U	0.202 U	0.583 U	0.129 U	0.232 U
PCB-073	0.127 U	0.345 U	0.223 U	0.276 U	0.191 U	0.246 U
PCB-077	0.166 U	1.69 J	0.197 U	1.77 U	0.14 U	0.222 U
PCB-078	0.209 U	0.524 U	0.221 U	1.04 J	0.173 U	0.253 U
PCB-079	0.157 U	0.402 U	0.169 U	1.08 U	0.13 U	0.194 U
PCB-080	0.162 U	0.403 U	0.17 U	0.507 U	0.134 U	0.194 U
PCB-081	0.179 U	0.549 U	0.214 U	0.933 U	0.153 U	0.248 U
Total Tetrachlorobiphenyls	2.79 U	2.8 J	3.4 U	6.48 J	17.7 J	10.1 J
PCB-082	0.464 U	0.831 U	0.562 U	0.849 U	0.287 U	0.504 U
PCB-083/099	0.408 U	0.598 U	0.429 U	0.668 U	0.25 U	0.374 U
PCB-084	0.351 U	0.559 U	0.419 U	0.622 U	0.228 U	0.374 U
PCB-085/116/117	0.334 U	0.547 U	0.592 U	0.558 U	0.206 U	0.331 U
PCB-086/087/097/109/119/125	0.335 U	0.533 U	0.36 U	0.545 U	0.207 U	0.323 U
PCB-088/091	0.319 U	0.467 U	0.35 U	0.52 U	0.207 U	0.313 U
PCB-089	0.42 U	0.649 U	0.466 U	0.726 U	0.258 U	0.407 U
PCB-090/101/113	0.327 U	0.486 U	0.389 U	0.544 U	0.2 U	0.305 U
PCB-092	0.37 U	0.548 U	0.393 U	0.612 U	0.227 U	0.343 U
PCB-093/098/100/102	0.298 U	0.465 U	0.348 U	0.518 U	0.193 U	0.311 U
PCB-094	0.327 U	0.527 U	0.395 U	0.587 U	0.212 U	0.353 U
PCB-095	0.286 U	0.446 U	0.523 U	0.496 U	0.186 U	0.298 U
PCB-096	0.102 U	0.209 U	0.06 U	0.198 U	0.0693 U	0.105 U
PCB-103	0.268 U	0.434 U	0.325 U	0.484 U	0.174 U	0.291 U
PCB-104	0.0888 U	0.172 U	0.081 U	0.163 U	0.0603 U	0.0861 U

Table D-3
Quality Assurance Sample Results

	Equipment Rinse[1]				Source Water Blank[1]	
Sample ID	LER-ER-1	LER-ER-2	LER-ER-3	LER-ER-4	LSB-SB-1	LSB-SB-2
Sample Date	3/16/2017	3/17/2017	3/27/2017	4/6/2017	3/15/2017	3/28/2017
PCB-105	0.114 U	0.712 U	0.139 U	0.874 U	0.121 U	0.161 U
PCB-106	0.145 U	0.361 U	0.186 U	0.32 U	0.149 U	0.215 U
PCB-107	0.127 U	0.326 U	0.168 U	0.289 U	0.13 U	0.194 U
PCB-108/124	0.146 U	0.368 U	0.19 U	0.327 U	0.15 U	0.22 U
PCB-110/115	0.319 U	0.467 U	0.315 U	0.477 U	0.197 U	0.283 U
PCB-111	0.275 U	0.452 U	0.305 U	0.461 U	0.17 U	0.274 U
PCB-112	0.276 U	0.413 U	0.296 U	0.462 U	0.169 U	0.259 U
PCB-114	0.12 U	0.293 U	0.133 U	0.581 J	0.123 U	0.145 U
PCB-118	0.126 U	0.836 U	0.169 U	0.947 U	0.133 U	0.201 U
PCB-120	0.26 U	0.404 U	0.273 U	0.412 U	0.16 U	0.244 U
PCB-121	0.274 U	0.42 U	0.301 U	0.47 U	0.168 U	0.263 U
PCB-122	0.146 U	0.353 U	0.161 U	0.31 U	0.149 U	0.175 U
PCB-123	0.139 U	0.363 U	0.187 U	0.322 U	0.143 U	0.216 U
PCB-126	0.119 U	0.832 U	0.128 U	1.42 J	0.123 U	0.14 U
PCB-127	0.113 U	0.253 U	0.127 U	0.596 U	0.119 U	0.142 U
Total Pentachlorobiphenyls	0.464 U	0.836 U	0.592 U	2.00 J	0.287 U	0.504 U
PCB-128/166	0.138 U	0.325 U	0.162 U	0.29 U	0.119 U	0.151 U
PCB-129/138/160/163	0.419 J	0.351 U	0.395 J	0.313 U	0.111 U	0.727 U
PCB-130	0.18 U	0.486 U	0.249 U	0.455 U	0.155 U	0.236 U
PCB-131	0.173 U	0.513 U	0.257 U	0.474 U	0.149 U	0.244 U
PCB-132	0.164 U	0.511 U	0.256 U	0.472 U	0.142 U	0.243 U
PCB-133	0.164 U	0.477 U	0.239 U	0.441 U	0.142 U	0.227 U
PCB-134/143	0.172 U	0.511 U	0.256 U	0.471 U	0.149 U	0.242 U
PCB-135/151	0.163 U	0.287 U	0.113 U	0.274 U	0.104 U	0.122 U
PCB-136	0.122 U	0.218 U	0.0858 U	0.208 U	0.078 U	0.0926 U
PCB-137	0.143 U	0.411 U	0.21 U	0.385 U	0.123 U	0.2 U
PCB-139/140	0.153 U	0.439 U	0.22 U	0.405 U	0.132 U	0.208 U
PCB-141	0.157 U	0.427 U	0.218 U	0.4 U	0.135 U	0.208 U

Table D-3
Quality Assurance Sample Results

	Equipment Rinse[1]				Source Water Blank[1]	
Sample ID	LER-ER-1	LER-ER-2	LER-ER-3	LER-ER-4	LSB-SB-1	LSB-SB-2
Sample Date	3/16/2017	3/17/2017	3/27/2017	4/6/2017	3/15/2017	3/28/2017
PCB-142	0.183 U	0.52 U	0.26 U	0.48 U	0.158 U	0.247 U
PCB-144	0.157 U	0.271 U	0.106 U	0.258 U	0.1 U	0.115 U
PCB-145	0.128 U	0.23 U	0.0905 U	0.219 U	0.082 U	0.0975 U
PCB-146	0.15 U	0.428 U	0.215 U	0.395 U	0.129 U	0.203 U
PCB-147/149	0.152 U	0.469 U	0.252 U	0.433 U	0.132 U	0.223 U
PCB-148	0.167 U	0.302 U	0.119 U	0.288 U	0.106 U	0.128 U
PCB-150	0.12 U	0.219 U	0.0861 U	0.209 U	0.077 U	0.0929 U
PCB-152	0.122 U	0.217 U	0.0855 U	0.207 U	0.0781 U	0.0922 U
PCB-153/168	0.247 U	0.342 U	0.259 U	0.316 U	0.0991 U	0.377 U
PCB-154	0.145 U	0.25 U	0.0983 U	0.238 U	0.0928 U	0.106 U
PCB-155	0.115 U	0.201 U	0.079 U	0.191 U	0.0737 U	0.0852 U
PCB-156/157	0.108 U	0.997 U	0.156 U	1.97 J	0.0981 U	0.142 U
PCB-158	0.0973 U	0.261 U	0.13 U	0.233 U	0.084 U	0.235 J
PCB-159	0.0546 U	0.192 U	0.0797 U	0.411 J	0.0487 U	0.0747 U
PCB-161	0.116 U	0.344 U	0.173 U	0.318 U	0.101 U	0.164 U
PCB-162	0.0637 U	0.222 U	0.133 U	0.406 J	0.0564 U	0.0667 U
PCB-164	0.114 U	0.31 U	0.158 U	0.289 U	0.0977 U	0.15 U
PCB-165	0.127 U	0.354 U	0.177 U	0.327 U	0.11 U	0.168 U
PCB-167	0.0655 U	0.258 U	0.0853 U	0.595 J	0.058 U	0.0773 U
PCB-169	0.149 U	0.781 U	0.226 U	1.53 U	0.127 U	0.119 U
Total Hexachlorobiphenyls	0.419 J	0.997 U	0.395 J	3.38 J	0.158 U	0.235 J
PCB-170	0.339 U	0.481 U	0.222 U	0.35 U	0.163 U	0.278 U
PCB-171/173	0.218 U	0.508 U	0.218 U	0.367 U	0.103 U	0.274 U
PCB-172	0.268 U	0.443 U	0.19 U	0.32 U	0.127 U	0.239 U
PCB-174	0.164 U	0.423 U	0.182 U	0.306 U	0.0777 U	0.228 U
PCB-175	0.0954 U	0.287 U	0.146 U	0.208 U	0.0933 U	0.135 U
PCB-176	0.0617 U	0.207 U	0.106 U	0.151 U	0.0604 U	0.0976 U
PCB-177	0.19 U	0.481 U	0.206 U	0.347 U	0.0899 U	0.259 U

Table D-3
Quality Assurance Sample Results

	Equipment Rinse[1]				Source Water Blank[1]	
Sample ID	LER-ER-1	LER-ER-2	LER-ER-3	LER-ER-4	LSB-SB-1	LSB-SB-2
Sample Date	3/16/2017	3/17/2017	3/27/2017	4/6/2017	3/15/2017	3/28/2017
PCB-178	0.0885 U	0.29 U	0.148 U	0.211 U	0.0866 U	0.137 U
PCB-179	0.0669 U	0.221 U	0.113 U	0.161 U	0.0655 U	0.104 U
PCB-180/193	0.248 U	1.1 U	0.163 U	0.274 U	0.117 U	0.205 U
PCB-181	0.189 U	0.449 U	0.193 U	0.324 U	0.0892 U	0.242 U
PCB-182	0.0943 U	0.276 U	0.141 U	0.201 U	0.0923 U	0.13 U
PCB-183/185	0.141 U	0.351 U	0.151 U	0.254 U	0.0666 U	0.19 U
PCB-184	0.0676 U	0.232 U	0.118 U	0.169 U	0.0661 U	0.109 U
PCB-186	0.0617 U	0.208 U	0.106 U	0.151 U	0.0604 U	0.0979 U
PCB-187	0.0942 U	0.28 U	0.143 U	0.204 U	0.0922 U	0.132 U
PCB-188	0.0615 U	0.217 U	0.111 U	0.158 U	0.0602 U	0.102 U
PCB-189	0.094 U	0.419 U	0.123 U	0.814 U	0.0984 U	0.127 U
PCB-190	0.242 U	0.33 U	0.152 U	0.24 U	0.116 U	0.191 U
PCB-191	0.235 U	0.336 U	0.144 U	0.243 U	0.111 U	0.181 U
PCB-192	0.229 U	0.355 U	0.153 U	0.257 U	0.108 U	0.192 U
Total Heptachlorobiphenyls	0.339 U	1.10 U	0.222 U	0.814 U	0.163 U	0.278 U
PCB-194	0.884 U	0.346 U	0.403 U	0.954 U	0.14 U	0.622 J
PCB-195	0.21 U	0.382 U	0.199 U	0.139 U	0.146 U	0.161 U
PCB-196	0.239 U	0.473 U	0.151 U	0.216 U	0.157 U	0.141 U
PCB-197	0.132 U	0.314 U	0.100 U	0.143 U	0.0868 U	0.0933 U
PCB-198/199	0.247 U	0.481 U	0.153 U	0.22 U	0.162 U	0.143 U
PCB-200	0.157 U	0.342 U	0.109 U	0.156 U	0.103 U	0.102 U
PCB-201	0.118 U	0.349 U	0.111 U	0.159 U	0.0775 U	0.104 U
PCB-202	0.107 U	0.376 U	0.120 U	0.172 U	0.0700 U	0.112 U
PCB-203	0.244 U	0.472 U	0.150 U	0.216 U	0.160 U	0.140 U
PCB-204	0.146 U	0.351 U	0.112 U	0.160 U	0.096 U	0.104 U
PCB-205	0.161 U	0.279 U	0.146 U	0.102 U	0.112 U	0.118 U
Total Octachlorobiphenyl	0.884 U	0.481 U	0.403 U	0.954 U	0.162 U	0.622 J
PCB-206	0.617 U	1.19 U	0.534 U	1.05 U	0.534 U	0.661 U

Table D-3
Quality Assurance Sample Results

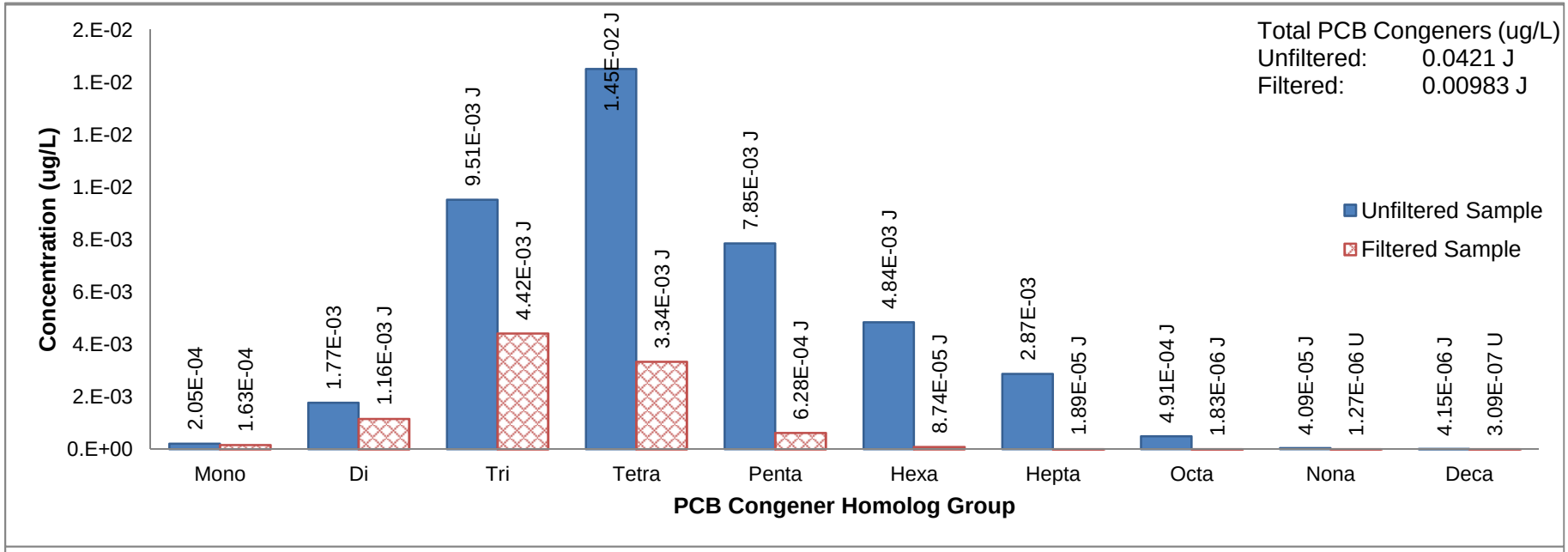
	Equipment Rinse[1]				Source Water Blank[1]	
Sample ID	**LER-ER-1**	**LER-ER-2**	**LER-ER-3**	**LER-ER-4**	**LSB-SB-1**	**LSB-SB-2**
Sample Date	**3/16/2017**	**3/17/2017**	**3/27/2017**	**4/6/2017**	**3/15/2017**	**3/28/2017**
PCB-207	0.446 U	0.405 U	0.296 U	0.664 U	0.293 U	0.297 U
PCB-208	0.456 U	0.413 U	0.302 U	0.677 U	0.299 U	0.303 U
Total Nonchlorobiphenyl	0.617 U	1.19 U	0.534 U	1.05 U	0.534 U	0.661 U
PCB-209	0.301 U	0.434 U	0.242 U	0.306 U	0.256 U	0.254 U
Total Decachlorobiphenyl	0.301 U	0.434 U	0.242 U	0.306 U	0.256 U	0.254 U
Total PCB Congeners (pg/L)	0.419 J	6.82 J	2.47 J	23.6 J	43.0 J	20.9 J
Total PCB Congeners (ug/L)	4.19E-07 J	0.00000682 J	0.00000247 J	0.0000236 J	0.0000430 J	0.0000209 J
PCB Congener TEQ (ug/L)	0.00823	0.0536	0.00985	0.165	0.00810	0.00885
PCB Aroclors (ug/L)						
PCB-aroclor 1016	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
PCB-aroclor 1221	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
PCB-aroclor 1232	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
PCB-aroclor 1242	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
PCB-aroclor 1248	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
PCB-aroclor 1254	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
PCB-aroclor 1260	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
PCB-aroclor 1262	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
PCB-aroclor 1268	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
Total PCB Aroclors	0.01 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U

[1] All four equipment rinse sample IDs were LER-ER-1 and both source blank sample IDs were LSB-SB followed by the sample date. Samples were renumbered to easily distinguish each sample.

PCB - polychlorinated biphenyl
ug/L - micrograms per Liter
pg/L - picograms per Liter
J - estimated concentration
U - not detected at or above the reporting limit
TEQ - toxic equivalent concentration

Appendix E
Filtered Versus Unfiltered Sample Results

Figure E-1
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors
Douglas Management Dock - Well MW-17 (Unfiltered and Filtered Samples)



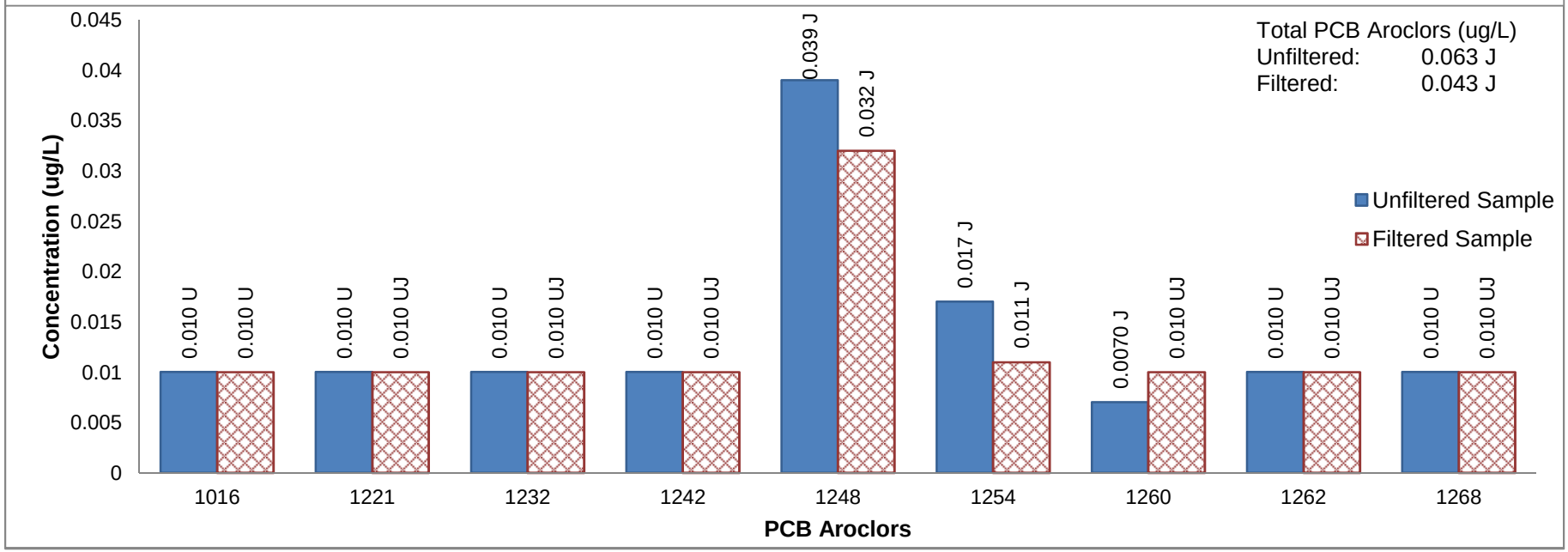


Figure E-2
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors
Industrial Container Services - Well DOF-MW1 (Unfiltered and Filtered Samples)

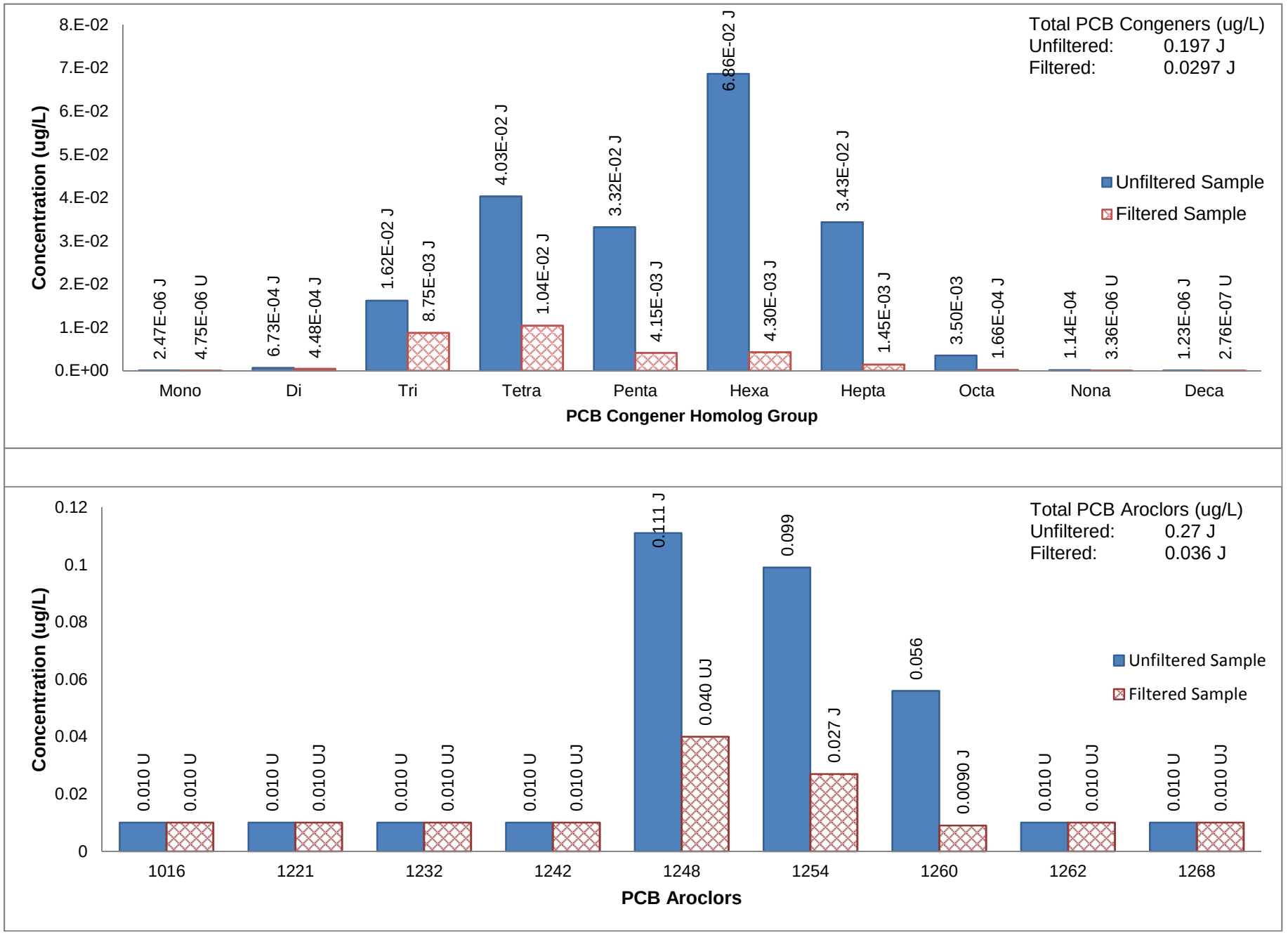


Figure E-3
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors
Crowley Marine Services - Well EMW-13S (Unfiltered and Filtered Samples)

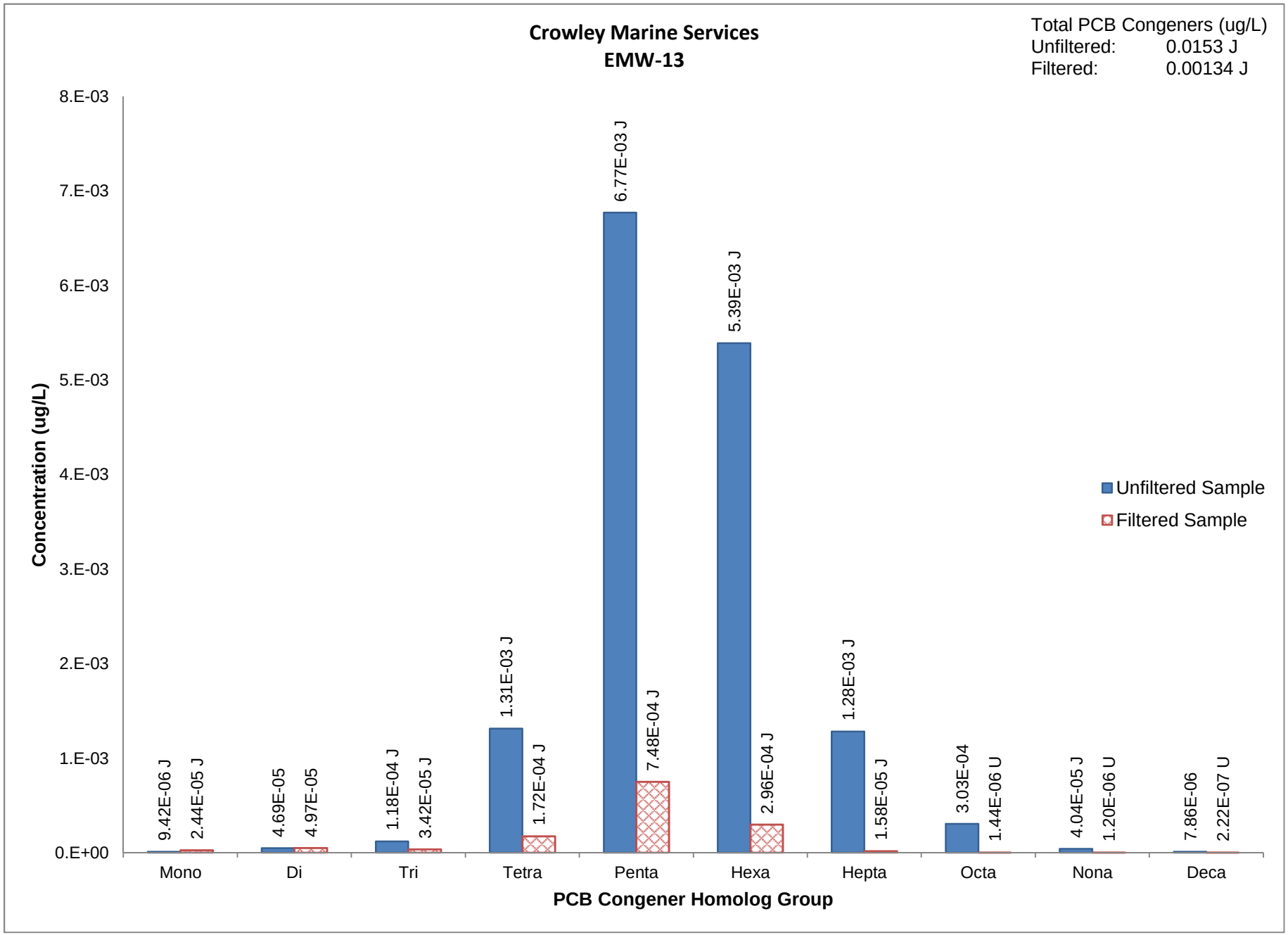


Figure E-4
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors
8801 Site/PACCAR - Well MW-16A (Unfiltered and Filtered Samples

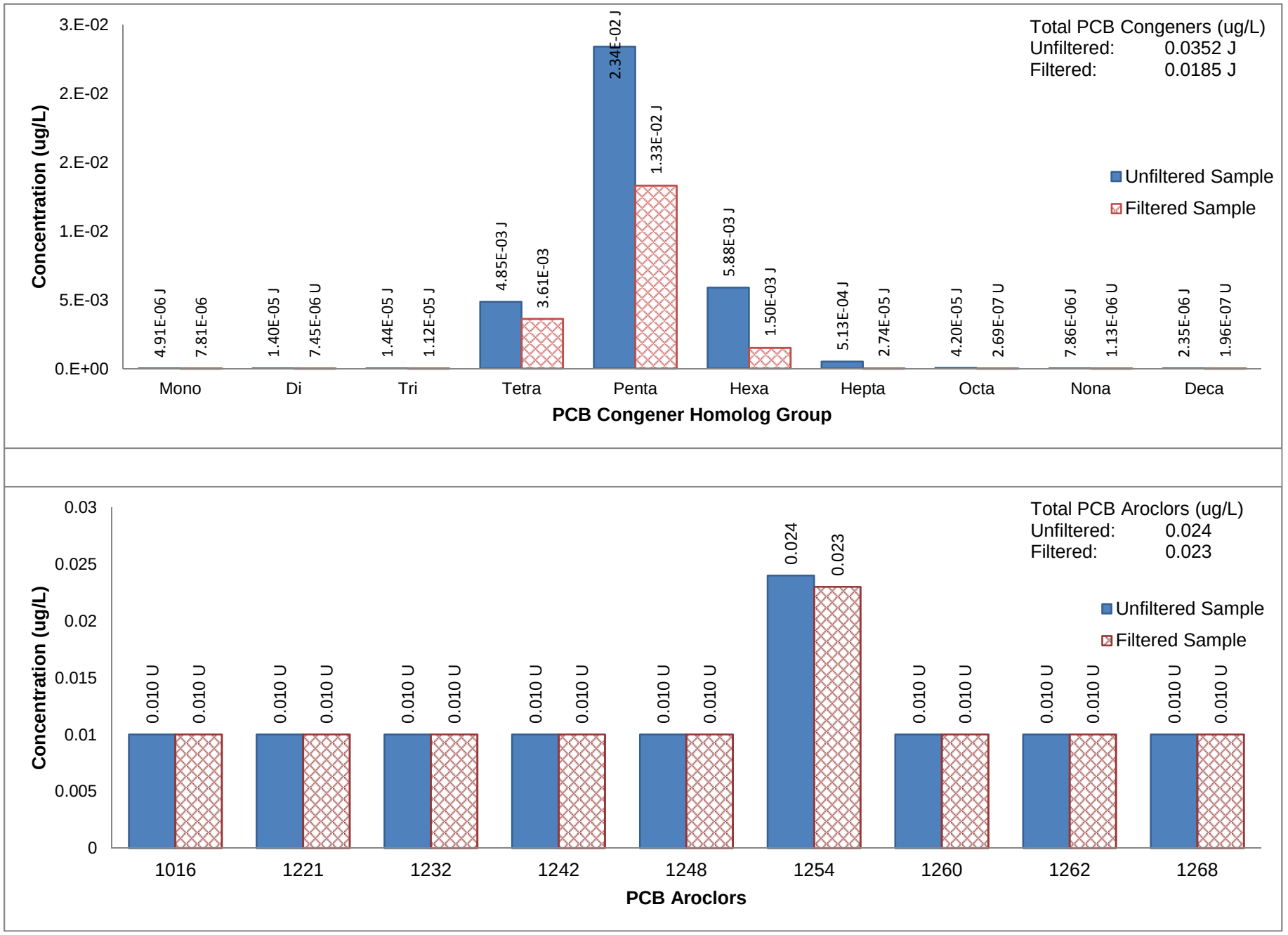


Figure E-5
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors
South Park Landfill - Well MW-32 (Unfiltered and Filtered Samples)

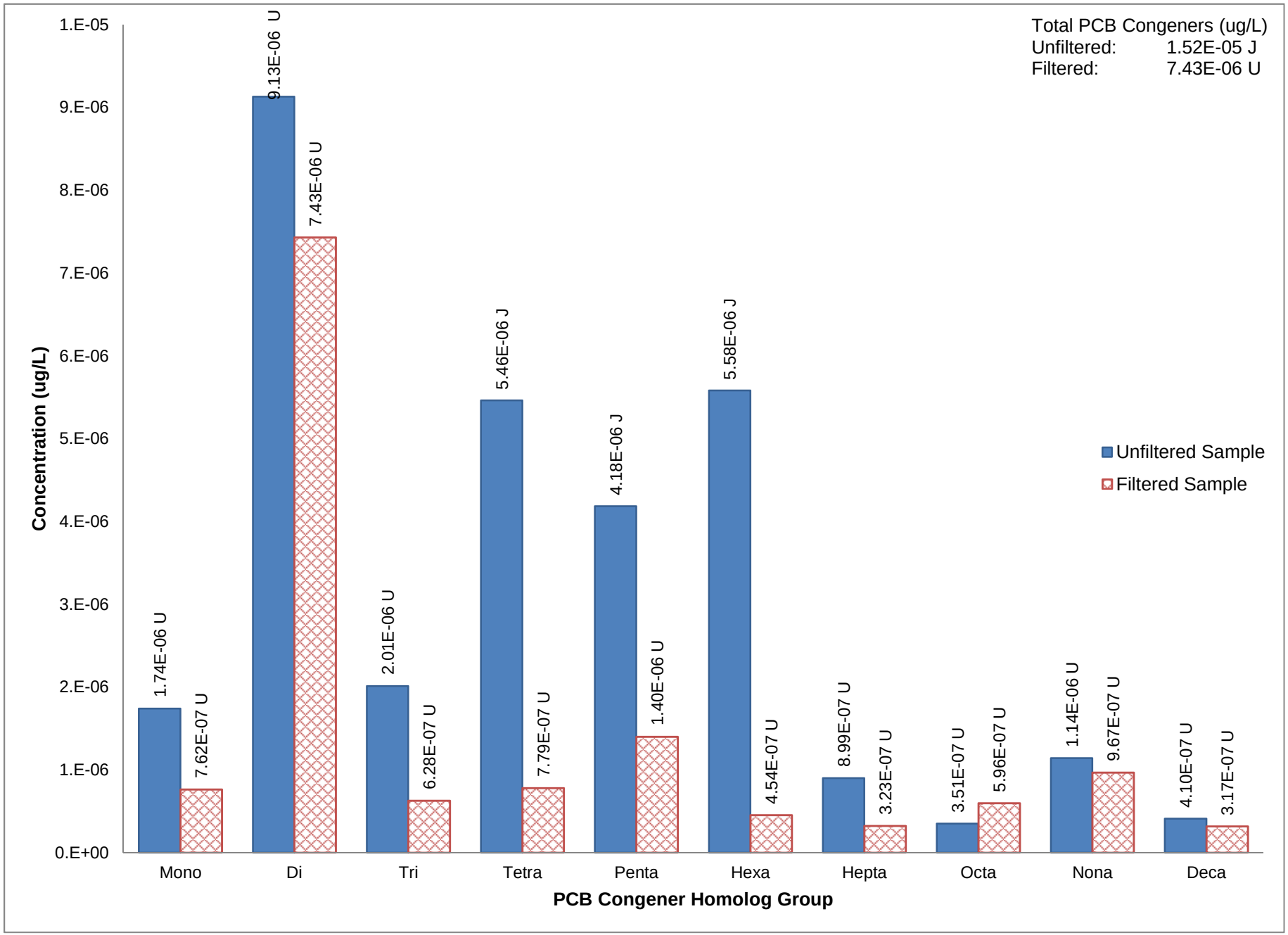
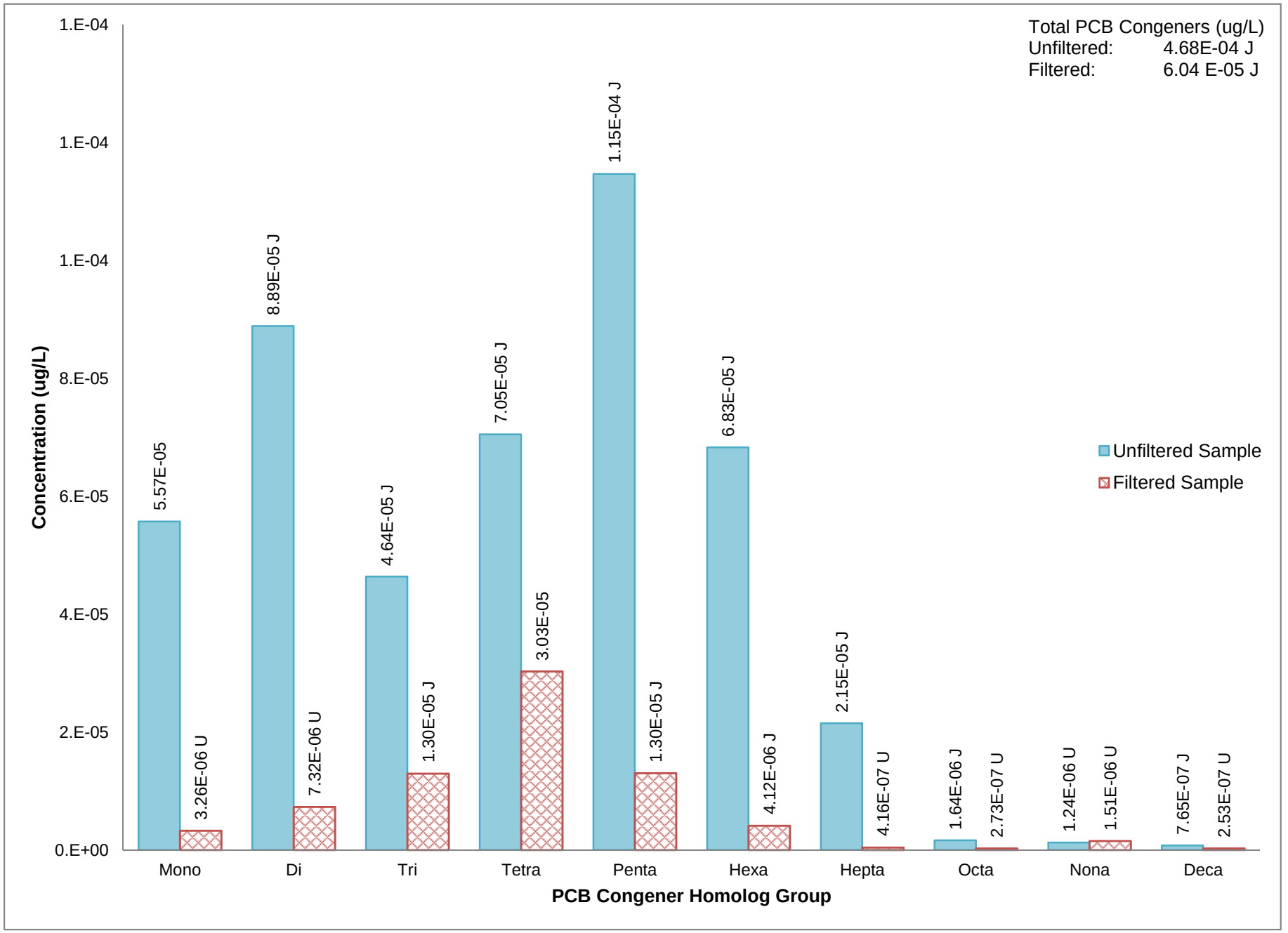


Figure E-6
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors
Glacier Northwest - SW-1 (Unfiltered and Filtered Samples)



Appendix F
Data Validation Report

DATA VALIDATION REPORT

LOWER DUWAMISH WATERWAY
GROUNDWATER SAMPLING FOR PCB CONGENERS AND AROCLORS

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EcoChem Project: C45157-1

May 24, 2017

Approved for Release:

Christine Ransom
Senior Project Chemist
EcoChem, Inc.

PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of full validation (EPA Stage 3/4) and summary validation (EPA Stage 2B) performed on groundwater, surface water, and associated quality control sample data for the former Lower Duwamish Waterway Groundwater Project. A complete list of samples is provided in the Sample Index.

PCB Congener analyses were performed by Vista Analytical Laboratory, El Dorado Hills, CA and the PCB Aroclor analyses were performed by Analytical Resources, Inc., Tukwila, WA. The analytical methods and EcoChem project chemists are listed in the following table:

ANALYSIS	METHOD	PRIMARY REVIEW	SECONDARY REVIEW
PCB Congeners	EPA 1668C	E. Clayton A. Bodkin	C. Frans
PCB Aroclors	SW8082A		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; *Lower Duwamish Waterway Groundwater Sampling and Analysis Plan* (Leidos, Feb 2017); *National Functional Guidelines for Organic Data Review* (USEPA 2008, 2014); and *National Functional Guidelines for High Resolution Superfund Methods Data Review* (USEPA 2016).

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. Data that have been rejected are flagged with (R). Rejected data should not be used for any purpose. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Validation criteria are included as Appendix A. The qualified data summary table (QDST) is included as Appendix B. Data Validation Worksheets and project associated communications will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) is also submitted.

Sample Index

Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SAMPLE ID	Vista SDG	Vista Lab ID	PCB Congeners	ARI SDG	ARI LAB ID	PCB Aroclors
DMC-SW-1-20170313	1700346	1700346-01	✓	17C0219	17C0219-01	✓
DMC-MW-16-20170313	1700346	1700346-02	✓	17C0219	17C0219-02	✓
DMC-MW-8-20170313	1700346	1700346-03	✓	17C0219	17C0219-03	✓
DMC-MW-10-20170313	1700346	1700346-04	✓	17C0219	17C0219-05	✓
DS-DS1P2-19-20170314	1700346	1700346-05	✓	17C0219	17C0219-06	✓
DS-SW-1-20170314	1700346	1700346-06	✓	17C0219	17C0219-07	✓
DS-DS1-MW-6-20170314	1700346	1700346-07	✓	17C0219	17C0219-08	✓
DS-DS1-PZ-01-20170314	1700346	1700346-08	✓	17C0219	17C0219-10	✓
BIT-MW-10-20170315-D	1700346	1700346-11	✓	17C0309	17C0309-02	✓
BIT-MW-10-20170315	1700346	1700346-12	✓	17C0309	17C0309-03	✓
BIT-MW-13-20170315	1700346	1700346-10	✓	17C0309	17C0309-04	✓
BIT-MW-25-20170315	1700346	1700346-09	✓	17C0309	17C0309-05	✓
LSB-SB-1-20170315	1700346	1700346-13	✓	17C0309	17C0309-06	✓
LER-ER-1-20170316	1700346	1700346-14	✓	17C0309	17C0309-07	✓
CMS-EMW-1S-20170316	1700346	1700346-15	✓	17C0309	17C0309-08	✓
CMS-EMW-13S-20170316	1700346	1700346-16	✓	17C0309	17C0309-09	✓
CMS-EMW-13S-20170316-F	1700346	1700346-17	✓	17C0309	17C0309-10	✓
CMS-SW-1-20170316	1700346	1700346-18	✓	17C0309	17C0309-11	✓
CMS-SW-1-20170316-D	1700346	1700346-19	✓	17C0309	17C0309-12	✓
CMS-DMW-6A-20170316	1700346	1700346-20	✓	17C0309	17C0309-13	✓
NT115-MW-10-20170317	1700373	1700373-01	✓	17C0309	17C0309-15	✓
LER-ER-1-20170317	1700373	1700373-02	✓	17C0309	17C0309-16	✓
NT115-MW-3-20170317	1700373	1700373-03	✓	17C0309	17C0309-17	✓
NT115-MW-20-20170317	1700373	1700373-04	✓	17C0309	17C0309-18	✓
SPL-MW-32-20170320	1700373	1700373-05	✓	17C0309	17C0309-19	✓
SPL-MW-32-20170320-F	1700373	1700373-06	✓	17C0309	17C0309-20	✓
SPL-MW-12-20170320	1700373	1700373-07	✓	17C0309	17C0309-21	✓
SPL-MW-31-20170320	1700373	1700373-08	✓	17C0309	17C0309-22	✓
GNW-MW-32S-20170321	1700373	1700373-09	✓	17C0409	17C0409-02	✓
GNW-MW-4S-20170321	1700373	1700373-10	✓	17C0409	17C0409-03	✓
GNW-MW-33S-20170321	1700373	1700373-13	✓	17C0409	17C0409-04	✓
GNW-SW-1-20170321	1700373	1700373-11	✓	17C0409	17C0409-05	✓
GNW-SW-1-20170321-F	1700373	1700373-12	✓	17C0409	17C0409-06	✓
EMF-MW-7-20170322	1700373	1700373-14	✓	17C0409	17C0409-07	✓
NBF-NGW252-20170322	1700373	1700373-15	✓	17C0409	17C0409-08	✓
NBF-NGW520-20170322	1700373	1700373-16	✓	17C0409	17C0409-09	✓
NBF-NGW521-20170322	1700373	1700373-17	✓	17C0409	17C0409-10	✓
WT-MW-06-20170327	1700409	1700409-01	✓	17C0409	17C0409-11	✓
LER-ER-1-20170327	1700409	1700409-02	✓	17C0409	17C0409-12	✓

Sample Index

Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SAMPLE ID	Vista SDG	Vista Lab ID	PCB Congeners	ARI SDG	ARI LAB ID	PCB Aroclors
WT-MW-108-20170327	1700409	1700409-03	✓	17C0409	17C0409-13	✓
WT-MW-110-20170327	1700409	1700409-04	✓	17C0409	17C0409-14	✓
WT-MW-110-20170327-D	1700409	1700409-05	✓	17C0409	17C0409-15	✓
8801-MW-16A-20170328	1700409	1700409-06	✓	17C0409	17C0409-17	✓
8801-MW-16A-20170328-F	1700409	1700409-07	✓	17C0409	17C0409-18	✓
8801-MW-42A-20170328	1700409	1700409-08	✓	17C0409	17C0409-19	✓
8801-MW-30A-20170328	1700409	1700409-09	✓	17C0409	17C0409-20	✓
LSB-SB-1-20170328	1700409	1700409-10	✓	17C0409	17C0409-22	✓
ICS-DOF-MW3-20170329	1700413	1700413-01	✓	17D0022	17D0022-01	✓
ICS-SA-MW2-20170329	1700413	1700413-02	✓	17D0022	17D0022-02	✓
ICS-DOF-MW1-20170329	1700413	1700413-03	✓	17D0022	17D0022-03	✓
ICS-DOF-MW1-20170329-F	1700413	1700413-04	✓	17D0022	17D0022-04	✓
DMD-MW-11-20170330	1700413	1700413-05	✓	17D0022	17D0022-06	✓
DMD-MW-17-20170330	1700413	1700413-06	✓	17D0022	17D0022-07	✓
DMD-MW-17-20170330-F	1700413	1700413-07	✓	17D0022	17D0022-08	✓
DMD-MW-15-20170330	1700413	1700413-08	✓	17D0022	17D0022-09	✓
DMD-SW-1-20170330	1700413	1700413-09	✓	17D0022	17D0022-10	✓
JF-MW-23-20170331	1700413	1700413-10	✓	17D0022	17D0022-12	✓
JF-MW-48-20170331	1700413	1700413-11	✓	17D0022	17D0022-13	✓
JF-MW-51-20170331	1700413	1700413-12	✓	17D0022	17D0022-14	✓
DOT-MW-2-20170406	1700431	1700431-01	✓	17D0124	17D0124-01	✓
LER-ER-1-20170406	1700431	1700431-02	✓	17D0124	17D0124-02	✓
GLS-MW-K01-20170406	1700431	1700431-03	✓	17D0124	17D0124-03	✓
SHS-MW-07-20170406	1700431	1700431-04	✓	17D0124	17D0124-04	✓
SHS-MW-02-20170406	1700431	1700431-05	✓	17D0124	17D0124-05	✓

DATA VALIDATION REPORT
Leidos SAIC - Lower Duwamish Waterway
PCB Congeners by EPA 1668C

This report documents the review of analytical data from the analysis of groundwater samples and the associated laboratory quality control (QC) samples. Vista Analytical Laboratory, El Dorado Hills, California, analyzed the samples. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples	Validation Level
1700346	8 Groundwater	EPA Stage 4
1700373	17 Groundwater, 2 Rinsate, 1 Source Water	EPA Stage 4
1700409	17 Groundwater, 1 Rinsate, 1 Source Water	EPA Stage 4
1700413	12 Groundwater	EPA Stage 4
1700431	4 Groundwater, 1 Rinsate	EPA Stage 4

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

VERIFICATION OF EDD TO LABORATORY REPORT

Sample results and related quality control data were received as an electronic data deliverable (EDD) and laboratory report. The EDD was verified against the laboratory report; no errors were found.

TECHNICAL DATA VALIDATION

This report documents the review of analytical QC requirements as listed in the following table.

1	Sample Receipt, Preservation, and Holding Times	2	Matrix Spike/Matrix Spike Duplicates (MS/MSD)
✓	Initial Calibration (ICAL)	2	Field Duplicates
✓	Continuing Calibration Verification	✓	Target Analyte List
2	Laboratory Blanks	1	Reporting Limits
2	Field Blanks	1	Compound Identification
2	Laboratory Control Samples (LCS/LCSD)	2	Compound Quantitation
✓	Labeled Compound Recovery	1	Calculation Verification

1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted.
Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2° to 6°C. All samples were received at temperatures less than the lower

acceptance criteria, the lowest at 0.1°C. These temperature outliers were determined to have no effect and no data were qualified.

One or more samples reported in these SDGs were extracted after the 7-day extraction holding time indicated in the project SAP/QAPP. Current SW846 guidance states that when samples are held under the proper storage conditions (cool 0-6°C), the holding time is up to one year. All samples for this project were held under the proper storage conditions; therefore, no qualifiers were applied.

Laboratory Blanks

To assess the impact of any blank contaminant on the reported sample results, an action level was established at five times (5x) the concentration reported in the blank. If a contaminant was reported in an associated field sample and the concentration was less than the action level, the result was qualified as not detected (U-7) at the reported concentration.

Several congeners were detected in each method blank; however only results for the following congeners were qualified as not-detected in one or more field samples:

SDG	Blank ID	Qualified Congener			Qualifier
1700346	B7C0109-BLK1	PCB-003	PCB-031	PCB-156/157	U-7
		PCB-020/028	PCB-035	PCB-167	U-7
		PCB-021/033	PCB-077		U-7
	B7C0110-BLK1	PCB-020/028	PCB-039	PCB-066	U-7
		PCB-021/033	PCB-049/069	PCB-081	U-7
		PCB-025	PCB-052	PCB-105	U-7
		PCB-031	PCB-056	PCB-153/168	U-7
		PCB-032	PCB-059/062/075	PCB-156/157	U-7
		PCB-035	PCB-061/070/074/076	PCB-194	U-7
		PCB-036	PCB-064		U-7
1700373	BYC0164-BLK1	PCB-003	PCB-055	PCB-105	U-7
		PCB-011	PCB-056	PCB-108/124	U-7
		PCB-020/028	PCB-058	PCB-122	U-7
		PCB-025	PCB-061/070/074/076	PCB-127	U-7
		PCB-026/029	PCB-063	PCB-162	U-7
		PCB-032	PCB-066	PCB-167	U-7
		PCB-035	PCB-068	PCB-169	U-7
		PCB-036	PCB-078	PCB-194	U-7
		PCB-038	PCB-079	PCB-208	U-7
		PCB-039	PCB-081		U-7
	B7D0037-BLK1	PCB-011	PCB-052	PCB-189	U-7
		PCB-031	PCB-156/157	PCB-194	U-7
		PCB-044/047/065	PCB-169		U-7
1700409	B7D0019-BLK1	PCB-020/028	PCB-052	PCB-156/157	U-7
		PCB-031	PCB-061/070/074/076	PCB-169	U-7
		PCB-035	PCB-153/168		U-7

SDG	Blank ID	Qualified Congener			Qualifier
1700409	B7D0037-BLK1	PCB-031			U-7
1700413	B7D0019-BLK1	PCB-018/030	PCB-035	PCB-153/168	U-7
		PCB-020/028	PCB-052	PCB-156/157	U-7
		PCB-031	PCB-061/070/074/076	PCB-169	U-7
1700431	B7D0050-BLK1	PCB-169			U-7

Field Blanks

Two types of field blanks were submitted: source water blanks and rinsate blanks. After qualification based on method blank contamination, positive results in the source water blanks were used to evaluate the rinsate blanks. The highest value reported from the two source water blanks was used. Positive results in the rinsate blanks that were less than five times the source blank concentration were qualified as not-detected (U-7). The following congeners were detected in either one or both of the source water blanks:

Blank ID	Detected Congeners		
LSB-SB-1-20170315 LSB-SB-1-21703280	PCB-1	PCB-18/30	PCB-48
	PCB-2	PCB-22	PCB-64
	PCB-3	PCB-32	PCB-66
	PCB-8	PCB-37	PCB-68
	PCB-11	PCB-44/47/65	PCB-158
	PCB-16	PCB-45/51	PCB-194

After qualification of the rinsate blanks based on method blank and source water contamination, remaining positive results in the rinsate blanks were used to evaluate the field sample results. Positive results in the associated that were less than the 5x action level were qualified as not detected (U-6). The following congeners were detected in each rinsate blank:

Blank ID	Associated Samples	Detected Congeners
LER-ER-1-20170316	samples collected 3/13/17 3/14/17 3/15/17 3/16/17	PCB-129/138/160/163
LER-ER-1-20170317	samples collected 3/17/17 3/18/17 3/19/17 3/20/17 3/21/17 3/22/17	PCB-17 PCB-21/33 PCB-31 PCB-60 PCB-77

Blank ID	Associated Samples	Detected Congeners
LER-ER-1-20170327	All samples collected: 3/27/17 3/28/17 3/29/17 3/30/17 3/31/13	PCB-17 PCB-21/33 PCB-26/29 PCB-129/138/160/163
LER-ER-1-20170406	All samples collected: 4/06/17	PCB-15 PCB-20/28 PCB-21/33 PCB-26/29 PCB-31 PCB-35 PCB-36 PCB-39 PCB-49/69 PCB-60 PCB-61/70/74/76 PCB-78 PCB-114 PCB-126 PCB-156/157 PCB-159 PCB-162 PCB-167

Laboratory Control Samples

Ongoing precision and recovery samples were analyzed at the required frequency of one per batch of 20 or fewer samples. With the following exceptions, all OPR recovery values were within the QAPP-defined control limits of 60-135%. There were no control limits for relative percent difference (RPD) values defined in the QAPP. The control limit for the matrix spike/matrix spike duplicate RSD (25%) was used to evaluate the LCS/LCSD precision:

SDG 1700373: For extraction batch B7C0164

- PCB-20/28: The RPD value was greater than the control limit. Positive results for PCB-20/28 were estimated (J-9) in the associated samples.

- PCB-83/99: The LCS recovery was greater than the upper control limit. The LCSD %R value was acceptable. No action was taken. The RPD value was greater than the control limit at 56. Positive results for PCB-83/99 were estimated (J-9) in the associated samples.

- PCB-142: The RPD value was greater than the control limit. There were no positive results for this congener in the associated samples. No action was required.

SDG 1700413: For extraction batch B7D0025, the LCS recovery for PCB-8 was greater than the upper control limit. No LCSD was analyzed. The PCB-8 results for Samples DMD-MW-17-20170330-F and ICS-DOF-MW1-20170329-F were estimated (J-10H).

SDG 1700431: For extraction batch B7D0050, the LCSD recovery for PCB-8 was greater than the upper control limit but was in control in the associated LCS. No action was taken.

Matrix Spike/Matrix Spike Duplicates

For matrix spike/matrix spike duplicate (MS/MSD) recovery outliers, no action was taken unless both the MS and MSD %R values are outside the control limits. When the MS/MSD %R values indicated a potential low bias, associated results were estimated (J/UJ-8L). Only the associated positive results were estimated (J-8H) if the %R values indicated a potential high bias. Precision is indicated by the relative percent difference (RPD) between the MS and MSD values. Only associated positive results were qualified based on RPD outliers. Qualifiers based on MS/MSD %R or RPD outliers were only issued to the parent sample.

SDG 1700431: Sample DOT-MW-2-20170406 was used for the MS/MSD analyses. The MS/MSD recoveries for PCB-8 were greater than the upper control limit. This analyte was not detected in the parent sample; no qualification was required. The MSD recovery for PCB-36 was also greater than the upper control limit. The associated MS recovery was within acceptance criteria; no qualification was required.

Sample GLS-MW-K01-20170406 was used for the MS/MSD analyses. The MS/MSD recoveries for PCB-8 were greater than the upper control limit; the PCB-8 result in the parent sample was estimated (J-8H). The RPD value for PCB-129/138/160/163 was greater than the control limit; the result in the parent sample was estimated (J-9).

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) or relative percent standard deviation (%RSD) control limit is 35% for results greater than 5x the reporting limit (RL). The difference between the sample and replicate must be less than the RL for results less than 5x the RL.

SDG 1700346: Two sets of field duplicates were submitted: CMS-SW-1-20170316 & CMS-SW-1-20170316-D and BIT-MW-10-20170315 and BIT-MW-10-20170315-D. For samples CMS-SW-1-20170316 & CMS-SW-1-20170316-D, the result for PCB-206 did not meet the precision criteria. The PCB-206 results for these two samples were estimated (J-9).

SDG 1700409: Samples WT-MW-110-20170327 and WT-MW-110-20170327-D were identified as field duplicates. The results for the following congeners did not meet field precision criteria. Results in both samples were estimated (J/UJ-9).

Congener	Qualifier	Congener	Qualifier
PCB-006	J/UJ-9	PCB-086/087/097/109/119/125	J-9
PCB-008	J/UJ-9	PCB-088/091	J-9
PCB-015	J/UJ-9	PCB-090/101/113	J-9
PCB-016	J-9	PCB-092	J/UJ-9
PCB-017	J-9	PCB-095	J-9
PCB-018/030	J-9	PCB-105	J-9
PCB-020/028	J-9	PCB-110/115	J-9
PCB-021/033	J-9	PCB-118	J-9
PCB-022	J-9	PCB-128/166	J-9
PCB-025	J-9	PCB-129/138/160/163	J-9
PCB-026/029	J-9	PCB-130	J-9
PCB-031	J-9	PCB-132	J-9
PCB-032	J/UJ-9	PCB-135/151	J-9
PCB-037	J-9	PCB-136	J/UJ-9
PCB-040/041/071	J-9	PCB-137	J-9
PCB-042	J-9	PCB-141	J-9
PCB-044/047/065	J-9	PCB-146	J-9
PCB-045/051	J/UJ-9	PCB-147/149	J-9
PCB-046	J/UJ-9	PCB-153/168	J-9
PCB-048	J-9	PCB-156/157	J/UJ-9
PCB-049/069	J-9	PCB-158	J-9
PCB-050/053	J/UJ-9	PCB-164	J/UJ-9
PCB-052	J-9	PCB-167	J/UJ-9
PCB-056	J-9	PCB-170	J-9
PCB-060	J-9	PCB-174	J/UJ-9
PCB-061/070/074/076	J-9	PCB-177	J-9
PCB-064	J-9	PCB-180/193	J/UJ-9
PCB-066	J-9	PCB-187	J/UJ-9
PCB-077	J/UJ-9	PCB-194	J-9
PCB-082	J/UJ-9	PCB-198/199	J/UJ-9
PCB-083/099	J/UJ-9	PCB-203	J/UJ-9
PCB-084	J-9	PCB-206	J/UJ-9
PCB-085/116/117	J/UJ-9		

Reporting Limits

SDG 1700373: The reporting limits for several samples were slightly elevated due to limited sample volumes.

SDG 1700431: Samples DOT-MW-2-20170406 and GLS-MW-K01-20170406 had elevated reporting limits due to limited sample volumes.

Compound Identification

For several samples, the laboratory reported EMPC or "estimated maximum possible concentration" values for one or more of the target analytes. An EMPC value is reported when a peak was detected but did not meet ion ratio identification criteria, as required by the method; therefore the result cannot be considered as a positive identification for the analyte. When the ion ratio for analyte identification was not met, the lab reported the analyte as not-detected (ND) with a "UEMPC" flag. No additional action was taken.

Compound Quantitation

The samples listed in the following table were filtered in the laboratory using a 1-micron borosilicate glass filter prior to extraction and analysis. The results for these samples were evaluated to determine if values for the filtered samples were greater than the unfiltered sample. If values were greater in the filtered sample, then the precision between the values was assessed using the same acceptance criteria used for the field replicates. If the precision criteria were not met, the results for both the filtered and unfiltered samples were estimated (J/UJ-14):

SDG	Parent Sample	Filtered Sample	Congener	Qualifier
1700346	CMS-EMW-13S-20170316	CMS-EMW-13S-20170316-F	PCB-001	J-14
1700373	SPL-MW-32-20170320	SPL-MW-32-20170320-F	No outliers	--
	GNW-SW-1-20170321	GNW-SW-1-20170321-F	No outliers	--
1700409	8801-MW-16A-20170328	8801-MW-16A-20170328-F	PCB-025	J-14
1700413	DMD-MW-17-20170330	DMD-MW-17-20170330-F	No outliers	--
	ICS-DOF-MW1-20170329	ICS-DOF-MW1-20170329-F	PCB-137	J/UJ-14

Calculation Verification

Several results were verified be recalculation form the raw data. No transcription or calculation errors were found.

OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory performed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the labeled compound, LCS/LCSD, and MS/MSD percent recoveries and precision was acceptable as demonstrated by the LCS/LCSD, MS/MSD, and field duplicate RPD values.

Detection limits were elevated due to method and field blank contamination. Results were estimated based on field duplicate precision outliers, MS/MSD and LCS/LCSD accuracy and precision outliers, and for filtered results being greater than the corresponding unfiltered results.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Leidos SAIC – Lower Duwamish Waterway
PCB Aroclors by SW846 Method 8082

This report documents the review of analytical data from the analysis of groundwater samples and the associated laboratory and field quality control (QC) samples. Analytical Resources, Inc, Tukwila, Washington, analyzed the samples. Refer to the SAMPLE INDEX for a list of the individual samples.

SDG	NUMBER OF SAMPLES	VALIDATION LEVEL
17C0291	8 Groundwater	EPA Stage 2B
17C0309	17 Groundwater, 2 Rinsate, 1 Source Water	EPA Stage 2B
17C0409	17 Groundwater, 1 Rinsate, 1 Source Water	EPA Stage 2B
17D0022	12 Groundwater	EPA Stage 2B
17D0124	4 Groundwater, 1 Rinsate	EPA Stage 2B

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

VERIFICATION OF EDD TO LABORATORY REPORT

Sample results and related quality control data were received as an electronic data deliverable (EDD) and laboratory report. The EDD was verified against the laboratory report; no errors were found.

SDG 17C0219: For Sample DMC-GW-16-20170313 listed on the COC, the ID on the container was DMC-MW-16-20170313. The ID on the container should be used. The Sample ID was corrected in the EDD.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	✓	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
✓	Initial Calibration (ICAL)	1	Field Duplicates
1	Continuing Calibration (CCAL)	✓	Target Analyte List
✓	Laboratory Blanks	1	Reporting Limits
1	Field Blanks	2	Compound Identification
✓	Surrogate Compounds	2	Reported Results
2	Laboratory Control Samples (LCS)		

✓ Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed
1 Quality control outliers are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2° to 6°C. All samples were received at temperatures less than the lower acceptance criteria, the lowest at 0.1°C. These temperature outliers were determined to have no effect and no data were qualified.

One or more samples reported in these SDGs were extracted after the 7-day extraction holding time indicated in the project SAP/QAPP. Current SW846 guidance states that when samples are held under the proper storage conditions (cool 0-6°C), the holding time is up to one year. All samples for this project were held under the proper storage conditions; therefore, no qualifiers were applied.

SDG 17C0309: Sample NT115-IDW-20170317 was received by the laboratory, but was not noted on the COC. No results were reported for this sample.

SDG 17C0409: The client ID listed on the COC, NBF-NGW252-20170322, was listed as LDNBF-NGW-252-20170322 on the container label. The information on the COC was used for login purposes.

The client ID listed on the COC, WT-MW-06-20170317, was listed as LDWT-MW-06-20170317 on the container label. The information on the COC was used for login purposes.

SDG 17D0124: Sample SHS-MW-02-20170406 was missing two bottles upon receipt at the laboratory. There were two extra bottles labeled SHS-MW-06-20170406. These extra bottles were labeled with the same sample date and time as the missing sample (SHS-MW-02-20170406). The laboratory assumed that the Sample IDs on the extra bottles were incorrect and logged them in as SHS-MW-02-20170406.

Continuing Calibration

Continuing calibration (CCAL) verification standards were analyzed at the required frequency. The percent difference (%D) control limits are +/- 20%. Although some CCAL %D values were outside of the control limits, they represented a possible high bias associated only with non-detected results. No data required qualification based on CCAL %D outliers.

Field Blanks

Two source water samples, LSB-SB-1-20170315 and LSB-SB-1-2170328, were submitted. These were the waters used for the rinsate blanks. For rinsate blanks were submitted: LER-ER-1-20170316, LER-ER-1-20170317, LER-ER-1-20170327, and LER-ER-1-20170406. There were no target analytes detected in any of the field blanks.

Laboratory Control Samples

Laboratory control samples (LCS) were analyzed at the required frequency of one per batch of 20 or fewer samples. With the following exception, the LCS recovery values were within the laboratory control limits.

SDG 17C0309: For LCS Sample BFC0591-BS1, the percent recovery (%R) value for Aroclor 1260 was less than the lower control limit. Aroclor 1016 was in control. Aroclors were not detected in the associated samples. Reporting limits for all Aroclors except 1016 were estimated (UJ-10L) in the associated samples.

SDG 17D0022: For LCS Sample BFD00101-BS1, %R value for Aroclor 1260 was less than the lower control limit. Aroclor 1016 was in control. Results for all Aroclors except 1016 were estimated (J/UJ-10L) in the associated samples.

Field Duplicates

SDG 17C0309: Two sets of field duplicates were submitted: BIT-MW-10-20170315 & BIT-MW-10-20170315-D and CMS-SW-1-20170316 & CMS-SW-1-20170316-D. No target analytes were detected. Field precision was acceptable.

SDG 17C0409: Samples WT-MW-110-20170327 & WT-MW-110-20170327-D were submitted as field duplicates. No target analytes were detected. Field precision was acceptable.

Reporting Limits

SDG 17D0022: The chromatogram for Sample ISC-DOF-20170329-F indicated non-target background interference and the result for Aroclor 1248 was flagged "Y1" by the laboratory. This "Y1" flagged result was qualified (U-22) to indicate that it was not detected at an elevated reporting limit.

Compound Identification

SDG 17D0022: For Sample ICS-DOF-MW1-20170329, the RPD between the primary and confirmation column results for Aroclor 1248 (42%) exceeded the acceptance criteria of 40%. The result for Aroclor 1248 was estimated (J-3).

Reported Results

SDG 17C0409: Sample NBF-NGW521-20170322 was reanalyzed at a 10x dilution due to a high level of Aroclor 1248 in the 1x dilution. Both sets of analyses were reported. The Aroclor 1248 result from the original analysis exceeded the calibration range of the instrument and was flagged do-not-report (DNR-20). The results for all other Aroclors in the dilution were flagged as do-not-report (DNR-11).

OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory performed the specified analytical method. With the exception noted above, accuracy was acceptable as demonstrated by the surrogate and LCS recoveries and precision was evaluated using the field duplicate RPD values.

Data were estimated based on LCS recovery outliers and a dual column confirmation precision outlier. One reporting limit was elevated based on non-target background interferences.

Data were flagged as do-not-report (DNR) to indicate which result, from multiple reported values analyses, should be used.

Data that have been flagged as DNR should not be used for any purpose. All other data, as qualified, are acceptable for use.

ECOCHEM
Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler temperature, pH, summa canister pressure); Exceeded Holding Times
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown, lock-mass)
	5A	Initial Calibration (RF, %RSD, r^2)
	5B	Calibration Verification (CCV, CCAL; RF, %D, %R) Use bias flags (H,L)[1] where appropriate
	5C	Initial Calibration Verification (ICV %D, %R) Use bias flags (H,L)[1] where appropriate
Blank Contamination	6	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
	7	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)[1] for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS and/or MSD) Recoveries Use bias flags (H,L)[1] where appropriate
	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)[1] where appropriate
	12	Reference Material Use bias flags (H,L)[1] where appropriate
	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)[1] where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)[1] where appropriate
	19	Internal Standard Performance (i.e., area, retention time, recovery)
	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
	3	2nd column confirmation (RPD or %D)
	4	Tentatively Identified Compound (TIC) (associated with NJ only)
	20	Calibration Range or Linear Range Exceeded
	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, re-extractions, etc. Associated with "R" and "DNR" only)
	14	Other (See DV report for details)
	26	Method QC information not provided

[1] H = high bias indicated
L = low bias indicated

PCB Congener Analysis by HRMS
(Based on EPA DV Guidance[1] and Method EPA 1668C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler/Storage Temperature Preservation	Waters/Solids ≤ 6°C & in the dark Tissues <-10°C & in the dark **Preservation Aqueous:** If Cl_2 is present Thiosulfate must be added and if needed adjust pH to 2 - 3 (drinking water requirement)	EPA (1) Method (2)	J(pos)/R(ND) if thiosulfate not added if Cl_2 present and J(pos)/UJ(ND) if pH not adjusted; J(pos)/UJ(ND) if temp > 20°C	1	Note: EPA DV guidance documents use < 4°C, method uses ≤ 6°C. Info in EcoChem TM-05 also generally applies.
Holding Time	If properly stored, 1 year prior to extraction. If extracts properly stored (< -10°C & in dark), 1 year from extraction to analysis.	EPA (1) Method (2)	If not properly stored or HT exceeded: J(pos)/UJ(ND)	1	May **be dictated by QAPP** Info in EcoChem TM-05 also generally applies
Instrument Performance					
Mass Resolution (Tuning)	≥10,000 resolving power at m/z 330.9792 <5 ppm deviation from each m/z listed in **Table 7** of method. Analyzed prior to ICAL and at the beginning and end of each 12 hr. shift	EPA (1) Method (2)	R all analytes in all samples associated with a failed tune	24	PFK (Perfluorokerosene) tuning compound
Column Resolution	Mix of all 209 PCBs run prior to each ICAL/12 hours RT of PCB209 must be > 55 min PCB156 & 157 must coelute w/in 2 sec PCB34 & 23 and PCB187 & 182 must be resolved where ((x/y)*100%) < 40% x = ht of valley and y = ht of shortest peak RRT of all congeners must fall within the range in **Table 2** of the method	EPA (1) Method (2)	If criteria are not met, review sample chromatograms to determine if sample results are negatively impacted. If so, discuss with client for possible reanalyses, or J(pos) all data.	24	Criteria are for SPB-octyl column. If different column used, see Section 6.9.1.2 of method. Appendix A provides info for DB-1 column
Initial Calibration **Sensitivity**	S/N ratio > 10 for all native and labeled congeners in CS1 std.	EPA (1) Method (2)	If <10, elevate Det. Limit or R(ND)	5A	
Initial Calibration **Selectivity**	Ion Abundance ratios within QC limits (**Table 8** of Method 1668C)	EPA (1) Method (2)	If ion ratios are out for a given congener in 2 or more standards in ICAL, J(pos) results for that congener in all samples	5A	Professional judgement. The info in EcoChem TM-05 also generally applies
Initial Calibration (Minimum 5 stds.) **Stability**	%RSD < 20% for congeners listed in **Table 3** of method RRT of all congeners must meet **Table 2** of method	EPA (1) Method (2)	J(pos) natives if %RSD > 20% RRT outliers: narrate, no action	5A	RRT outliers: professional judgement. The info in EcoChem TM-05 also generally applies
Continuing Calibration (Prior to each 12 hr. shift) **Sensitivity**	S/N ratio for CS3 standard > 10	EPA (1) Method (2)	If <10, elevate Det. Limit to lowest calibration or R(ND)	5B	
Continuing Calibration (Prior to each 12 hr. shift) **Selectivity**	Ion Abundance ratios within QC limits (**Table 8** of Method 1668C)	EPA (1) Method (2)	No action if %D acceptable, review sample ion ratios, U(pos) if ion ratio outside limits	5B	Professional judgement. The info in EcoChem TM-05 also generally applies.

PCB Congener Analysis by HRMS
(Based on EPA DV Guidance[1] and Method EPA 1668C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Continuing Calibration (Prior to each 12 hr. shift) **Stability**	Recoveries must meet VER% limits in **Table 6,** Method 1668C	EPA [(1)] Method [(2)]	**Labeled congeners:** Narrate, no action. **Native congeners:** J(pos)/UJ(ND) for low bias J(pos) for high bias	5B (H,L)[3]	
	Absolute RT of all Labeled congeners and Window Defining Congeners must be +/- 15 sec of RT in ICAL RRT of all congeners must be within range in **Table 2** of method	EPA [(1)] Method [(2)]	Narrate, no action	5B	Professional judgement. The info in EcoChem TM-05 also generally applies
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected congeners	EPA [(1)] Method [(2)]	U(pos) if sample result is < 5X blank concentration	7	**Heirarchy of blank review:** **#1 - Review MB, quaify as needed** **#2 - Review FB , qualify as needed** EMPC values in blanks as considered to be non-detects
Field Blank (FB)	FB: frequency as per QAPP No detected congeners		U(pos) if sample result is < 5X blank concentration	6	
Precision and Accuracy					
MS/MSD (recovery)	**MS/MSD not typically required for HRMS analyses.** If lab analyzes MS/MSD then one set per matrix per batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos) if both %R > UCL - high bias J(pos)/UJ(ND) if both %R < LCL - low bias J(pos)/R(ND) if both %R < 10% - very low bias J(pos)/UJ(ND) if one > UCL & one < LCL, with no bias **PJ if only one %R outlier**	8 (H,L)[3]	No action if only one spike %R is outside criteria. No action if parent concentration is >4x the amount spiked. Qualify parent sample only unless other QC indicates systematic problems.
MS/MSD (RPD)	**MS/MSD not typically required for HRMS analyses.** If lab analyzes MS/MSD then one set per matrix per batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos) in parent sample if RPD > CL	9	Qualify parent sample only.
LCS (or OPR)	One per lab batch (of ≤ 20 samples) %R must meet limits in **Table 6** Method 1668C	EPA [(1)] Method [(2)]	J(pos) if %R > UCL - high bias J(pos)/UJ(ND) if %R < LCL - low bias J(pos)/R(ND) if %R < 10% - very low bias	10 (H,L)[3]	No action if only one spike %R is outside criteria, when LCSD is analyzed. Qualify all associated samples.
LCS/LCSD (RPD)	**LCS/LCSD not typically required for HRMS analyses.** If lab analyzes LCS/LCSD then one set per matrix and batch of 20 samples RPD < 35%	EcoChem standard policy	J(pos) assoc. congener in all samples if RPD > CL	9	Qualify all associated samples.
Lab Duplicate (RPD) (if required)	**Lab Dup not typically required for HRMS analyses.** One per lab batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos)/UJ(ND) if RPD > CL	9	Optional element. Qualify parent sample only.

PCB Congener Analysis by HRMS
(Based on EPA DV Guidance[1] and Method EPA 1668C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Labeled congeners (Internal Standards)	Added to all samples %R must meet limits in **Table 6** Method 1668C	EPA [(1)] Method [(2)]	J(pos) if %R > UCL - high bias J(pos)/UJ(ND) if %R < LCL - low bias J(pos)/R(ND) if %R <5% - very low bias J(pos)/UJ(ND) if %R between 5-10% for two or more labeled compounds in a substitution group (ie, mono, -di-, trichlorinated)- very low bias	13 (H,L)[3]	See next tab for labled congener associations as per **Table 2** Method 1668
Field Duplicates	Solids: RPD <50% OR difference < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	Narrate and qualify if required by project **(EcoChem PJ)**	9	**RPD values may be dictated by QAPP** 35% and 50% are EcoChem defaults
Compound ID and Calculation					
Quantitation/ Identification	All ions for each isomer must maximize within +/- 2 seconds. S/N ratio >2.5 Ion ratios must meet criteria listed in **Table 8** of 1668C; RRTs w/in limits in **Table 2** of 1668C	EPA [(1)] Method [(2)]	Narrate in report; qualify if necessary NJ(pos) for retention time outliers. U(pos) for ion ratio outliers.	25	The info in EcoChem TM-05 also generally applies
EMPC (estimated maximum possible concentration)	If quantitation identification criteria are not met, laboratory should report an EMPC value.	EPA [(1)] Method [(2)]	If laboratory correctly reported an EMPC value, qualify the native congener U to indicate that the value is an elevated detection limit and qualify total homolog groups J(+)	25	**Use professional judgment.** **See TM-18**
Interferences	Lock masses must not deviate +/- 20% from values in **Table 7** of 1668C	Method [(2)]	J(pos)/UJ(ND) if present	24	**Use professional judgment.** **See TM-17**
Calibration Range	Results greater than highest calibration standard	EcoChem standard policy	Qualify J (pos)	20	If result from dilution analysis is not reported.
Calculation Check	Check 10% of field & QC sample results	EcoChem standard policy	Contact laboratory for resolution and/or corrective action	na	Full data validation only.
Electronic Data Deliverable (EDD)					
Verification of EDD to hardcopy data	EcoChem verify @ 10% unless problems noted; then increase level up to 100% for next several packages.		Depending on scope of problem, correct at EcoChem (minor issues) to resubmittal by laboratory (major issues).	na	EcoChem Project Manager and/or Database Administrator will work with lab to provide long-term corrective action.
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	Standard reporting policy	Use "DNR" to flag results that will not be reported.	11	

[1] USEPA Region 2 Data Validation, Standard Operating Procedure for EPA Method 1668A, Revision 1, September 2008
USEPA Region 3 Interim Guidelines for the Validation of Data Generated Using Method 1668 PCB Congener Data, Revision 0, April 2004
USEPA Region 10 SOP For the Validation of Method 1668 Toxic, Dioxin-like, PCB Data, Revision 1, December 1995
[2] EPA Method 1668, Rev.C, Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS, April 2010
[3] "H" = high bias indicated; "L" = low bias indicated

(pos): Positive Result(s)
(ND): Non-detects

PCB Aroclors by GC
(Based on Organic NFG 2008 and SW-846 Method 8082A)

QC Element	Acceptance Criteria (NFG)	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample					
Cooler/Storage Temperature Preservation	4°C ± 2°C Tissue/sediments (may be frozen -20°C)	NFG [1] Method [2]	**If required by project:** J (pos)/UJ (ND) if greater than 6° C	1	Use Professional Judgment (PJ) to qualify for temperature outlier. Current SW846 criterion is ≤ 6° C [3]
Holding Time	**Extraction Aqueous:** 7 days from collection **Extraction Solid:** 14 days from collection **Exraction Tissue/Sediment (frozen):** 1 year **Analysis (all matrices)**: 40 days from extraction	NFG [1] Method [2]	**If required by project:** J (pos)/UJ (ND) if ext/analyzed > HT J (pos)/R (ND) if gross exceedance (> 2x HT)	1	Use PJ to qualify for holding time outlier. ***Current SW846 does not have an extraction holding time limit.*** [3] Gross exceedance > 2x HT, as per NFG 1999
Instrument Performance					
Retention Times	Surrogates: TCMX (± 0.05); DCB (± 0.10) Aroclors (± 0.07)	NFG [1]	NJ (pos)/R (ND) results for analytes with RT shifts	24	
Initial Calibration	Minimum 5 point with RSD ≤ 20% OR correlation coefficient (r-value) ≥ 0.995 OR Minimum 6-point with co-efficient of determination (r2-value) ≥ 0.99	NFG [1] Method [4]	J (pos) if %RSD greater than 20% OR r-value < 0.995 OR r^2-value < 0.99	5A	Refer to TM-01 for additional information. Use bias flags (H,L)[5] where appropriate
Initial Calibration Verification (ICV)	No NFG criteria. Project specific.	Project	J (pos) if > UCL J (pos)/UJ (ND) if < LCL	5B	Use bias flags (H,L) where appropriate
Continuing Calibration (Prior to each 12 hr. shift)	%D ± 20%	Method [2]	If > 20% (high bias): J (pos) If <20% (low bias: J (pos)/UJ (ND)	5B	Refer to TM-01 for additional information. Use bias flags (H,L) where appropriate
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected compounds > RL	NFG [1] Method [2]	U (pos) if result is less than appropriate 5X action level.	7	**Hierarchy of blank review:** **#1 - Review MB and IB, qualify as needed** **#2 - Review FB , qualify as needed** Note: Actions as per NFG 1999 Note: IB not required by method
Field Blank (FB)	FB: frequency as per QAPP No detected compounds > RL	NFG [1] Method [2]	U (pos) if result is less than appropriate 5X action level.	6	
Instrument Blanks (IB)	Analyzed at the beginning and end of every 12 hour sequence No analyte > CRQL	NFG [1]	U (pos) if result is less than appropriate 5X action level.	7	

PCB Aroclors by GC
(Based on Organic NFG 2008 and SW-846 Method 8082A)

QC Element	Acceptance Criteria (NFG)	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy					
MS/MSD (recovery)	One set per matrix per batch (of ≤ 20 samples) AR1016 and AR1260: %R = 29% - 135%, or project limits	NFG (1) Method (2)	Qualify parent only unless other QC indicates systematic problems. J (pos) if both %R > upper control limit (UCL) J (pos)/UJ (ND) if both %R < lower control limit (LCL) J (pos)/R (ND) if both %R < 10%	8	No action if only one spike %R is outside criteria. No action if native analyte conc. > 5x the amount spiked. Use bias flags (H,L) where appropriate. Actions apply to all Aroclors in parent sample.
MS/MSD (RPD)	One set per matrix per batch (of ≤ 20 samples) AR1016: RPD < 15%, AR1260: RPD < 20% or project limits	NFG (1) Method (2)	Qualify parent only unless other QC indicates systematic problems. J (pos) if RPD > control limit	9	No action if parent is ND.
LCS	One per lab batch (of ≤ 20 samples) AR1016 and AR1260: %R = 50% - 150%, or project limits	NFG (1)	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND) if %R < 10%	10	Use bias flags (H,L) where appropriate. Actions apply to all Aroclors in associated samples.
LCS/LCSD (RPD)	if analyzed use MS/MSD RPD criteria	NFG (1)	J (pos) assoc. compound in all samples	9	LCSD not required by method or NFG
Precision and Accuracy					
Surrogates	TCMX and DCBP added to every sample %R = 30% - 150% or project limits	NFG (1) Method (2)	J (pos) if either %R > UCL J (pos)/UJ (ND) if either %R < LCL J (pos)/R (ND) if either %R < 10%	13	If %R < 10% (sample dilution is a factor), use PJ Use bias flags (H,L) where appropriate
Internal Standards (if used)	Acceptable Range: IS area = 50% to 200% of CCAL area RT within 30 seconds of CC RT	Method (2)	J (pos) if area > 200% J (pos)/UJ (ND) if area < 50% J (pos)/R (ND) if area < 25% RT > 30 seconds, narrate	19	
Field Duplicates	**Solids:** RPD < 50% OR difference < 2X RL (for results < 5X RL) **Aqueous:** RPD < 35% OR difference < 1X RL (for results < 5X RL)	EcoChem	J (pos)/UJ (ND) Qualify only parent and field duplicate samples	9	use project limits if specified

PCB Aroclors by GC
(Based on Organic NFG 2008 and SW-846 Method 8082A)

QC Element	Acceptance Criteria (NFG)	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Compound Identification/Quantification					
Quantitation/ Identification	Between two columns: RPD < 40% or %D < 25% Within Retention Time Windows on both columns.	NFG [1] Method [2]	J (pos) if RPD = 40% - 60% (25% - 60% for %D) NJ (pos) if > 60% R (pos) if RTW criterion not met	3	See TM-08 for additional info.
Calibration Range	on column concentration < high calibration standard	NFG [1] Method [2]	J (pos) if conc > high standard and sample was not diluted	20	
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	Standard reporting policy	Use "DNR" to flag results that will not be reported.	11	TM-04 Rev. 1 for additional info.
Sample Clean-up					
GPC/Sulfur/ Florisil/Acid	No criteria - cleanups are optional	NFG [1] Method [2]	Use Professional Judgment	14	special cleanups may be required for project cleanup standards may be associated with GPC/florisil cleanups

[1] National Functional Guidelines for Organic Data Review, June, 2008
[2] Polychlorinated Biphenyls (PCBs) by Gas Chromatography USEPA Method SW846 8082A, Feb 2007, Rev. 1
[3] SW846, Chapter 4, Organic Analytes
[4] Determinative Chromatographic Separations , Method 8000C , March 2003, Rev.3
[5] "H" = high bias indicated; "L" = low bias indicated

ECOCHEM
Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700346	BIT-MW-10-20170315	EPA1668C	PCB-020/028	1.42	pg/L	JB	U	7
1700346	BIT-MW-10-20170315	EPA1668C	PCB-031	0.933	pg/L	JB	U	7
1700346	BIT-MW-10-20170315	EPA1668C	PCB-056	1.38	pg/L	JB	U	7
1700346	BIT-MW-10-20170315	EPA1668C	PCB-061/070/074/076	10.8	pg/L	JB	U	7
1700346	BIT-MW-10-20170315	EPA1668C	PCB-064	1.62	pg/L	JB	U	7
1700346	BIT-MW-10-20170315	EPA1668C	PCB-156/157	5.73	pg/L	JB	U	7
1700346	BIT-MW-10-20170315-D	EPA1668C	PCB-020/028	1.80	pg/L	JB	U	7
1700346	BIT-MW-10-20170315-D	EPA1668C	PCB-031	0.950	pg/L	JB	U	7
1700346	BIT-MW-10-20170315-D	EPA1668C	PCB-056	1.55	pg/L	JB	U	7
1700346	BIT-MW-10-20170315-D	EPA1668C	PCB-156/157	6.61	pg/L	JB	U	7
1700346	BIT-MW-10-20170315-D	EPA1668C	PCB-194	2.46	pg/L	JB	U	7
1700346	BIT-MW-13-20170315	EPA1668C	PCB-020/028	2.32	pg/L	JB	U	7
1700346	BIT-MW-13-20170315	EPA1668C	PCB-021/033	2.92	pg/L	JB	U	7
1700346	BIT-MW-13-20170315	EPA1668C	PCB-025	0.641	pg/L	JB	U	7
1700346	BIT-MW-13-20170315	EPA1668C	PCB-031	2.50	pg/L	JB	U	7
1700346	BIT-MW-13-20170315	EPA1668C	PCB-036	2.43	pg/L	JB	U	7
1700346	BIT-MW-13-20170315	EPA1668C	PCB-059/062/075	2.16	pg/L	JB	U	7
1700346	BIT-MW-13-20170315	EPA1668C	PCB-081	0.549	pg/L	JB	U	7
1700346	BIT-MW-25-20170315	EPA1668C	PCB-021/033	3.63	pg/L	JB	U	7
1700346	BIT-MW-25-20170315	EPA1668C	PCB-025	1.66	pg/L	JB	U	7
1700346	BIT-MW-25-20170315	EPA1668C	PCB-035	0.705	pg/L	JB	U	7
1700346	BIT-MW-25-20170315	EPA1668C	PCB-039	0.186	pg/L	JB	U	7
1700346	BIT-MW-25-20170315	EPA1668C	PCB-056	1.54	pg/L	JB	U	7
1700346	BIT-MW-25-20170315	EPA1668C	PCB-061/070/074/076	9.67	pg/L	JB	U	7
1700346	BIT-MW-25-20170315	EPA1668C	PCB-081	0.572	pg/L	JB	U	7
1700346	BIT-MW-25-20170315	EPA1668C	PCB-156/157	4.77	pg/L	JB	U	7
1700346	CMS-DMW-6A-20170316	EPA1668C	PCB-020/028	1.44	pg/L	JB	U	7
1700346	CMS-DMW-6A-20170316	EPA1668C	PCB-031	1.22	pg/L	JB	U	7
1700346	CMS-DMW-6A-20170316	EPA1668C	PCB-056	2.56	pg/L	JB	U	7
1700346	CMS-DMW-6A-20170316	EPA1668C	PCB-194	2.68	pg/L	JB	U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700346	CMS-EMW-13S-20170316	EPA1668C	PCB-001	9.42	pg/L		J	14
1700346	CMS-EMW-13S-20170316	EPA1668C	PCB-035	0.416	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316	EPA1668C	PCB-081	0.782	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-001	21.1	pg/L		J	14
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-003	5.18	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-020/028	4.51	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-021/033	2.12	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-031	3.68	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-035	1.20	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-077	1.11	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-156/157	2.44	pg/L	JB	U	7
1700346	CMS-EMW-13S-20170316-F	EPA1668C	PCB-167	2.07	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-020/028	0.955	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-021/033	0.510	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-025	0.255	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-031	0.735	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-052	1.07	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-061/070/074/076	1.30	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-064	0.405	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-066	0.582	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-105	0.856	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-156/157	0.982	pg/L	JB	U	7
1700346	CMS-EMW-1S-20170316	EPA1668C	PCB-194	4.39	pg/L	JB	U	7
1700346	CMS-SW-1-20170316	EPA1668C	PCB-021/033	5.23	pg/L	JB	U	7
1700346	CMS-SW-1-20170316	EPA1668C	PCB-036	1.01	pg/L	JB	U	7
1700346	CMS-SW-1-20170316	EPA1668C	PCB-059/062/075	2.06	pg/L	JB	U	7
1700346	CMS-SW-1-20170316	EPA1668C	PCB-156/157	4.80	pg/L	JB	U	7
1700346	CMS-SW-1-20170316	EPA1668C	PCB-194	7.04	pg/L	B	U	7
1700346	CMS-SW-1-20170316	EPA1668C	PCB-206	11.6	pg/L		J	9
1700346	CMS-SW-1-20170316-D	EPA1668C	PCB-021/033	5.09	pg/L	JB	U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700346	CMS-SW-1-20170316-D	EPA1668C	PCB-035	0.557	pg/L	JB	U	7
1700346	CMS-SW-1-20170316-D	EPA1668C	PCB-059/062/075	2.40	pg/L	JB	U	7
1700346	CMS-SW-1-20170316-D	EPA1668C	PCB-156/157	5.79	pg/L	JB	U	7
1700346	CMS-SW-1-20170316-D	EPA1668C	PCB-206	4.11	pg/L	J	J	9
1700346	DMC-MW-10-20170313	EPA1668C	PCB-021/033	0.764	pg/L	JB	U	7
1700346	DMC-MW-10-20170313	EPA1668C	PCB-031	0.920	pg/L	JB	U	7
1700346	DMC-MW-10-20170313	EPA1668C	PCB-049/069	1.07	pg/L	JB	U	7
1700346	DMC-MW-10-20170313	EPA1668C	PCB-052	2.15	pg/L	JB	U	7
1700346	DMC-MW-10-20170313	EPA1668C	PCB-156/157	1.66	pg/L	JB	U	7
1700346	DMC-MW-16-20170313	EPA1668C	PCB-035	7.42	pg/L	B	U	7
1700346	DMC-MW-16-20170313	EPA1668C	PCB-081	0.965	pg/L	JB	U	7
1700346	DMC-MW-16-20170313	EPA1668C	PCB-156/157	5.27	pg/L	JB	U	7
1700346	DMC-MW-8-20170313	EPA1668C	PCB-020/028	7.02	pg/L	JB	U	7
1700346	DMC-MW-8-20170313	EPA1668C	PCB-021/033	2.91	pg/L	JB	U	7
1700346	DMC-MW-8-20170313	EPA1668C	PCB-025	1.53	pg/L	JB	U	7
1700346	DMC-MW-8-20170313	EPA1668C	PCB-056	2.59	pg/L	JB	U	7
1700346	DMC-MW-8-20170313	EPA1668C	PCB-061/070/074/076	9.07	pg/L	JB	U	7
1700346	DMC-MW-8-20170313	EPA1668C	PCB-081	0.261	pg/L	JB	U	7
1700346	DMC-MW-8-20170313	EPA1668C	PCB-105	2.27	pg/L	JB	U	7
1700346	DMC-MW-8-20170313	EPA1668C	PCB-194	5.04	pg/L	JB	U	7
1700346	DMC-SW-1-20170313	EPA1668C	PCB-035	3.24	pg/L	JB	U	7
1700346	DMC-SW-1-20170313	EPA1668C	PCB-194	6.08	pg/L	B	U	7
1700346	DS-DS1-MW-06-20170314	EPA1668C	PCB-020/028	1.69	pg/L	JB	U	7
1700346	DS-DS1-MW-06-20170314	EPA1668C	PCB-025	0.369	pg/L	JB	U	7
1700346	DS-DS1-MW-06-20170314	EPA1668C	PCB-031	1.40	pg/L	JB	U	7
1700346	DS-DS1-MW-06-20170314	EPA1668C	PCB-032	1.12	pg/L	JB	U	7
1700346	DS-DS1-MW-06-20170314	EPA1668C	PCB-052	2.61	pg/L	JB	U	7
1700346	DS-DS1-MW-06-20170314	EPA1668C	PCB-059/062/075	0.331	pg/L	JB	U	7
1700346	DS-DS1-MW-06-20170314	EPA1668C	PCB-064	0.628	pg/L	JB	U	7
1700346	DS-DS1-MW-06-20170314	EPA1668C	PCB-129/138/160/163	0.856	pg/L	J	U	6

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-020/028	4.03	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-021/033	2.54	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-031	3.01	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-049/069	1.56	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-056	2.42	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-059/062/075	0.677	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-061/070/074/076	6.71	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-064	1.56	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-066	3.97	pg/L	JB	U	7
1700346	DS-DS1P2-19-20170314	EPA1668C	PCB-156/157	1.04	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-021/033	0.855	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-031	0.887	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-032	0.696	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-052	1.91	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-061/070/074/076	1.13	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-066	0.678	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-153/168	3.34	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-156/157	0.632	pg/L	JB	U	7
1700346	DS-DS1-PZ-01-20170314	EPA1668C	PCB-194	1.18	pg/L	JB	U	7
1700346	DS-SW-1-20170314	EPA1668C	PCB-021/033	2.90	pg/L	JB	U	7
1700346	DS-SW-1-20170314	EPA1668C	PCB-025	1.37	pg/L	JB	U	7
1700346	DS-SW-1-20170314	EPA1668C	PCB-032	3.06	pg/L	JB	U	7
1700346	DS-SW-1-20170314	EPA1668C	PCB-056	2.75	pg/L	JB	U	7
1700346	DS-SW-1-20170314	EPA1668C	PCB-059/062/075	1.01	pg/L	JB	U	7
1700346	DS-SW-1-20170314	EPA1668C	PCB-061/070/074/076	11.4	pg/L	JB	U	7
1700346	DS-SW-1-20170314	EPA1668C	PCB-105	4.61	pg/L	JB	U	7
1700346	DS-SW-1-20170314	EPA1668C	PCB-156/157	2.24	pg/L	JB	U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-001	4.71	pg/L	J	U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-002	11.5	pg/L		U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-003	6.65	pg/L		U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700346	LER-ER-1-20170316	EPA1668C	PCB-011	7.67	pg/L		U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-021/033	0.769	pg/L	JB	U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-022	0.588	pg/L	J	U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-032	0.845	pg/L	JB	U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-049/069	0.339	pg/L	JB	U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-052	0.898	pg/L	JB	U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-061/070/074/076	1.02	pg/L	JB	U	7
1700346	LER-ER-1-20170316	EPA1668C	PCB-194	0.884	pg/L	JB	U	7
1700346	LSB-SB-1-20170315	EPA1668C	PCB-020/028	0.947	pg/L	JB	U	7
1700346	LSB-SB-1-20170315	EPA1668C	PCB-021/033	0.738	pg/L	JB	U	7
1700346	LSB-SB-1-20170315	EPA1668C	PCB-031	0.751	pg/L	JB	U	7
1700346	LSB-SB-1-20170315	EPA1668C	PCB-061/070/074/076	0.760	pg/L	JB	U	7
1700346	LSB-SB-1-20170315	EPA1668C	PCB-066	0.470	pg/L	JB	U	7
1700373	EMF-MW-7-20170322	EPA1668C	PCB-011	8.69	pg/L	B	U	7
1700373	EMF-MW-7-20170322	EPA1668C	PCB-017	1.45	pg/L	J	U	6
1700373	EMF-MW-7-20170322	EPA1668C	PCB-020/028	2.88	pg/L	JB	U	7
1700373	EMF-MW-7-20170322	EPA1668C	PCB-021/033	1.64	pg/L	J	U	6
1700373	EMF-MW-7-20170322	EPA1668C	PCB-026/029	0.824	pg/L	JB	U	7
1700373	EMF-MW-7-20170322	EPA1668C	PCB-031	2.72	pg/L	J	U	6
1700373	EMF-MW-7-20170322	EPA1668C	PCB-032	1.51	pg/L	JB	U	7
1700373	EMF-MW-7-20170322	EPA1668C	PCB-061/070/074/076	1.99	pg/L	JB	U	7
1700373	EMF-MW-7-20170322	EPA1668C	PCB-066	0.832	pg/L	JB	U	7
1700373	EMF-MW-7-20170322	EPA1668C	PCB-105	0.779	pg/L	JB	U	7
1700373	EMF-MW-7-20170322	EPA1668C	PCB-167	0.360	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-011	9.40	pg/L	B	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-020/028	1.94	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-021/033	1.88	pg/L	J	U	6
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-026/029	0.934	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-031	1.53	pg/L	J	U	6
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-032	0.970	pg/L	JB	U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-035	0.889	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-060	1.14	pg/L	J	U	6
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-061/070/074/076	2.64	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-066	1.15	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-077	1.29	pg/L	J	U	6
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-105	1.02	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-162	0.495	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-167	0.704	pg/L	JB	U	7
1700373	GNW-MW-32S-20170321	EPA1668C	PCB-169	0.888	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-003	1.81	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-011	15.2	pg/L	B	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-020/028	5.67	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-021/033	2.70	pg/L	J	U	6
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-026/029	1.50	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-031	5.14	pg/L	J	U	6
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-032	3.26	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-060	2.37	pg/L	J	U	6
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-063	0.711	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-068	2.48	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-079	1.30	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-083/099	312	pg/L		J	9
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-122	3.01	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-167	5.12	pg/L	JB	U	7
1700373	GNW-MW-33S-20170321	EPA1668C	PCB-194	1.84	pg/L	JB	U	7
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-011	8.09	pg/L	B	U	7
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-017	0.906	pg/L	J	U	6
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-020/028	2.29	pg/L	JB	U	7
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-021/033	1.15	pg/L	J	U	6
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-031	1.65	pg/L	J	U	6
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-061/070/074/076	2.81	pg/L	JB	U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-066	1.35	pg/L	JB	U	7
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-068	0.665	pg/L	JB	U	7
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-083/099	2.99	pg/L	J	J	9
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-167	0.463	pg/L	JB	U	7
1700373	GNW-MW-4S-20170321	EPA1668C	PCB-194	1.13	pg/L	JB	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-011	8.83	pg/L	B	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-020/028	16.1	pg/L	B	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-021/033	6.07	pg/L	J	U	6
1700373	GNW-SW-1-20170321	EPA1668C	PCB-026/029	3.06	pg/L	JB	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-032	4.30	pg/L	JB	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-035	0.512	pg/L	JB	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-056	3.86	pg/L	JB	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-060	1.49	pg/L	J	U	6
1700373	GNW-SW-1-20170321	EPA1668C	PCB-061/070/074/076	13.7	pg/L	JB	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-083/099	12.4	pg/L		J	9
1700373	GNW-SW-1-20170321	EPA1668C	PCB-105	4.59	pg/L	JB	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-108/124	0.777	pg/L	JB	U	7
1700373	GNW-SW-1-20170321	EPA1668C	PCB-167	0.547	pg/L	JB	U	7
1700373	GNW-SW-1-20170321-F	EPA1668C	PCB-031	4.82	pg/L	JB	U	7
1700373	GNW-SW-1-20170321-F	EPA1668C	PCB-032	2.06	pg/L	J	U	7
1700373	GNW-SW-1-20170321-F	EPA1668C	PCB-044/047/065	9.22	pg/L	JB	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-001	1.92	pg/L	J	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-002	1.72	pg/L	J	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-003	1.92	pg/L	JB	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-016	0.817	pg/L	J	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-018/030	0.808	pg/L	J	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-032	0.889	pg/L	JB	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-036	0.867	pg/L	JB	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-039	1.17	pg/L	JB	U	7
1700373	LER-ER-1-20170317	EPA1668C	PCB-061/070/074/076	2.38	pg/L	JB	U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700373	LER-ER-1-20170317	EPA1668C	PCB-066	1.24	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-011	8.81	pg/L	B	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-017	1.32	pg/L	J	U	6
1700373	NBF-NGW252-20170322	EPA1668C	PCB-020/028	2.28	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-026/029	0.724	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-031	1.77	pg/L	J	U	6
1700373	NBF-NGW252-20170322	EPA1668C	PCB-032	1.55	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-056	0.920	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-058	1.89	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-061/070/074/076	5.90	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-066	2.77	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-083/099	41.5	pg/L		J	9
1700373	NBF-NGW252-20170322	EPA1668C	PCB-108/124	6.45	pg/L	JB	U	7
1700373	NBF-NGW252-20170322	EPA1668C	PCB-162	1.12	pg/L	JB	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-011	9.01	pg/L	B	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-020/028	72.9	pg/L	B	J	9
1700373	NBF-NGW520-20170322	EPA1668C	PCB-025	6.21	pg/L	B	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-056	6.00	pg/L	B	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-060	1.14	pg/L	J	U	6
1700373	NBF-NGW520-20170322	EPA1668C	PCB-063	1.49	pg/L	JB	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-068	5.79	pg/L	B	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-077	1.04	pg/L	J	U	6
1700373	NBF-NGW520-20170322	EPA1668C	PCB-079	0.702	pg/L	JB	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-083/099	154	pg/L		J	9
1700373	NBF-NGW520-20170322	EPA1668C	PCB-108/124	6.85	pg/L	JB	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-122	1.46	pg/L	JB	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-162	0.386	pg/L	JB	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-167	4.73	pg/L	JB	U	7
1700373	NBF-NGW520-20170322	EPA1668C	PCB-194	1.46	pg/L	JB	U	7
1700373	NBF-NGW521-20170322	EPA1668C	PCB-020/028	71700	pg/L	B	J	9

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700373	NBF-NGW521-20170322	EPA1668C	PCB-083/099	7270	pg/L		J	9
1700373	NBF-NGW521-20170322	EPA1668C	PCB-162	3.92	pg/L	JB	U	7
1700373	NBF-NGW521-20170322	EPA1668C	PCB-194	4.50	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-011	12.0	pg/L	B	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-020/028	14.2	pg/L	B	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-021/033	7.82	pg/L	J	U	6
1700373	NT115-MW-10-20170317	EPA1668C	PCB-025	1.79	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-026/029	3.25	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-035	1.83	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-036	1.21	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-038	0.737	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-056	5.59	pg/L	B	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-060	2.73	pg/L	J	U	6
1700373	NT115-MW-10-20170317	EPA1668C	PCB-061/070/074/076	20.4	pg/L	B	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-063	0.903	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-068	2.58	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-077	2.42	pg/L	J	U	6
1700373	NT115-MW-10-20170317	EPA1668C	PCB-079	1.58	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-083/099	48.7	pg/L		J	9
1700373	NT115-MW-10-20170317	EPA1668C	PCB-108/124	4.64	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-162	1.11	pg/L	JB	U	7
1700373	NT115-MW-10-20170317	EPA1668C	PCB-169	1.16	pg/L	JB	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-011	13.9	pg/L	B	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-020/028	370	pg/L	B	J	9
1700373	NT115-MW-20-20170317	EPA1668C	PCB-035	3.62	pg/L	JB	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-058	3.85	pg/L	JB	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-063	1.70	pg/L	JB	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-066	81.7	pg/L	B	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-068	1.27	pg/L	JB	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-077	6.96	pg/L		U	6

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700373	NT115-MW-20-20170317	EPA1668C	PCB-083/099	34.7	pg/L		J	9
1700373	NT115-MW-20-20170317	EPA1668C	PCB-105	8.16	pg/L	B	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-167	2.42	pg/L	JB	U	7
1700373	NT115-MW-20-20170317	EPA1668C	PCB-169	0.995	pg/L	JB	U	7
1700373	NT115-MW-3-20170317	EPA1668C	PCB-003	1.36	pg/L	JB	U	7
1700373	NT115-MW-3-20170317	EPA1668C	PCB-020/028	11.0	pg/L	B	U	7
1700373	NT115-MW-3-20170317	EPA1668C	PCB-021/033	6.33	pg/L	J	U	6
1700373	NT115-MW-3-20170317	EPA1668C	PCB-026/029	2.46	pg/L	JB	U	7
1700373	NT115-MW-3-20170317	EPA1668C	PCB-031	7.32	pg/L		U	6
1700373	NT115-MW-3-20170317	EPA1668C	PCB-055	0.887	pg/L	JB	U	7
1700373	NT115-MW-3-20170317	EPA1668C	PCB-060	3.53	pg/L	J	U	6
1700373	NT115-MW-3-20170317	EPA1668C	PCB-068	2.92	pg/L	JB	U	7
1700373	NT115-MW-3-20170317	EPA1668C	PCB-077	3.80	pg/L	J	U	6
1700373	NT115-MW-3-20170317	EPA1668C	PCB-083/099	39.0	pg/L		J	9
1700373	NT115-MW-3-20170317	EPA1668C	PCB-108/124	2.68	pg/L	JB	U	7
1700373	NT115-MW-3-20170317	EPA1668C	PCB-167	2.41	pg/L	JB	U	7
1700373	NT115-MW-3-20170317	EPA1668C	PCB-194	7.97	pg/L	B	U	7
1700373	SPL-MW-12-20170320	EPA1668C	PCB-011	8.75	pg/L	B	U	7
1700373	SPL-MW-12-20170320	EPA1668C	PCB-017	0.532	pg/L	J	U	6
1700373	SPL-MW-12-20170320	EPA1668C	PCB-021/033	0.824	pg/L	J	U	6
1700373	SPL-MW-12-20170320	EPA1668C	PCB-031	1.13	pg/L	J	U	6
1700373	SPL-MW-12-20170320	EPA1668C	PCB-032	0.595	pg/L	JB	U	7
1700373	SPL-MW-12-20170320	EPA1668C	PCB-061/070/074/076	1.94	pg/L	JB	U	7
1700373	SPL-MW-12-20170320	EPA1668C	PCB-068	2.82	pg/L	JB	U	7
1700373	SPL-MW-12-20170320	EPA1668C	PCB-077	0.581	pg/L	J	U	6
1700373	SPL-MW-12-20170320	EPA1668C	PCB-105	0.506	pg/L	JB	U	7
1700373	SPL-MW-12-20170320	EPA1668C	PCB-194	1.73	pg/L	JB	U	7
1700373	SPL-MW-31-20170320	EPA1668C	PCB-011	10.5	pg/L	B	U	7
1700373	SPL-MW-31-20170320	EPA1668C	PCB-021/033	1.70	pg/L	J	U	6
1700373	SPL-MW-31-20170320	EPA1668C	PCB-056	0.786	pg/L	JB	U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700373	SPL-MW-31-20170320	EPA1668C	PCB-061/070/074/076	2.47	pg/L	JB	U	7
1700373	SPL-MW-31-20170320	EPA1668C	PCB-105	0.728	pg/L	JB	U	7
1700373	SPL-MW-32-20170320	EPA1668C	PCB-011	9.13	pg/L	B	U	7
1700373	SPL-MW-32-20170320	EPA1668C	PCB-020/028	2.01	pg/L	JB	U	7
1700373	SPL-MW-32-20170320	EPA1668C	PCB-061/070/074/076	1.89	pg/L	JB	U	7
1700409	8801-MW-16A-20170328	EPA1668C	PCB-017	1.35	pg/L	J	U	6
1700409	8801-MW-16A-20170328	EPA1668C	PCB-020/028	3.92	pg/L	JB	U	7
1700409	8801-MW-16A-20170328	EPA1668C	PCB-021/033	3.04	pg/L	J	U	6
1700409	8801-MW-16A-20170328	EPA1668C	PCB-025	0.306	pg/L	J	J	14
1700409	8801-MW-16A-20170328	EPA1668C	PCB-026/029	0.669	pg/L	J	U	6
1700409	8801-MW-16A-20170328-F	EPA1668C	PCB-025	5.86	pg/L		J	14
1700409	8801-MW-16A-20170328-F	EPA1668C	PCB-031	2.11	pg/L	JB	U	7
1700409	8801-MW-30A-20170328	EPA1668C	PCB-017	7.20	pg/L		U	6
1700409	8801-MW-30A-20170328	EPA1668C	PCB-021/033	4.14	pg/L	J	U	6
1700409	8801-MW-42A-20170328	EPA1668C	PCB-017	1.86	pg/L	J	U	6
1700409	8801-MW-42A-20170328	EPA1668C	PCB-021/033	4.12	pg/L	J	U	6
1700409	8801-MW-42A-20170328	EPA1668C	PCB-026/029	1.21	pg/L	J	U	6
1700409	8801-MW-42A-20170328	EPA1668C	PCB-035	0.428	pg/L	JB	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-016	1.19	pg/L	J	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-018/030	2.08	pg/L	JB	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-020/028	1.37	pg/L	JB	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-022	0.611	pg/L	J	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-031	1.45	pg/L	JB	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-044/047/065	3.40	pg/L	J	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-052	0.862	pg/L	JB	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-061/070/074/076	0.728	pg/L	JB	U	7
1700409	LER-ER-1-20170327	EPA1668C	PCB-068	0.560	pg/L	J	U	7
1700409	LSB-SB-1-20170328	EPA1668C	PCB-020/028	1.23	pg/L	JB	U	7
1700409	LSB-SB-1-20170328	EPA1668C	PCB-031	0.962	pg/L	JB	U	7
1700409	LSB-SB-1-20170328	EPA1668C	PCB-052	1.17	pg/L	JB	U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700409	WT-MW-06-20170327	EPA1668C	PCB-017	3.76	pg/L	J	U	6
1700409	WT-MW-06-20170327	EPA1668C	PCB-156/157	1.04	pg/L	JB	U	7
1700409	WT-MW-108-20170327	EPA1668C	PCB-017	2.18	pg/L	J	U	6
1700409	WT-MW-108-20170327	EPA1668C	PCB-021/033	2.57	pg/L	J	U	6
1700409	WT-MW-108-20170327	EPA1668C	PCB-026/029	1.02	pg/L	J	U	6
1700409	WT-MW-108-20170327	EPA1668C	PCB-153/168	1.55	pg/L	JB	U	7
1700409	WT-MW-108-20170327	EPA1668C	PCB-156/157	0.485	pg/L	JB	U	7
1700409	WT-MW-110-20170327	EPA1668C	PCB-006	12.4	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-008	55.7	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-015	64.3	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-016	45.7	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-017	34.3	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-018/030	78.5	pg/L	B	J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-020/028	203	pg/L	B	J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-021/033	87.8	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-022	73.9	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-025	12.9	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-026/029	23.4	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-031	135	pg/L	B	J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-032	32.9	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-037	78.5	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-040/041/071	119	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-042	49.6	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-044/047/065	177	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-045/051	35.1	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-046	15.4	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-048	36.2	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-049/069	90.6	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-050/053	25.8	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-052	220	pg/L	B	J	9

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700409	WT-MW-110-20170327	EPA1668C	PCB-056	52.7	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-060	26.8	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-061/070/074/076	200	pg/L	B	J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-064	83.0	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-066	104	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-077	13.9	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-082	28.2	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-083/099	95.9	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-084	52.9	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-085/116/117	32.2	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-086/087/097/109/119/125	124	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-088/091	24.6	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-090/101/113	173	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-092	26.7	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-095	142	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-105	69.6	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-110/115	237	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-118	163	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-128/166	31.0	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-129/138/160/163	188	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-130	11.0	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-132	57.9	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-135/151	44.1	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-136	17.6	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-137	10.4	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-141	28.1	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-146	18.3	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-147/149	99.3	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-153/168	117	pg/L	B	J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-156/157	25.0	pg/L	B	J	9

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700409	WT-MW-110-20170327	EPA1668C	PCB-158	18.1	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-164	11.8	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-167	7.12	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-169	0.970	pg/L	JB	U	7
1700409	WT-MW-110-20170327	EPA1668C	PCB-170	22.3	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-174	26.4	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-177	13.2	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-180/193	51.5	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-187	29.3	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-194	15.6	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-198/199	15.0	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-203	10.1	pg/L		J	9
1700409	WT-MW-110-20170327	EPA1668C	PCB-206	14.1	pg/L		J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-006	1.54	pg/L	U	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-008	1.50	pg/L	U	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-015	1.33	pg/L	U	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-016	4.06	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-017	2.55	pg/L	J	UJ	6,9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-018/030	5.47	pg/L	B	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-020/028	11.7	pg/L	B	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-021/033	5.97	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-022	5.54	pg/L		J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-025	1.15	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-026/029	1.73	pg/L	J	UJ	6,9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-031	9.26	pg/L	B	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-032	2.35	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-037	4.49	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-040/041/071	7.91	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-042	3.01	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-044/047/065	11.8	pg/L	J	J	9

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-045/051	2.68	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-046	1.12	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-048	2.59	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-049/069	5.17	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-050/053	1.28	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-052	11.9	pg/L	B	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-056	3.79	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-060	2.09	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-061/070/074/076	12.0	pg/L	JB	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-064	4.93	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-066	6.79	pg/L		J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-077	1.06	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-082	1.39	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-083/099	4.80	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-084	3.14	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-085/116/117	0.775	pg/L	U	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-086/087/097/109/119/125	5.93	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-088/091	1.83	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-090/101/113	8.12	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-092	0.652	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-095	9.45	pg/L		J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-105	3.21	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-110/115	11.9	pg/L		J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-118	7.27	pg/L		J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-128/166	1.84	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-129/138/160/163	9.13	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-130	0.624	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-132	3.29	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-135/151	2.77	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-136	1.06	pg/L	UEMPC	UJ	9

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-137	0.744	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-141	1.63	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-146	1.17	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-147/149	6.32	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-153/168	6.04	pg/L	JB	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-156/157	1.08	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-158	1.01	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-164	0.625	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-167	0.445	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-170	1.53	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-174	1.08	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-177	0.721	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-180/193	3.36	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-187	0.286	pg/L	U	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-194	1.27	pg/L	J	J	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-198/199	1.21	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-203	0.607	pg/L	UEMPC	UJ	9
1700409	WT-MW-110-20170327-D	EPA1668C	PCB-206	0.655	pg/L	U	UJ	9
1700413	DMD-MW-11-20170330	EPA1668C	PCB-017	1.02	pg/L	J	U	6
1700413	DMD-MW-11-20170330	EPA1668C	PCB-020/028	3.03	pg/L	JB	U	7
1700413	DMD-MW-17-20170330-F	EPA1668C	PCB-008	564	pg/L		J	10H
1700413	DMD-SW-1-20170330	EPA1668C	PCB-035	0.488	pg/L	JB	U	7
1700413	ICS-DOF-MW1-20170329	EPA1668C	PCB-137	1.52	pg/L	U	UJ	14
1700413	ICS-DOF-MW1-20170329-F	EPA1668C	PCB-008	36.9	pg/L		J	10H
1700413	ICS-DOF-MW1-20170329-F	EPA1668C	PCB-137	7.01	pg/L		J	14
1700413	ICS-DOF-MW3-20170329	EPA1668C	PCB-017	3.34	pg/L	J	U	6
1700413	ICS-SA-MW2-20170329	EPA1668C	PCB-169	2.12	pg/L	JB	U	7
1700413	JF-MW-23-20170331	EPA1668C	PCB-017	1.61	pg/L	J	U	6
1700413	JF-MW-23-20170331	EPA1668C	PCB-021/033	3.68	pg/L	J	U	6
1700413	JF-MW-23-20170331	EPA1668C	PCB-026/029	1.05	pg/L	J	U	6

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700413	JF-MW-23-20170331	EPA1668C	PCB-052	3.47	pg/L	JB	U	7
1700413	JF-MW-23-20170331	EPA1668C	PCB-153/168	1.13	pg/L	JB	U	7
1700413	JF-MW-23-20170331	EPA1668C	PCB-156/157	0.845	pg/L	JB	U	7
1700413	JF-MW-23-20170331	EPA1668C	PCB-169	0.379	pg/L	JB	U	7
1700413	JF-MW-48-20170331	EPA1668C	PCB-017	0.822	pg/L	J	U	6
1700413	JF-MW-48-20170331	EPA1668C	PCB-018/030	1.26	pg/L	JB	U	7
1700413	JF-MW-48-20170331	EPA1668C	PCB-020/028	1.55	pg/L	JB	U	7
1700413	JF-MW-48-20170331	EPA1668C	PCB-021/033	1.45	pg/L	J	U	6
1700413	JF-MW-48-20170331	EPA1668C	PCB-031	1.22	pg/L	JB	U	7
1700413	JF-MW-48-20170331	EPA1668C	PCB-061/070/074/076	1.75	pg/L	JB	U	7
1700413	JF-MW-48-20170331	EPA1668C	PCB-129/138/160/163	0.859	pg/L	J	U	6
1700413	JF-MW-48-20170331	EPA1668C	PCB-156/157	0.622	pg/L	JB	U	7
1700413	JF-MW-48-20170331	EPA1668C	PCB-169	0.389	pg/L	JB	U	7
1700413	JF-MW-51-20170331	EPA1668C	PCB-018/030	1.20	pg/L	JB	U	7
1700413	JF-MW-51-20170331	EPA1668C	PCB-020/028	1.96	pg/L	JB	U	7
1700413	JF-MW-51-20170331	EPA1668C	PCB-021/033	1.49	pg/L	J	U	6
1700413	JF-MW-51-20170331	EPA1668C	PCB-026/029	0.424	pg/L	J	U	6
1700413	JF-MW-51-20170331	EPA1668C	PCB-031	1.81	pg/L	JB	U	7
1700413	JF-MW-51-20170331	EPA1668C	PCB-052	1.47	pg/L	JB	U	7
1700413	JF-MW-51-20170331	EPA1668C	PCB-061/070/074/076	2.23	pg/L	JB	U	7
1700413	JF-MW-51-20170331	EPA1668C	PCB-129/138/160/163	0.952	pg/L	J	U	6
1700413	JF-MW-51-20170331	EPA1668C	PCB-156/157	0.258	pg/L	JB	U	7
1700413	JF-MW-51-20170331	EPA1668C	PCB-169	0.229	pg/L	JB	U	7
1700431	DOT-MW-2-20170406	EPA1668C	PCB-049/069	1.80	pg/L	J	U	6
1700431	DOT-MW-2-20170406	EPA1668C	PCB-061/070/074/076	5.02	pg/L	J	U	6
1700431	GLS-MW-K01-20170406	EPA1668C	PCB-008	52.1	pg/L		J	8H
1700431	GLS-MW-K01-20170406	EPA1668C	PCB-035	3.68	pg/L	J	U	6
1700431	GLS-MW-K01-20170406	EPA1668C	PCB-129/138/160/163	22.2	pg/L	J	J	9
1700431	LER-ER-1-20170406	EPA1668C	PCB-008	3.64	pg/L	J	U	7
1700431	LER-ER-1-20170406	EPA1668C	PCB-011	10.6	pg/L		U	7

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
1700431	LER-ER-1-20170406	EPA1668C	PCB-037	1.90	pg/L	J	U	7
1700431	LER-ER-1-20170406	EPA1668C	PCB-044/047/065	4.12	pg/L	J	U	7
1700431	LER-ER-1-20170406	EPA1668C	PCB-064	0.780	pg/L	J	U	7
1700431	LER-ER-1-20170406	EPA1668C	PCB-066	1.21	pg/L	J	U	7
1700431	LER-ER-1-20170406	EPA1668C	PCB-169	1.53	pg/L	JB	U	7
1700431	SHS-MW-02-20170406	EPA1668C	PCB-020/028	4.39	pg/L	J	U	6
1700431	SHS-MW-02-20170406	EPA1668C	PCB-031	3.01	pg/L	J	U	6
1700431	SHS-MW-02-20170406	EPA1668C	PCB-061/070/074/076	7.04	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-021/033	2.02	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-026/029	0.884	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-031	2.18	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-039	0.756	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-060	1.31	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-061/070/074/076	4.58	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-114	0.585	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-156/157	1.29	pg/L	J	U	6
1700431	SHS-MW-07-20170406	EPA1668C	PCB-169	1.03	pg/L	JB	U	7
17C0309	CMS-EMW-13S-20170316-F	SW8082A	PCB-aroclor 1221	0.010	ug/L	U	UJ	10L
17C0309	CMS-EMW-13S-20170316-F	SW8082A	PCB-aroclor 1232	0.010	ug/L	U	UJ	10L
17C0309	CMS-EMW-13S-20170316-F	SW8082A	PCB-aroclor 1242	0.010	ug/L	U	UJ	10L
17C0309	CMS-EMW-13S-20170316-F	SW8082A	PCB-aroclor 1248	0.010	ug/L	U	UJ	10L
17C0309	CMS-EMW-13S-20170316-F	SW8082A	PCB-aroclor 1254	0.010	ug/L	U	UJ	10L
17C0309	CMS-EMW-13S-20170316-F	SW8082A	PCB-aroclor 1260	0.010	ug/L	U	UJ	10L
17C0309	CMS-EMW-13S-20170316-F	SW8082A	PCB-aroclor 1262	0.010	ug/L	U	UJ	10L
17C0309	CMS-EMW-13S-20170316-F	SW8082A	PCB-aroclor 1268	0.010	ug/L	U	UJ	10L
17C0309	SPL-MW-32-20170320-F	SW8082A	PCB-aroclor 1221	0.010	ug/L	U	UJ	10L
17C0309	SPL-MW-32-20170320-F	SW8082A	PCB-aroclor 1232	0.010	ug/L	U	UJ	10L
17C0309	SPL-MW-32-20170320-F	SW8082A	PCB-aroclor 1242	0.010	ug/L	U	UJ	10L
17C0309	SPL-MW-32-20170320-F	SW8082A	PCB-aroclor 1248	0.010	ug/L	U	UJ	10L
17C0309	SPL-MW-32-20170320-F	SW8082A	PCB-aroclor 1254	0.010	ug/L	U	UJ	10L

Qualified Data Summary Table
Lower Duwamish Waterway - Groundwater Sampling for PCB Congeners and Aroclors

SDG	SAMPLE ID	METHOD	ANALYTE	RESULT	UNITS	LAB FLAG	DV QUALIFIER	DV REASON
17C0309	SPL-MW-32-20170320-F	SW8082A	PCB-aroclor 1260	0.010	ug/L	U	UJ	10L
17C0309	SPL-MW-32-20170320-F	SW8082A	PCB-aroclor 1262	0.010	ug/L	U	UJ	10L
17C0309	SPL-MW-32-20170320-F	SW8082A	PCB-aroclor 1268	0.010	ug/L	U	UJ	10L
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1016	0.100	ug/L	U	DNR	11
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1221	0.100	ug/L	U	DNR	11
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1232	0.100	ug/L	U	DNR	11
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1242	0.100	ug/L	U	DNR	11
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1248	0.732	ug/L	E	DNR	20
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1254	0.100	ug/L	U	DNR	11
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1260	0.100	ug/L	U	DNR	11
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1262	0.100	ug/L	U	DNR	11
17C0409	NBF-NGW521-20170322	SW8082A	PCB-aroclor 1268	0.100	ug/L	U	DNR	11
17D0022	DMD-MW-17-20170330-F	SW8082A	PCB-aroclor 1221	0.010	ug/L	U	UJ	10L
17D0022	DMD-MW-17-20170330-F	SW8082A	PCB-aroclor 1232	0.010	ug/L	U	UJ	10L
17D0022	DMD-MW-17-20170330-F	SW8082A	PCB-aroclor 1242	0.010	ug/L	U	UJ	10L
17D0022	DMD-MW-17-20170330-F	SW8082A	PCB-aroclor 1248	0.032	ug/L	J	J	10L
17D0022	DMD-MW-17-20170330-F	SW8082A	PCB-aroclor 1254	0.011	ug/L	J	J	10L
17D0022	DMD-MW-17-20170330-F	SW8082A	PCB-aroclor 1260	0.010	ug/L	U	UJ	10L
17D0022	DMD-MW-17-20170330-F	SW8082A	PCB-aroclor 1262	0.010	ug/L	U	UJ	10L
17D0022	DMD-MW-17-20170330-F	SW8082A	PCB-aroclor 1268	0.010	ug/L	U	UJ	10L
17D0022	ICS-DOF-MW1-20170329	SW8082A	PCB-aroclor 1248	0.111	ug/L	J	J	3
17D0022	ICS-DOF-MW1-20170329-F	SW8082A	PCB-aroclor 1221	0.010	ug/L	U	UJ	10L
17D0022	ICS-DOF-MW1-20170329-F	SW8082A	PCB-aroclor 1232	0.010	ug/L	U	UJ	10L
17D0022	ICS-DOF-MW1-20170329-F	SW8082A	PCB-aroclor 1242	0.010	ug/L	U	UJ	10L
17D0022	ICS-DOF-MW1-20170329-F	SW8082A	PCB-aroclor 1248	0.040	ug/L	U,UJK	UJ	10L, 22
17D0022	ICS-DOF-MW1-20170329-F	SW8082A	PCB-aroclor 1254	0.027	ug/L		J	10L
17D0022	ICS-DOF-MW1-20170329-F	SW8082A	PCB-aroclor 1260	0.009	ug/L	J	J	10L
17D0022	ICS-DOF-MW1-20170329-F	SW8082A	PCB-aroclor 1262	0.010	ug/L	U	UJ	10L
17D0022	ICS-DOF-MW1-20170329-F	SW8082A	PCB-aroclor 1268	0.010	ug/L	U	UJ	10L