APPENDIX A

Key Historical Document Excerpts

APPENDIX A.1

Aerial Photographs

1936 King County Aerial
1946 Aerial Photo Publisher
1961 Pacific Aerial Survey
1961 SAIC Aerial
1981 Washington State Dept. of Natural Resources Aerial
1982 Ecology Aerial

Basemap Layer Credits || King County

GIS Path: T:\projects_8\SeattleCityLight\SouthParkMarina_190293\Working\Historical Aerial Imagery - 1936.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 2020-05-25 || User: trulien || Print Date: 2020-05-25


1946 Aerial Photo


1961 Pacific Aerial Survey

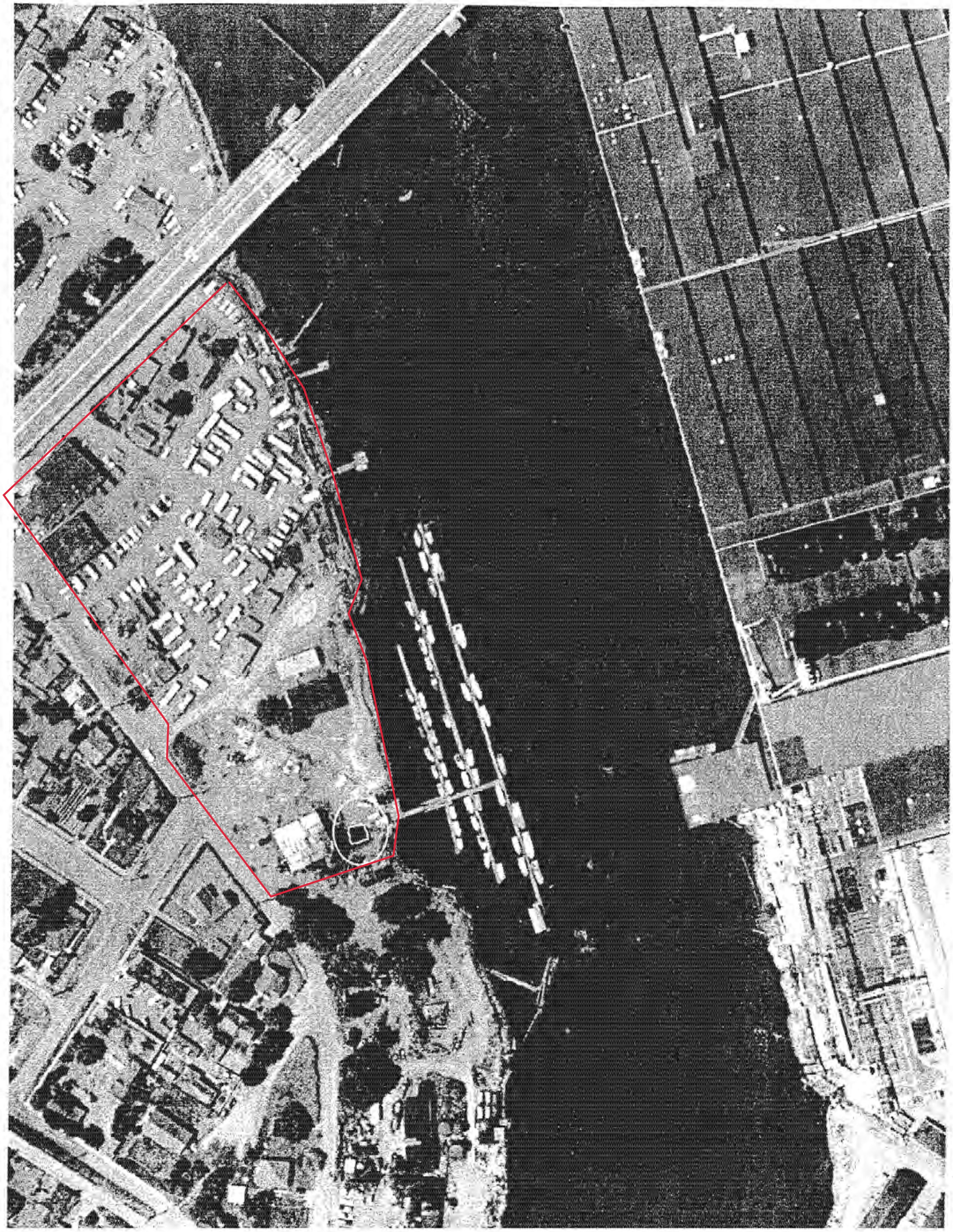
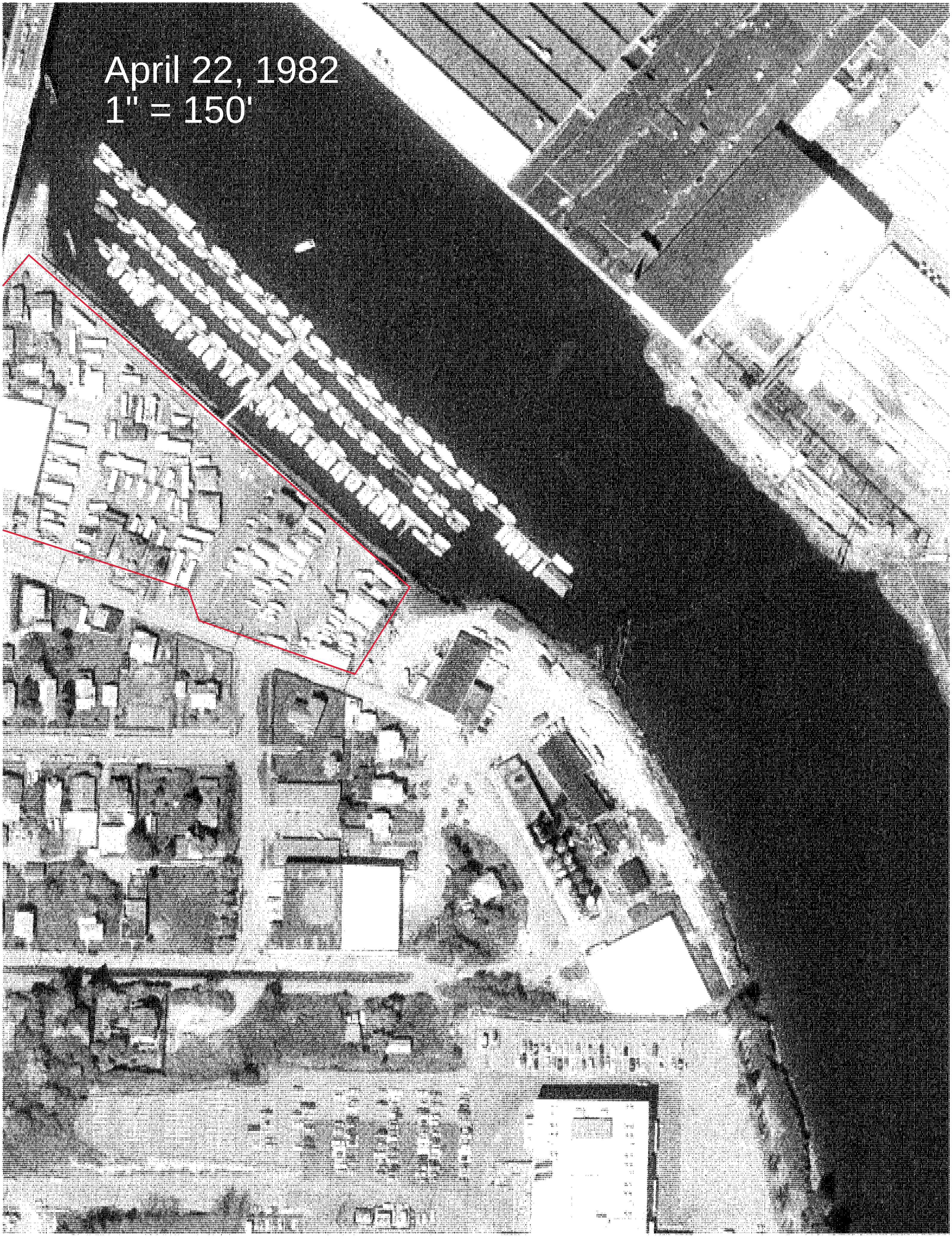


Figure 5. Historic Aerial Photo of South Park Marina Showing Pond (1961)
Source: Unknown


7-16-81
SP-81
15-56-181


April 22, 1982
1" = 150'

APPENDIX A.2

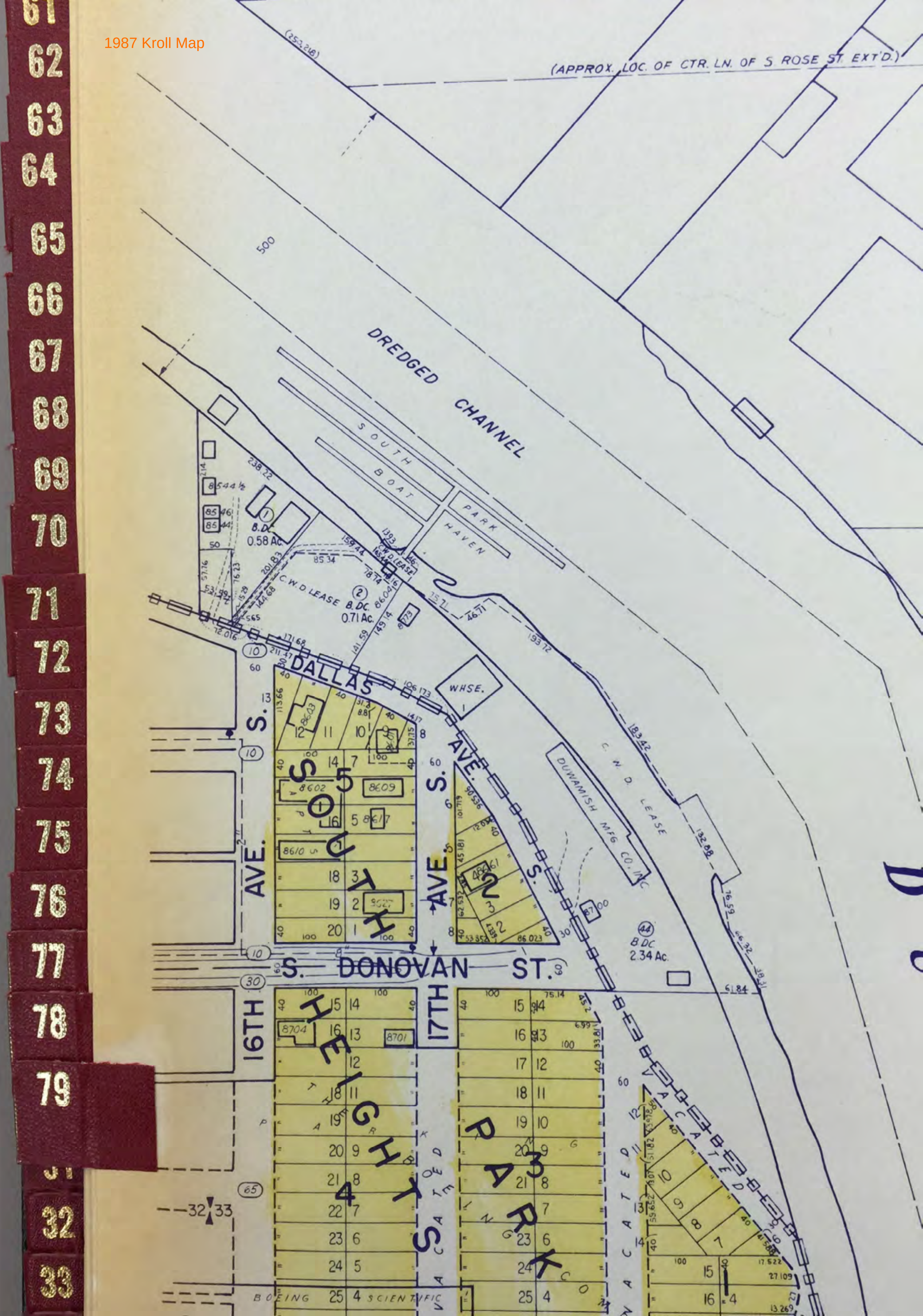
Kroll and Sanborn Maps

Kroll Map Company, Inc., 1987 Kroll Map_A and B, accessed at Seattle Public Library Central Branch.

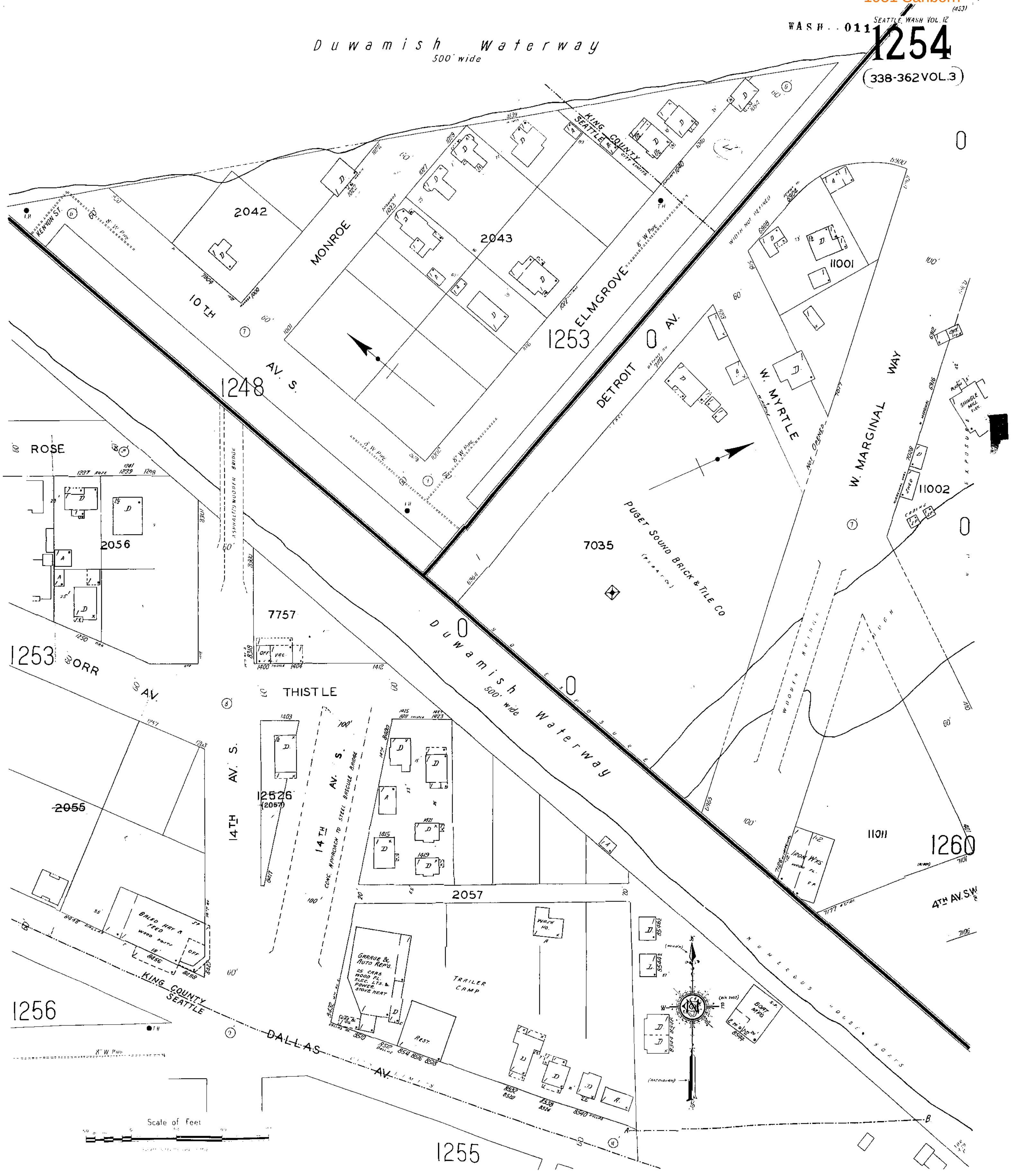
Sanborn Map Company, 1951 Sanborn Seattle Sheets 1254 and 1255, accessed via Seattle Public Library Digital Archive, spl.org.

1987 Kroll Map

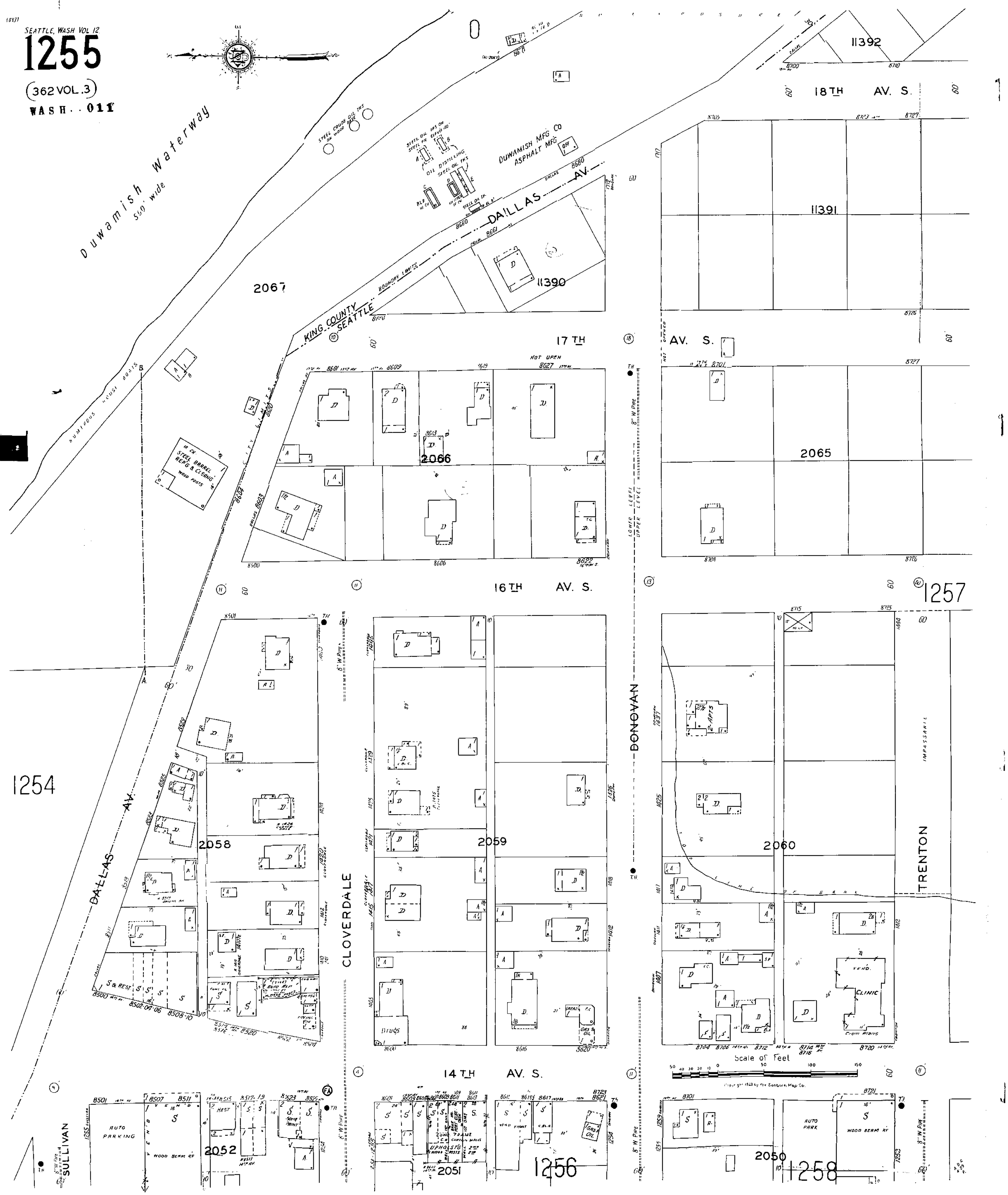
1987 Kroll Map



1951 Sanborn



1951 Sanborn



APPENDIX A.3

Boat Wash Water and StormwateRx™ System Schematics

King County Surface Water Management (King County), 1993, Boatyard Wastewater Treatment: Final Plans and Specifications, September 14, 1993.

TIG Environmental, 2018a, Stormwater and Boat Wash Water Systems Evaluation South Park Marina, Prepared for South Park Marina Limited Partnership, February 2018.

2.d. pg. 1-2

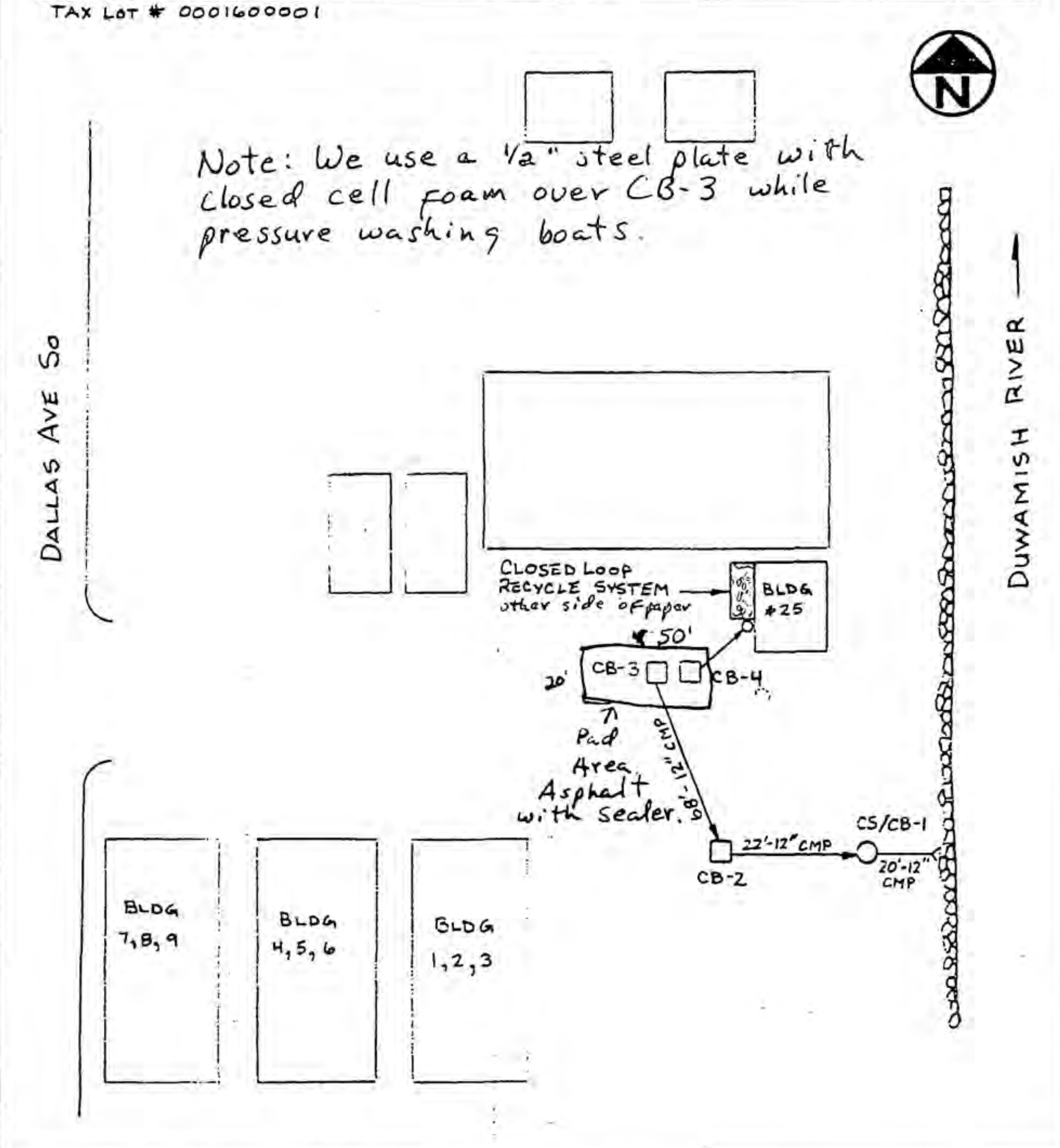
Boatyard Wastewater Treatment: Final Plans and Specifications 12.3.81

NPDES Boatyard Permit # WAG-030004-5 9.14.93

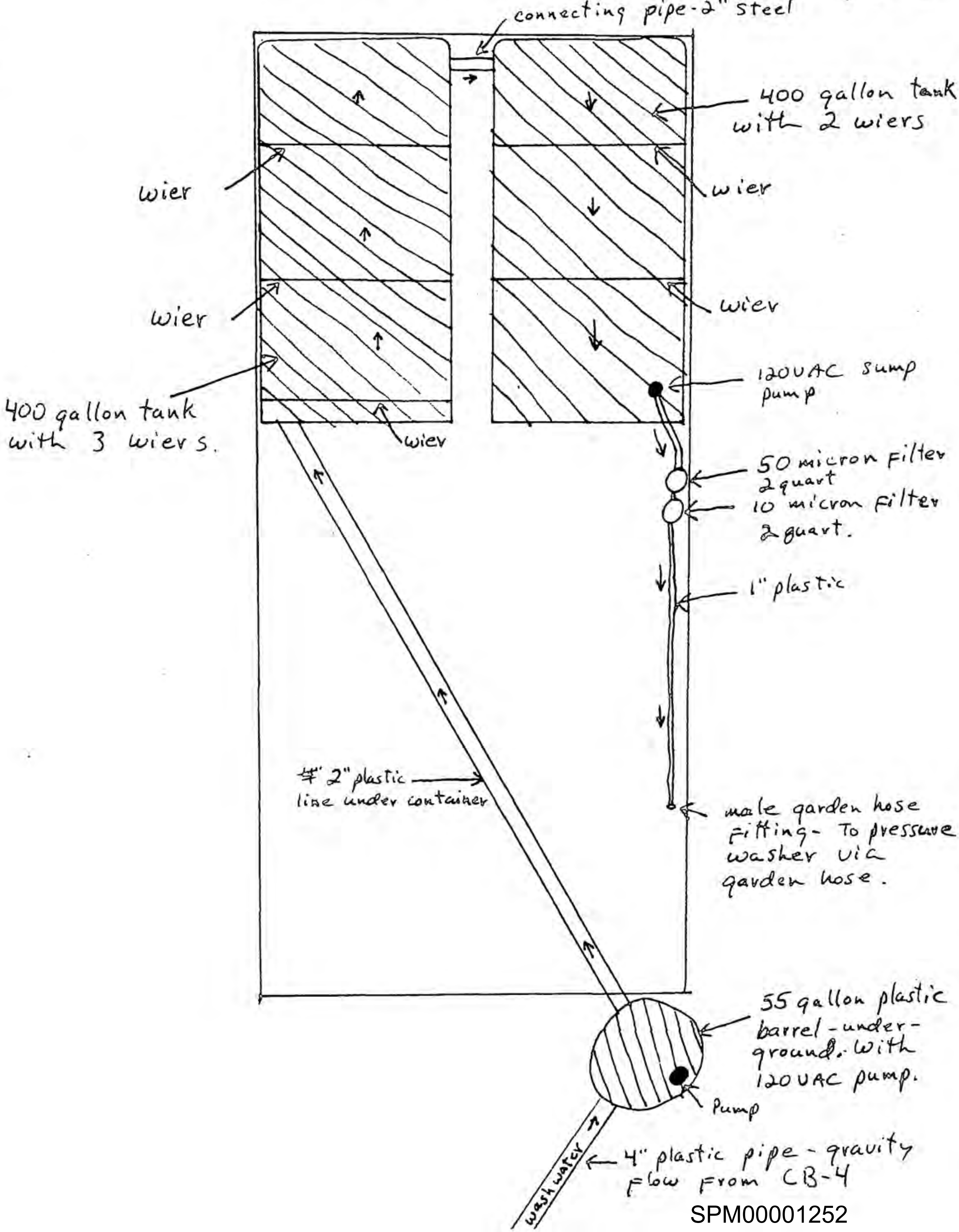
King County
Surface Water
Management
Everyone lives downstream

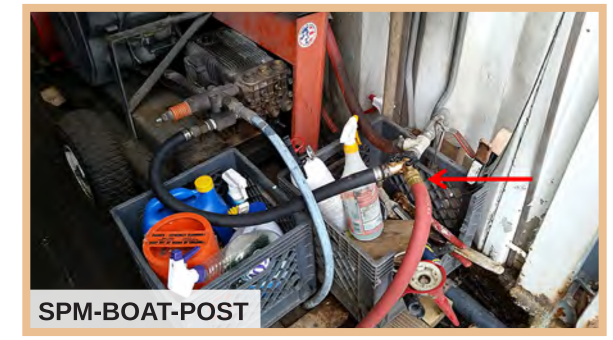
PROJECT NO. N97605
PROJECT SOUTH PARK MARINA
LOCATION 8604 - DALLAS AVE S.
KROLL PAGE 78E
BASIN DUWAMISH
TB PAGE 625-B3
TYPE OWS
MAINT. DIVISION 3
DATE 9-14-93
INITIALS - MAM/DP

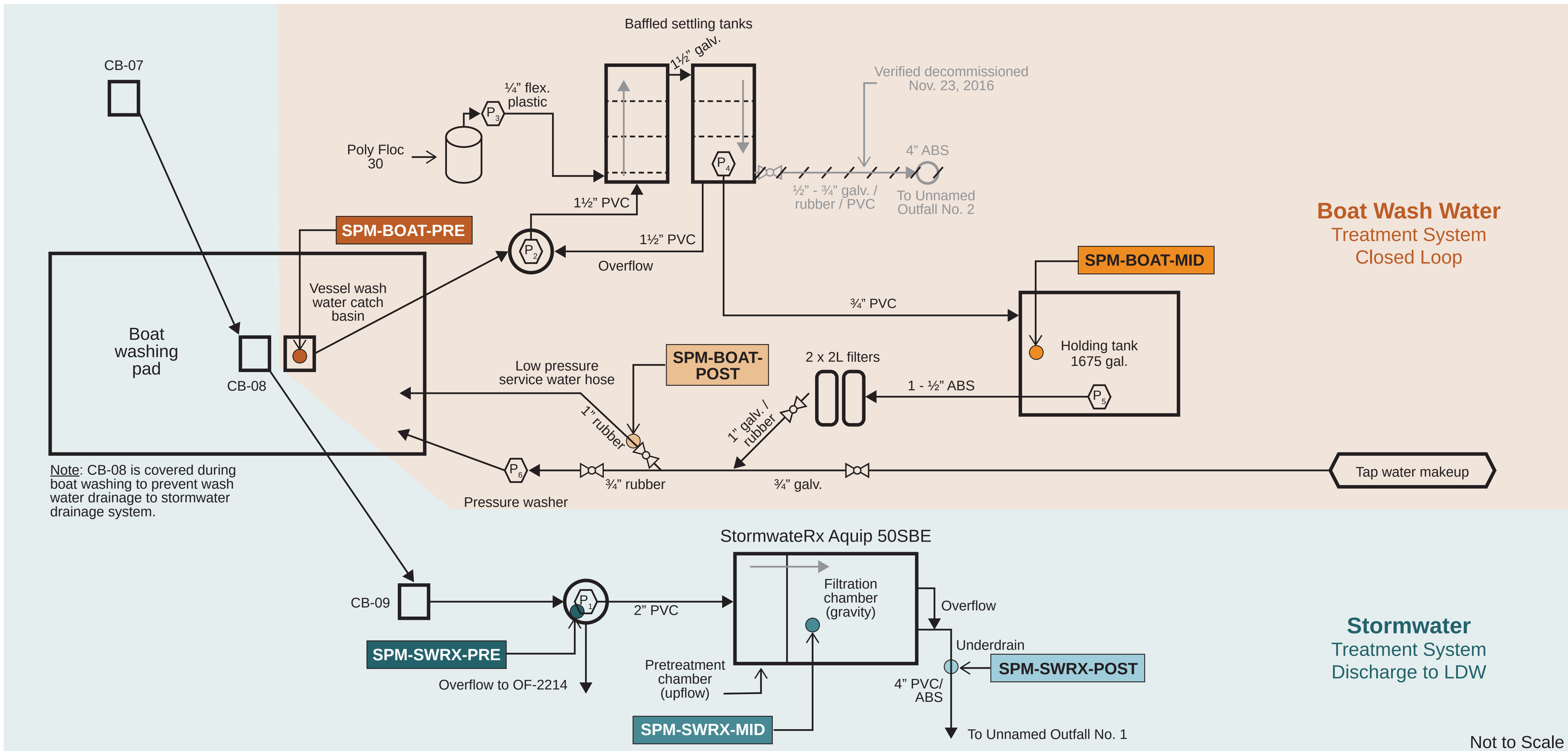
TAX LOT # 0001600001



20' Steel Container







CB = Catch basin

Legend:

- Sampling location
- Ball valve
- Pump
- Pump vault

FIGURE 3

PROCESS FLOW DIAGRAM AND SAMPLING LOCATIONS FOR WATER TREATMENT SYSTEMS

KARR TUTTLE CAMPBELL
SOUTH PARK MARINA

STORMWATER AND BOAT WASH WATER SYSTEMS EVALUATION

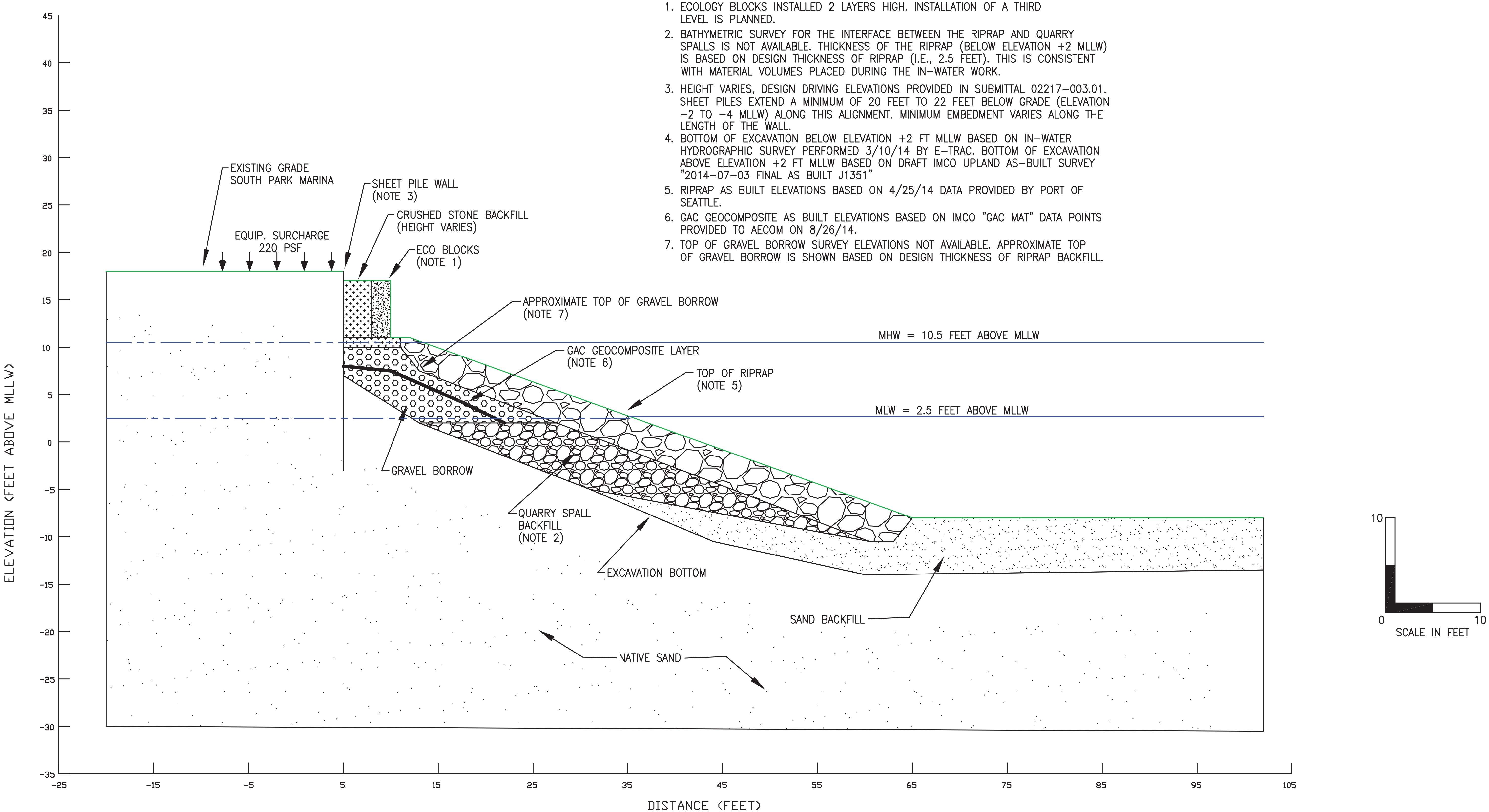
TIG environmental™

G:\GIS\SPMLP\SouthParkMarina\TreatmentSystemEvaluation\WTSEDA_WTSP Flow Diagram_v6.ai Date modified: 1/16/2018 Modified by: jfredenburg

APPENDIX A.4

Marina Corner Sheet Pile Wall As-Built Drawing

AECOM Environment, 2014b, Geotechnical Assessment of the As-Built South Park Marina Corner, Terminal 117 Cleanup, Prepared for Port of Seattle, December 2, 2014.



NOTES:

1. ECOLOGY BLOCKS INSTALLED 2 LAYERS HIGH. INSTALLATION OF A THIRD LEVEL IS PLANNED.
2. BATHYMETRIC SURVEY FOR THE INTERFACE BETWEEN THE RIPRAP AND QUARRY SPALLS IS NOT AVAILABLE. THICKNESS OF THE RIPRAP (BELOW ELEVATION +2 MLLW) IS BASED ON DESIGN THICKNESS OF RIPRAP (I.E., 2.5 FEET). THIS IS CONSISTENT WITH MATERIAL VOLUMES PLACED DURING THE IN-WATER WORK.
3. HEIGHT VARIES, DESIGN DRIVING ELEVATIONS PROVIDED IN SUBMITTAL 02217-003.01. SHEET PILES EXTEND A MINIMUM OF 20 FEET TO 22 FEET BELOW GRADE (ELEVATION −2 TO −4 MLLW) ALONG THIS ALIGNMENT. MINIMUM EMBEDMENT VARIES ALONG THE LENGTH OF THE WALL.
4. BOTTOM OF EXCAVATION BELOW ELEVATION +2 FT MLLW BASED ON IN-WATER HYDROGRAPHIC SURVEY PERFORMED 3/10/14 BY E-TRAC. BOTTOM OF EXCAVATION ABOVE ELEVATION +2 FT MLLW BASED ON DRAFT IMCO UPLAND AS-BUILT SURVEY "2014-07-03 FINAL AS BUILT J1351"
5. RIPRAP AS BUILT ELEVATIONS BASED ON 4/25/14 DATA PROVIDED BY PORT OF SEATTLE.
6. GAC GEOCOMPOSITE AS BUILT ELEVATIONS BASED ON IMCO "GAC MAT" DATA POINTS PROVIDED TO AECOM ON 8/26/14.
7. TOP OF GRAVEL BORROW SURVEY ELEVATIONS NOT AVAILABLE. APPROXIMATE TOP OF GRAVEL BORROW IS SHOWN BASED ON DESIGN THICKNESS OF RIPRAP BACKFILL.

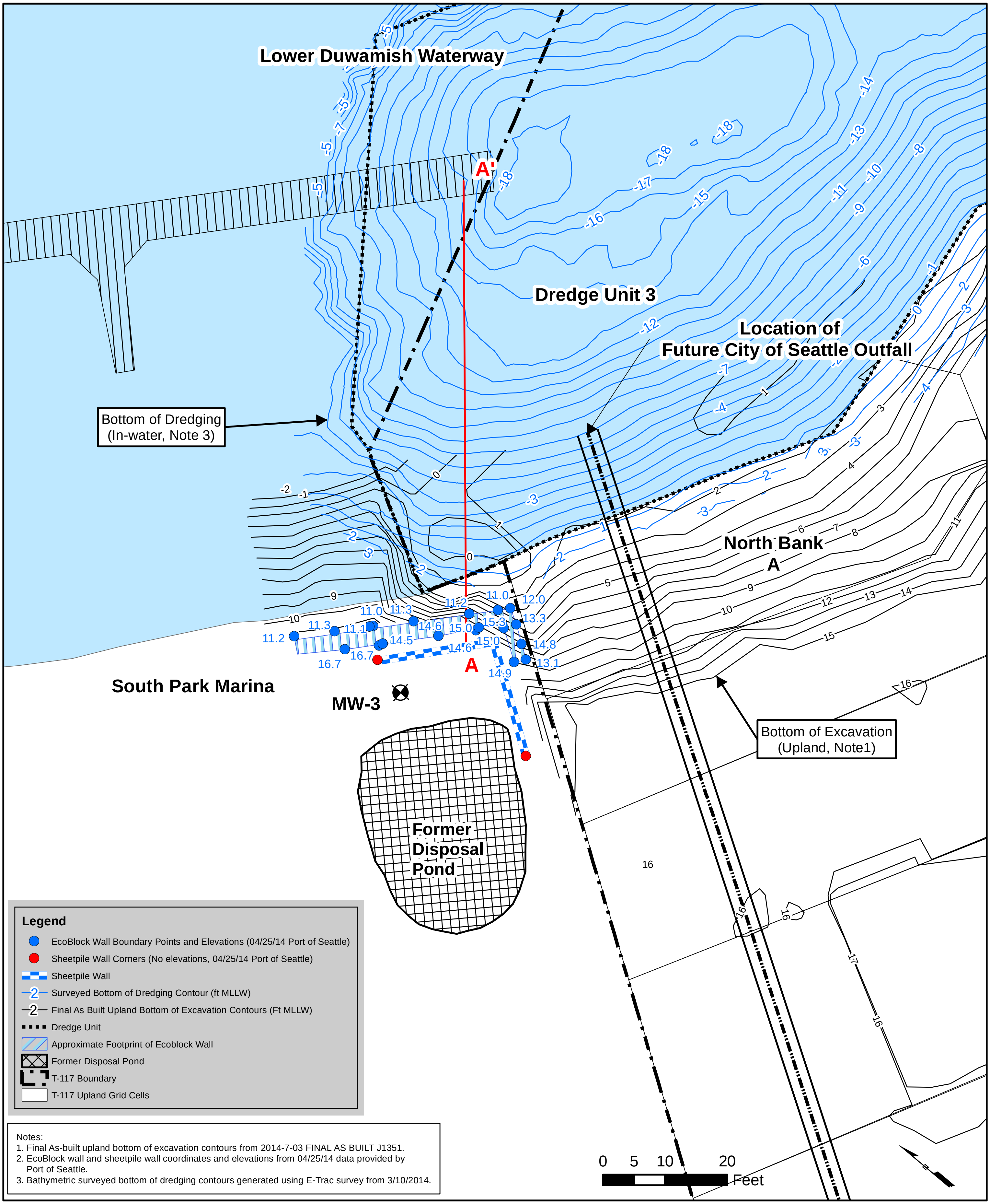
AECOM

PORT OF SEATTLE
T-117 EMBANKMENT STABILITY ANALYSIS
60288925

DATE: 10/22/14 | DRWN: MJG

EMBANKMENT AS-BUILT CROSS SECTION

FIGURE 1



Notes:
1. Final As-built upland bottom of excavation contours from 2014-7-03 FINAL AS BUILT J1351.
2. EcoBlock wall and sheetpile wall coordinates and elevations from 04/25/14 data provided by Port of Seattle.
3. Bathymetric surveyed bottom of dredging contours generated using E-Trac survey from 3/10/2014.

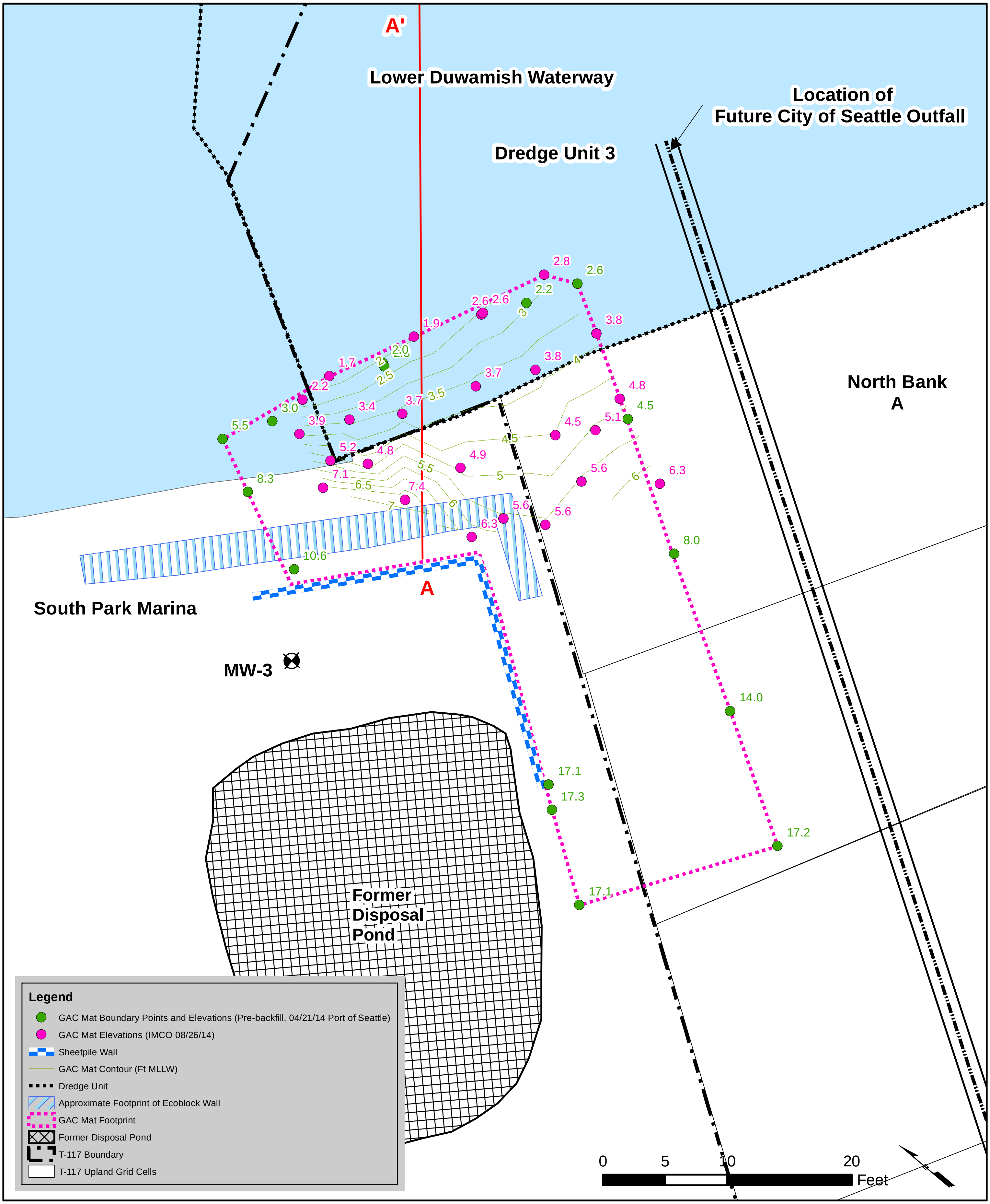
Path: P:\ENV\PROJECTS\WPort of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\Marina Corner As-Built\Figure 2 Bottom of Excavation.mxd

AECOM

T-117 CLEANUP
SEDIMENT AND UPLAND AREAS

MARINA BANK CORNER
BOTTOM OF EXCAVATION

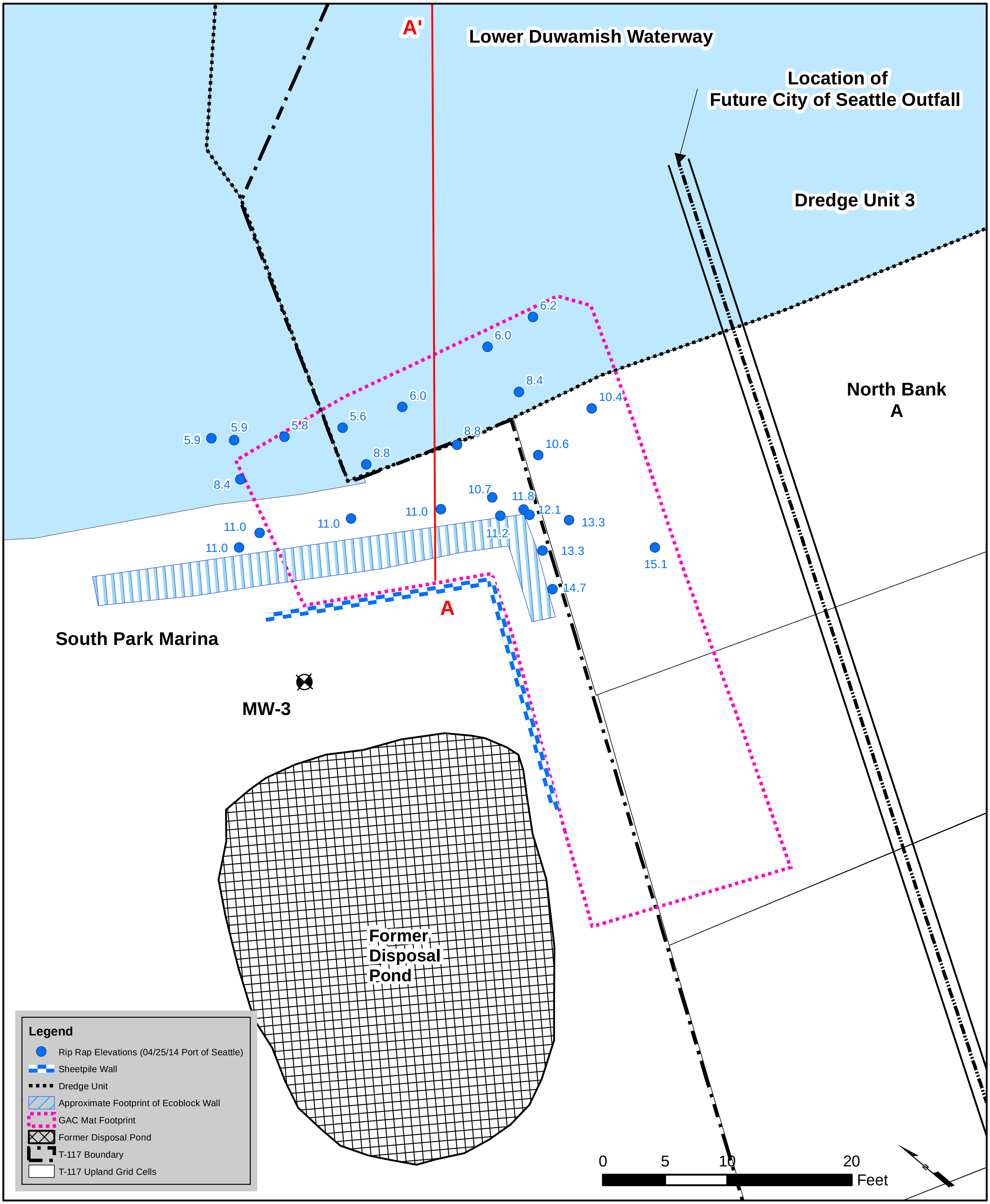
Date: 10/20/2014	DRWN:mvi/sea	Revision: 2	Project No: 6028925	FIGURE 2



Notes:
1. GAC mat coordinates, elevations, and contours from 08/26/14 data provided by IMCO.
2. GAC Mat boundary locations and elevations from GAC MATT 4-21-14.

T-117 CLEANUP SEDIMENT AND UPLAND AREAS	MARINA BANK CORNER GAC GEOCOMPOSITE AS-BUILT
Date: 10/6/2014 · DRWN:mvi/sea · Revision: 2	Project No: 6028925 · FIGURE 3

Path: P:\ENV\PROJECTS\WPort of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\Marina Corner As-Built\Figure 3 Bottom of Mat.mxd



Notes:
1. Rip Rap coordinates and elevations from 04/25/14 data provided by Port of Seattle.
2. GAC mat extent from 08/26/14 data provided by IMCO.

AECOM

T-117 CLEANUP SEDIMENT AND UPLAND AREAS	MARINA BANK CORNER RIP RAP AS-BUILT ELEVATIONS
Date: 10/6/2014 DRWN:mvi/sea Revision: 2	Project No: 6028925 FIGURE 4

APPENDIX A.5
Marina Corner Sheen Memo

AECOM, 2014a, Subject: Terminal 117 – Upland and Sediment NTCRA, Sheen in Seeps Bordering Dredge Unit 3 Memorandum, Prepared for Port of Seattle, April 7, 2014.

AECOM
710 Second Avenue, Suite 1000
Seattle, WA 98104
206.624.9349 tel
206.623.3793 fax

Memorandum

To	Roy Kuroiwa, Stacy Heilgeist, Kym Anderson – Port of Seattle	Page	1
CC	Mary Mitchener – City of Seattle; Ben Starr – Integral; Kristin Kerns – USACE; Mike Byers – Crete		
Subject	Terminal 117 – Upland and Sediment NTCRA, Sheen in Seeps Bordering Dredge Unit 3		
From	Noah Garguilo, Anne Fitzpatrick, Winston Chen, Charles Vita – AECOM		
Date	April 7, 2014		

On behalf of the Port of Seattle (Port), this memorandum identifies modifications to the backfill plan in portions of North Bank A and Dredge Unit 3 (DU3) that border the South Park Marina (SPM) at Terminal 117 (T-117). These modifications are proposed to address the presence of sheen, which has periodically been observed in the bank area of DU3, and to reduce the potential for recontamination of the backfill.

The area of interest is located north of the T-117 North Bank A, in the southeast corner of the SPM. At this corner, a temporary sheet pile was installed to provide bank stability during soil and sediment excavation. The sheet pile wall was placed in an “L” shape approximately 18 ft long on both the eastern and southern sides. Ground surface elevation at the SPM is approximately +19 ft mean lower low water (MLLW). The bottom of the excavated ground surface in the North Bank A/DU3 excavation area slopes from about +15 ft MLLW to -16 ft MLLW along an approximately 2H:1V slope. Along the eastern border of the SPM, the grade transitions steeply between the SPM and the extent of excavation (Attachment 1, Photo 1).

1.0 Excavation History

North Bank A was excavated to design grade beginning September 16, 2013 (slope between +2 and +15 ft MLLW). Round 1 bank confirmation sampling indicated exceedances of the removal action levels (RvALs). An additional foot of excavation was performed beginning October 10, 2013, based on Round 1 bank confirmation exceedances. One additional foot of excavation was performed on November 6, 2013, based on Round 2 bank confirmation exceedances. Round 3 confirmation samples were below the RvALs for the T-117 contaminants of concern (COCs) (cPAHs, PCBs, Diesel, and TPH). Excavation was completed across North Bank A except for approximately 15 ft bordering the SPM where slope stabilization was needed before performing further excavation. On December 28, 2013, a utility pole on the SPM corner was relocated, and a temporary steel sheet pile wall was installed on the SPM property.

The corner of North Bank A that borders the SPM was excavated on the nights of January 2 and 3, 2014 (Photo 1). The area was excavated to final grade, and a final topographic survey of the area was performed on February 13, 2014. At times, excavation in North Bank A encountered tar-like material, which was removed when encountered. No sheen was observed on the surface water in North Bank A at any time during or immediately after excavation. North Bank A was over-excavated a total of 1 to 2 ft below design grade.

Dredging of DU3 began January 31, 2014. Soon after, site personnel noted unstable soil conditions along the slope leading from DU3 to the east face of the temporary sheet pile wall. On February 12, 2014, site personnel observed major sloughing (i.e., surficial slope failure) of the slope between the eastern border of the SPM and DU3, approximately 10 ft northwest of the temporary sheet pile corner. The approximate location of sloughing is shown on Figure 1; it extends for the entire slope along the sheet pile wall from the top of bank (to within 3 ft of the temporary sheet pile wall) down to below the low tide water line. The bottom of dredging grades (before backfill) as well as ground surface elevations (surveyed on March 17, 2014 after sloughing occurred) are shown on Figure 1. The locations of various cross sections are shown on Figure 2. A conceptual cross section of the area is shown on Figure 3, including soil stratigraphy based on reported data for the SPM (SAIC 2009) and field observations. As of March 22, 2014, the DU3 dredge area, bordering the SPM, has been backfilled to approximately elevation +2 ft MLLW. The top of backfill survey is not currently available, but approximate backfill grades are shown on Figures 4 and 5.

2.0 Appearance of Sheen

On February 1, 2014 during oversight of dredging activities in DU3, a sheen was noted on the water surface near the SPM bank corner (low tide of approximately 4 ft MLLW). The onsite USACE representative was notified and the contractor was directed by the Port to place a containment boom around the area (Photos 2 and 3). Dredge oversight personnel visually assessed the area and determined that the sheen was focused near the North Bank A/SPM bank corner (Photo 4). However, geotextile fabric covering the area prevented direct observation of the slope.

Since then, a sheen varying in appearance from milky white to rainbow color, has been observed within the boomed area on February 11, 12, 13, 21, 22, and 25, 2014, and several intermittent days in March after an absorbent boom was installed. Sheen was contained within the absorbent boom along the toe of the sheet pile wall (Photo 4). The boom is inspected and maintained daily by the onsite contractor (NRC). No visible heavy petroleum product (e.g., dark brown blebs, etc.) has been noted. The estimated location of the sheen discharge is thought to be contained within the area bordering the corner of the temporary sheet pile wall. When present, sheen continues to collect at the waterline along the corner of North Bank A near the sloughed area, and is contained by the boom. A panoramic photo showing the temporary sheet pile wall, SPM, sheen area, and the slough area is included in Attachment 2.

An inspection of the bank was conducted on March 6, 2014 by AECOM at an approximate low tidal height of +2.5 ft MLLW. The purpose of the inspection was to identify the source of the seeps (and if sheens were present). This inspection indicated two areas of small groundwater discharge seeps from a perched silt layer at about 7 to 8 ft MLLW elevation: (1) discharge on east bank of the SPM (from tidal inundation and/or perched groundwater draining) along the entire sloughed area as a diffuse wet area along the face; where water flow was too slow to obtain an estimate of the discharge and (2) discharge on south side of sheet pile wall with rivulets continuing down the bank; water flow roughly 0.2 gallons per minute (gpm). No sheen was visible at the point of discharge in either area, but a sheen was observed near the base of the slope as groundwater made contact with the Lower Duwamish Waterway (LDW) indicating sheen may be produced as a result of the seep discharging over the exposed soils (direct contact with surface soil). Soil along the base of the east bank was very loose, providing evidence that it may have sloughed from the bank.

Based on these observations, we infer that some or all of the observed sheen is due to contact with exposed soils on the east/south bank of the SPM corner. There is also potential that sheen may be present in groundwater originating from the SPM property, based on elevated TPH detections measured in site soil data and based on the former property use[1] (SAIC 2009; Table 1). TPH was not detected in SPM wells, although sampling methodology may not have captured sheen if present in site groundwater. Additionally, a preferential pathway for groundwater flow may have been created during construction by (1) removal of overburden along the bank face and associated reduction in soil confining pressure and/or (2) installation of the temporary sheet pile wall at the marina corner disturbing and potentially redirecting groundwater flow toward the T-117 site from the SPM (e.g., change in hydraulic head groundwater, change in groundwater flow direction).

3.0 Sample Collection

Sample collection was performed on March 6 and March 17, 2014. Detailed chemistry results (unvalidated) of soil and water samples are included in Tables 2 and 3 respectively. TPH and PCB data results are summarized and compared to other applicable datasets in Table 1.

March 6 Sample Collection

On March 6, 2014, AECOM staff collected a surface water sample with rainbow sheen along the shoreline (approximate low tide of +2 ft MLLW) near the corner of the temporary sheet pile wall (see Figure 1). The sample was submitted to the laboratory for hydrocarbon identification (NWTPH-HCID) analysis to aid in consideration of amendments to the backfill. HCID results detected heavy oil range hydrocarbons (>0.5 mg/L in water). Lighter end hydrocarbons (gasoline and diesel range) were non-detect (Table 1). The observed seep was not sampled for chemical testing (located about 3 ft south of the sheet pile wall).

A 6-point soil composite sample was also collected from the bank. Subsamples were taken from the sand layer present at approximately +3 to +7 ft MLLW elevation (below the silt layer at 8 ft) along the eastern wall. The sample was loose, light brown, fine to medium sand. The soil sample was submitted to the laboratory for NWTPH-HCID and total PCB analysis. HCID results detected heavy oil range (> 250 mg/kg dw) and PCB Aroclors 1254 (1.6 mg/kg dw) and 1260 (1.4 mg/kg dw).

March 17 Data Collection

On March 17, 2014, the Port and AECOM conducted additional soil sampling of the same exposed face, which was sampled on March 6, for analytes found in the marina soils (SAIC 2008; Cd, Cu, Pb, Zn, pesticides/herbicides, PCBs, DRO, GRO, RRO, and VOCs). Sampling occurred at periods of low tide to allow site access; and sample locations for the 6-point composite sample (about +5 ft MLLW) are shown on Figure 1. In addition, the seep observed on T-117 property (about 5 ft from the sheet pile wall) was also sampled to evaluate seep quality in this area before slope backfilling is performed. The seepage was dispersed along the face as small weeps at about +7 ft elevation (in the silt layers). The collective flow was assessed to be roughly about 0.1 to 0.2 gpm, but much slower in individual locations. Because of the dissipated flow, a small hole was dug (about 1 ft by 1 ft) to capture the flowing water. Initial turbidity was 384 NTU but quickly cleared to 122 NTU then 70 NTU as the solids settled. Based on these turbidity readings (> 5 NTU), samples for PCBs, pesticides, and TPH were lab-filtered before testing. Samples for metals testing were filtered in the field. No sheen was observed on the Duwamish River water surface when staff arrived at the site, but gradually appeared as the exposed soils were physically disturbed during sampling (i.e., walking back and forth to collect samples and taking field measurements). A ground surface elevation survey of the area was also performed (see Figure 1). Soil and groundwater samples were sent to the laboratory for analysis of heavy metals (Cd, Cu, Pb, Zn), pesticides/herbicides, PCBs, TPH (gasoline, diesel, and motor oil ranges), and VOCs.

---

1 The A&B Barrel Company formerly operated on the SPM property, and used the corner of the property abutting T-117 North Bank A as a disposal pond for oils, grease, and sodium hydroxide (SAIC 2009).

Soil analysis detected diesel range (520 mg/kg) and motor oil range (1,500 mg/kg) but did not detect gasoline range TPH. PCBs were also detected (Aroclor 1254 at 3.5 mg/kg dw, Aroclor 1260 at 1.9 mg/kg dw). Analytical results (unvalidated) are included in Table 2 for soil data.

Groundwater analysis detected diesel range hydrocarbons at 0.11 mg/L, but gasoline and motor oil range were not detected. PCB Aroclor 1260 was detected in the groundwater seep sample at 0.062 µg/l. Analytical results (unvalidated) are included in Table 3 for seep data.

4.0 Design Modification

Per the project plans, the backfill design for the T-117 slope area in this portion of the site was to consist of non-woven geotextile filter fabric along the excavated grade, then 5 to 6 ft of backfill, overlain by 2.5 ft of riprap for stability (Crete 2012).[2] Modifications to the project plans are being made in this area to reduce the potential for sheen releases containing TPH to reach the LDW after backfilling. The design of the backfill material has been modified as shown on Figures 4, 5, and 6. The modification consists of placing a high-permeability, approximately 1/4-inch thick, activated charcoal-carbon geocomposite layer near the bottom of the backfill instead of the non-woven geotextile. Activated charcoal/carbon (AC) is an industry-standard method of treating organic compounds in water via adsorption.[3] Based on immediate product availability, the Huesker FilterMat AC will be used as the geocomposite. Product specification sheets are included in Attachment 3.[4]

Based on the lack of past observations of sheen before soil was exposed and sloughing occurred, backfill alone may be sufficient to prevent sheen in the future. However, the granular activated carbon (GAC) geocomposite is being added by the Port as an additional measure to reduce the potential for sheens to emerge in this area after backfilling. (It also helps reduce the potential for groundwater discharge to recontaminate the backfill after construction is complete.) See the *Uncertainty/Limitations* section for more discussion.

Horizontal Extent of **the** *Geocomposite Layer*

The proposed horizontal extent of enhanced backfill material with the geocomposite is shown on Figure 1. The material will be placed on about 30 ft of shoreline extending from the northern end of the sheet pile wall to about 10 to 15 ft south of the sheet pile wall corner (about 5 ft into T-117 property). As shown on Figure 1, this encompasses the groundwater seep and soil sample locations from March 6 and March 17. The material will be placed starting at approximately +15 ft MLLW elevation down to approximately +2 ft MLLW (current extent of backfill). Material will be placed using land-based equipment at low tide. A conceptual cross section showing geocomposite placement in North Bank A (along the southern leg of the temporary sheet pile wall) is included on Figure 4. A conceptual cross section showing the geocomposite placement in DU3 and the east bank of the SPM is included on Figure 5. A section showing geocomposite placement between North Bank A and the SPM is included on Figure 6. The geocomposite layer will be surveyed following placement to delineate the placement area.

The geocomposite will be placed on an approximately 350 ft^2 area as shown on Figure 1. The horizontal extent of the geocomposite layer was based on the following considerations:

- The extent of the apparent discharge area and slough area.

---

2 The backfill material consists of sand and quarry spalls below elevation +2 ft MLLW and gravel borrow above +2 ft, as per design drawings.

3 Adsorption is the process of a substance adhering to the surface of a solid (including the surface presented by internal pore space. Absorption is the process of an atom, molecule, or ion entering a bulk phase (solid, liquid, or gas). TPH is adsorbed by the surface of GAC.

4 The geocomposite contains approximately 800 grams of GAC per square meter.

- The width of available geocomposite (~15 ft).
- Coverage near top of slope above the perched groundwater at about +8 ft MLLW.
- The eastern extent (into the LDW) – to +2 ft MLLW elevation.
- The southern extent – area of observed seep discharge plus an approximately 5-ft buffer.
- The western extent – observed extent of groundwater seepage from the area. Geocomposite will be extended to the top of the bank slope for anchoring.

Geotechnical Evaluation

In collaboration with AECOM, a geotechnical engineering evaluation is currently being conducted by Crete (supported by Jacobs Engineering) to check that the geocomposite conceptual design as represented on Figures 1, and 4 through 6 will not undermine the slope stability of the North Bank and the permanent support of the SPM corner. A slope stability analysis is being conducted for two areas: the T-117 slope located along the north bank and south of the sheet pile wall, and the sloughed area located east of the sheet pile wall. In addition, a sample of the geocomposite material was submitted to GeoTesting Express geotechnical laboratory for shear stress analyses (ASTM D6243 Internal Shear and ASTM D6496 Peel Strength) to evaluate the internal shear strength of the material. Final test results were received on April 3, 2014. An appropriate interface friction value (phi value) has been sent to Crete for use in evaluating slope stability.

The analysis is being performed with the understanding that the temporary sheet pile wall will be removed, as shown on Figures 4 and 5. AECOM expects that the Crete-Jacobs analysis will support the conceptual design presented in this memorandum. After making any needed design refinements, a final, stamped design drawing will be developed by Crete and provided by the Port to the contractor for installation.

Geocomposite Potential Design Life

The function of the proposed geocomposite layer is to adsorb organic contaminants, and thereby inhibit the release of TPH sheen. As such, it is anticipated to have a finite design life if the source of sheen is not removed or depleted. Given the project’s time constraints, it was necessary to select a geocomposite prior to performing a detailed estimate of the potential design life. An analysis was conducted to provide an estimate of the breakthrough time for the geocomposite. The analysis uses a version of the Active Cap Layer Model (Lampert and Reible 2009) modified for the LDW Feasibility Study (AECOM 2012). Site-specific T-117 values were used as appropriate and available for model input. The analysis focused on heavy/motor oil range (detected in soil) and diesel range (detected in soil and groundwater) TPH (see Tables 2 and 3). The goal of this analysis was to calculate a range of potential breakthrough times for the GAC geocomposite given the range of assumed input values. Conclusions regarding the potential design life for breakthrough of PCBs from the underlying soil through the GAC layer are also included in this memorandum.

Model Setup and Assumptions

The model is typically applied to model caps that will be continuously submerged and not subject to tidal flushing. The transient and variable nature of tidal flushing is difficult to quantify. To help compensate for this unknown, a constant groundwater flow at a relatively high rate was assumed, which is indicative of the ebb tidal cycle when contaminant transport is expected to be highest. During the flood cycle, it is assumed that groundwater velocities may slow and flow may reverse (e.g., flow from the river into the bank), slowing or reversing the transport of contaminants. Not including the flood phase of the tidal cycle in the modeling functions as a conservative assumption.

The breakthrough in the model is defined as the point where 1% of the initial contaminant concentration passes through the active layer (e.g., the GAC geocomposite). The initial concentrations used in the model runs were 500 µg/L in groundwater and 2,000 mg/kg in soil. A 1% breakthrough of these initial concentrations would not likely cause a visible sheen. This evaluation criterion (i.e., 1%) was used because it is an integral component of the model mechanics (Lampert and Reible 2009) and provides an indication of the effective life (breakthrough) of the GAC layer.

Two key parameters control the calculated breakthrough time: the organic carbon partitioning coefficient (Koc) and the effective groundwater flux (Darcy velocity). The sensitivity of analysis results to these parameters was explored in the model runs as described below:

- **Partitioning Coefficient**. Koc for a single TPH fraction can vary over four orders of magnitude depending on the hydrocarbon chain length and structure (i.e., aliphatic vs. aromatic). Hydrocarbon source compositions vary; however, aromatics tend to be the minority fraction and aliphatics (with a significantly higher Koc) the majority of TPH mixtures. Model runs varied the log Koc from 5.1 to 8.8, which is representative of aromatic and aliphatic motor oil range hydrocarbons, and aliphatic diesel range hydrocarbons. This parameter was the single most important factor in calculating breakthrough times, and is why results are presented as a range (see *Model Results* section).
- **Groundwater Flux.** The Darcy velocity in this analysis was kept fairly high to consistently reflect the ongoing seeps and weeps observed. The groundwater seeps measured at T-117 ranged from 12 mL/sec (measured on 3/16/14) to 360 mL/sec (App. J, Basis of Design Report, Crete 2012). These values were converted to Darcy velocities for use in the model. Assuming these seeps were distributed over 90% of the backfilled area, this yielded a range of values used in modeling of 270 cm/yr up to 8,125 cm/yr. For comparison, the highest Darcy velocity used in cap modeling in the LDW FS (AECOM 2012) was 590 cm/yr. The SPM sediment recontamination assessment (SAIC 2009) estimated groundwater flux through the former disposal pond at 45 ft^3/day over a 1,000 ft^2 area, equivalent to 500 cm/yr. Both of these values fall within the range of Darcy values assumed here.

Model Results

The best estimate calculated breakthrough time of diesel and heavy/motor oil range TPH through the GAC layer ranges from 7 to 30 years, depending on the partitioning coefficient used for petroleum. The presence of a notable sheen on the surface water may or may not coincide with these calculated breakthrough times, depending on site conditions and many other site factors not accounted for in the model runs (see *Uncertainty/Limitations* section). Additionally, TPH will also undergo sorption with the gravel borrow backfill. This is anticipated to further reduce the potential for visible sheen reaching the LDW after backfilling.

The potential design life for breakthrough of PCBs through the GAC geocomposite and migration through gravel borrow backfill to the water surface (and to the biologically active zone [BAZ] of newly deposited sediment if present) was also assessed based on three lines of evidence. First, results of the calculations performed for TPH breakthrough in this memo can be extrapolated for PCBs. The log Koc values for PCB Aroclors 1254 and 1260 are approximately 4.9 and 5.3 respectively (SAIC 2009); these values are similar to the mid-range Koc values used in the model. Because Koc is the dominant parameter in the model, it is anticipated the GAC geocomposite would have a similar potential design life (7 to 30 years) or longer for PCBs, evaluated as a 1% breakthrough. Second, a 1% breakthrough (of the soil PCB concentration of 5.4 mg/kg dw sampled on March 17) is unlikely to cause an exceedance of the Sediment Quality Standards (SQS) at the upper boundary of the geocomposite (e.g., 1% of 5.4 mg/kg dw concentration is less than the SQS dry weight equivalent of 130 ug/kg dw). Third, the cap will be integrated with approximately five or more feet of gravel borrow backfill. The T-117 backfill/capping memorandum for PCBs in DU1 (Crete 2014) calculated the sand backfill would function as a cap for soil PCB concentrations up to 100 mg/kg dw remaining in the underlying material for up to 100 years before surface sediment concentrations in the BAZ would exceed the SQS. Given the similar properties of the backfill materials and the lower PCB concentrations in the marina area (compared to the 100 ppm concentration evaluated in Crete's 2014 memorandum), the gravel borrow backfill is anticipated to have a significant potential design life after breakthrough of the GAC. Based on these three lines of evidence, it appears likely that the combination of GAC geocomposite and backfill material should provide adequate protection and isolation of PCB concentrations in the underlying soil for the next 100 years.

5.0 Uncertainty/Limitations

This memorandum identifies backfill modifications to the SPM corner to address the presence of sheen periodically observed in surface water and to prevent (or limit) recontamination of the backfill after placement. Best professional judgment and preliminary design calculations were used to develop these modifications. Limitations and uncertainty associated with these assumptions are discussed below.

- The addition of GAC material should be considered a temporary cap, and not a fully engineered isolation cap designed in accordance with all applicable best management practices. This proposed modification is being implemented in the limited time frame available for construction using our interpretation of the currently available information and availability of GAC material. GAC performance should be considered a temporary adaptive-management source control solution. It is possible that the GAC geocomposite in combination with the T-117 backfill may be able to perform all the functions of a long-term engineered cap, but effectiveness and longevity are uncertain at this time (see Section 6).
- There is a potential for the GAC to be fouled over time as it continually comes in contact with free NAPL product. If this situation occurs, the potential design life of the GAC geocomposite would be reduced. The likelihood and impact of fouling has not been assessed.
- Implementation of the contaminant model utilized the following assumptions:
  - *Linear portioning*. The Reible active cap model uses a linear portioning coefficient. Activated carbon is widely recognized to undergo non-linear sorption (i.e., Freundlich isotherm) where the adsorptive capacity becomes exhausted above a certain loading. Modeling of non-linear isotherms is possible using more sophisticated model mechanics; however, the assumption of a linear portioning coefficient provides a reasonable estimate at low inflow concentrations.
  - *Infinite source*. It was assumed that a measured contaminant concentration of the source would not decrease over time as contaminant mass was transported by groundwater flow. This assumption supports a conservative estimate of breakthrough time.
  - *TPH as the sole sorbate*. Activated carbon can adsorb a wide variety of dissolved compounds, some of which are present in the groundwater. The adsorption of other compounds by GAC would decrease its effective lifespan with regard to TPH. This reduction in sorptive capacity has not been quantified in this memorandum.
- The model only predicts contaminant breakthrough of the GAC material (placed between +2 ft and top of slope). During very low tide, groundwater may discharge from the bank below elevation +2 ft MLLW. During these periods, it is possible that impacted groundwater (and associated sheen) may discharge at lower elevations (below +2 ft MLLW) through the quarry spalls and rip rap (see Figure 5). Neither of these materials is anticipated to have a significant ability to adsorb TPH. As a result, it is possible that sheen may periodically appear at the water surface during these times. Given the constraint of only being able to work in the dry, the geocomposite will not be placed below +2 ft MLLW. However, expression of sheen has not historically been observed, and it is anticipated that placement of backfill may reduce the likelihood of transport via this pathway.

6.0 Future Inspections

A visual inspection of the area will be periodically conducted as part of long-term monitoring to ensure adequate protection and performance. These inspections will be performed at low tide, and will document the condition of the surrounding area. Visual inspections will likely include a minimum of two tasks:

- Inspect the soil bank surface and surface water for signs of sheen. Note the size, color, odor, and location of sheen if present.
- Inspect the bank for signs of cap disturbance or geotechnical instability (e.g., displaced riprap, soil cracking, etc.). Note if newly deposited sediment is present on the bank.

Details and frequency of monitoring will be developed as part of the upcoming T-117 Long-term Monitoring and Maintenance Plan (LTMMP).

7.0 References

AECOM 2012. *Final Feasibility Study, Lower Duwamish Waterway, Seattle, Washington*. Prepared for the Lower Duwamish Waterway Group for submittal to the U.S. Environmental Protection Agency. October 31, 2012.

Crete 2012. *Final Design Report, Phase 1: Sediment and Upland Cleanup; Lower Duwamish Waterway Superfund Site, Terminal 117 Early Action Area*. Prepared for the Port of Seattle for submittal to the U.S. Environmental Protection Agency. October 8, 2012.

Crete 2014. *Capping Model Evaluation of Maximum Protective Total PCB Concentrations in DU-1 Confirmation Samples.* Prepared for the Port of Seattle for submittal to the U.S. Environmental Protection Agency. April 2014.

Lampert, D.J. and D. Reible 2009. An Analytical Modeling Approach for Evaluation of Capping of Contaminated Sediments. In: *Soil and Sediment Contamination: An International Journal*, 18: 4, 470-488. 2009.

SAIC 2008. *South Park Marina, Seattle, Washington, Additional Site Characterization Activities Data Report*. Prepared for Washington State Department of Ecology, Northwest Regional Office, Toxics Cleanup Program. Prepared by Science Applications International Corporation, Bothell, WA. June 30, 2008.

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Windward, 2005. *Lower Duwamish Waterway Superfund Site, Terminal 117 Early Action Area, T-117 Sediment, Soil, and Water Field Sampling Cruise and Data Report Final*. Prepared for the Lower Duwamish Waterway Group for submittal to the U.S. Environmental Protection Agency. March 4, 2005.

Windward, 2010a. *Lower Duwamish Waterway Superfund Site, Terminal 117 Early Action Area, Revised Engineering Evaluation/Cost Analysis.* Prepared for the Lower Duwamish Waterway Group for submittal to the U.S. Environmental Protection Agency. June 2, 2010.

Windward, 2010b. *Lower Duwamish Waterway Remedial Investigation, Remedial Investigation Report. Final.* Prepared for the Lower Duwamish Waterway Group for submittal to the U.S. Environmental Protection Agency. July 9, 2010.

Signed,

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Attachments:

Table 1 – Summary of Area Chemistry Data (PCBs and TPH)

Table 2 – Summary of 2014 Marina Bank Soil Sample Results

Table 3 – Summary of 2014 Marina Bank Water Sample Results

Figure 1 – Marina Bank Corner Plan View (Extent of Observed Sheen and Proposed Extent of Geocomposite)

Figure 2 – Marina Bank Corner Plan View Showing [Cross] Section Locations

Figure 3 – Conceptual Cross Section of Marina Bank (Existing Conditions)

Figure 4 – Cross Section, North Bank

Figure 5 – Cross Section, South Park Marina

Figure 6 – Conceptual North Bank A to South Park Marina Section

Attachment 1 – Photos of Observed Sheen

Attachment 2 – Panorama Photo of North Bank A and South Park Marina taken 3/12/14

Attachment 3 – Manufacturer Product Data – Huesker Filtermat AC

Last revised by NJG on 4/3/14, reviewed by AGF on 4/3/14; saved in AECOM/projectW/PoS/T-117/technical/Research/SheenDU3MemoRev 2

Table 1. Summary of Area Chemistry Data (PCBs and TPH)

Study	Media	Sample	**Total PCBs** (mg/kg dw or mg/l)	**TPH** (soil – mg/kg dw, GW – mg/l) GRO	DRO	RRO
Marina Investigation (SAIC *SPM Data Report June 2008)*	Upland Soil (inside disposal pond) [c]	SB-14 (7.5 ft bgs)	11.9 (7 = PCB1254; 4.9 = PCB1260)	350 J	3,000 J	8,900 J
	Upland Soil (outside pond)	SB-13 (7 ft bgs)	13 (13 = PCB1254)	1.6 U	950 J	4,700 J
	Riverbank Soil	Transects A and B (highest conc.)	0.32 (PCB1260)	5.1 U	1,300 J	620 J
	Groundwater	MW-3 (abandoned)	n/a	ND[d]	ND[d]	ND[d]
2014 Marina Bank Samples *(collected March 6 and 17, 2014)*	Surface Water	w/sheen	n/a	ND[d]	ND[d]	Detected[d]
	Riverbank Soil	6-pt composite[b]	5.4 (3.5 = PCB1254; 1.9 = PCB1260)	2 U	520 J	1,500
	Groundwater Seep	Seep	0.000062 (ND = PCB1254; 0.000062= PCB1260)	0.012 U	0.11 J	0.25 U
T-117 Cleanup (on-going)	Soil Confirmation Samples	North Bank A composite (11/1/13)	0.022 (PCB1260)	n/a	14	38
T-117 Cruise and Data Report *(Windward, 2005)*	Intertidal seeps	Three areas on North Bank	--	No sheens observed. PAHs were ND		
Final EE/CA *(Windward, 2010a)*	Groundwater	MW-07 (9/23/10) (abandoned)	---	ND	0.028 J[e]	64 J[e]
LDW RI *(Windward, 2010b)*	Intertidal Seeps	None in vicinity; (closest location 44)	Not sampled	No sheen observed		
	Porewater Samples	None in vicinity	---	---	---	---

Notes:

a The EE/CA contains RvALs for other PAHs and phenol, but they are not shown here because there are no corresponding RALs

b 6-point composite sample of loose F-M sand between +3 to +7 ft MLLW elevation.

c Other analytes were detected in soils from the disposal pond above the MCTA Soil Cleanup Levels including heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, and zinc), pesticides (DDT, aldrin, dieldrin), SVOCs, and VOCs.

d Not detected by NWTPH-HCID in soil at or above 20 mg/kg gas, 50 mg/kg diesel and detected above 250 mg/kg heavy oil. Not detected in water at or above 0.2 mg/L gas, 0.5 mg/L diesel and detected above 0.5 mg/L heavy oil. MW-3 detection limits are similar.

e Compound was not detected in previous samples dating back to 2008 in MW-07. MW-07 is the closest T-117 well to this area. It has since been abandoned and the soil removed.

All results shown in mg/kg dw or mg/L.

n/a = not analyzed; ND = non detect

DRO – Diesel Range Organics; GRO – Gasoline Range Organics; RRO – Residual Range Organics; SVOCs – semi volatile organic compounds; VOCs – volatile organic compounds

Table 2 - Summary of 2014 Marina Bank Soil Sample Results

Location:	Marina Bank		Marina Bank	
Sample ID:	Marina Bank-140306		Marina Bank-140317	
Description:	6-part soil composite collected along lower marina bank		6-part soil composite collected along lower marina bank	
Sample Date:	3/6/2014		3/17/2014	
Approximate Elevation:	+5 ft MLLW		+5 ft MLLW	
Matrix:	Soil		Soil	
Chemical	Conc	Qual	Conc	Qual
TPH (HCID) (mg/kg)				
Gasoline	<20	U	-	
Diesel	<50	U	-	
Heavy Oil	250	J	-	
TPH (NWTPH) (mg/kg)				
Gasoline	-		2.0	U
Diesel	-		520	J
Motor Oil	-		1500	
TPH	-		2000	J
PCBs (mg/kg)				
Aroclor 1221	0.020	U	0.020	U
Aroclor 1232	0.020	U	0.020	U
Aroclor 1016	0.020	U	0.020	U
Aroclor 1242	0.020	U	0.020	U
Aroclor 1248	0.020	U	0.020	U
Aroclor 1254	1.6		3.5	
Aroclor 1260	1.4		1.9	
Total PCBs	3.0		5.4	
Pesticides (mg/kg)**				
4,4´-DDE	-		0.0438	
Total DDTs	-		0.0438	
Aldrin	-		0.345	
Dieldrin	-		0.314	
gamma-Chlordane	-		0.0279	
Herbicides (mg/kg) **				
Metals (mg/kg)				
Cadmium	-		1	U
Chromium	-		24.2	
Lead	-		66.4	
Mercury	-		0.1	U
VOCs (mg/kg)**	-			
Dichloromethane (methylene chloride)	-		0.15	fb
Conventionals (%)				
Total organic carbon (TOC)	-		0.527	
% Moisture			16.0	

Notes:

*** Only detected Pesticides, Herbicides, and VOCs are included in this summary.*

na - not availiable

"-" not analyzed

U - not detected at the reported detection limit

J - estimated concentration

fb - analyte present in the blank and the sample

Table 3 - Summary of 2014 Marina Bank Water Sample Results

Location:	Marina Bank		Marina Bank	
Sample ID:	Marina Sheen-140306		North Bank Seep-140317**	
Description:	Sheen from water surface in vicinity of marina bank seep		Groundwater seep collected from the North Bank	
Sample Date:	3/6/2014		3/17/2014	
Approximate Elevation:	+2 ft MLLW		+7.3 ft MLLW	
Matrix:	Surface water		Groundwater seep	
Chemical	Conc	Qual	Conc	Qual
TPH (HCID) (mg/L)				
Gasoline	<0.2	U	-	
Diesel	<0.5	U	-	
Heavy Oil	0.5	J	-	
TPH (NWTPH) (mg/L)				
Gasoline	-		0.012	UJ
Diesel	-		0.11	J
Motor Oil	-		0.25	U
TPH	-		0.11	J
PCBs (µg/L)				
Aroclor 1221	-		0.010	UJ
Aroclor 1232	-		0.010	UJ
Aroclor 1016	-		0.010	UJ
Aroclor 1242	-		0.010	UJ
Aroclor 1248	-		0.010	UJ
Aroclor 1254	-		0.010	UJ
Aroclor 1260	-		0.062	
Total PCBs	-		0.062	
Pesticides (µg/L)* **				
Herbicides (µg/L)* **				
Metals (dissolved) (µg/L)				
Cadmium	-		1	U
Chromium	-		1.54	
Lead	-		1.02	
Mercury	-		0.1	U
VOCs (µg/L)* **	-			
Tetrachloroethene	-		0.22	
Conventionals (mg/L)				
Dissolved organic carbon (DOC)	-		4.47	
Total suspended solids (TSS)	-		68	

Notes:

*** NWTPH, PCBs, pesticides and herbicides were lab-filtered per EPA-approved SAP/QAPP protocols for the Duwamish.*

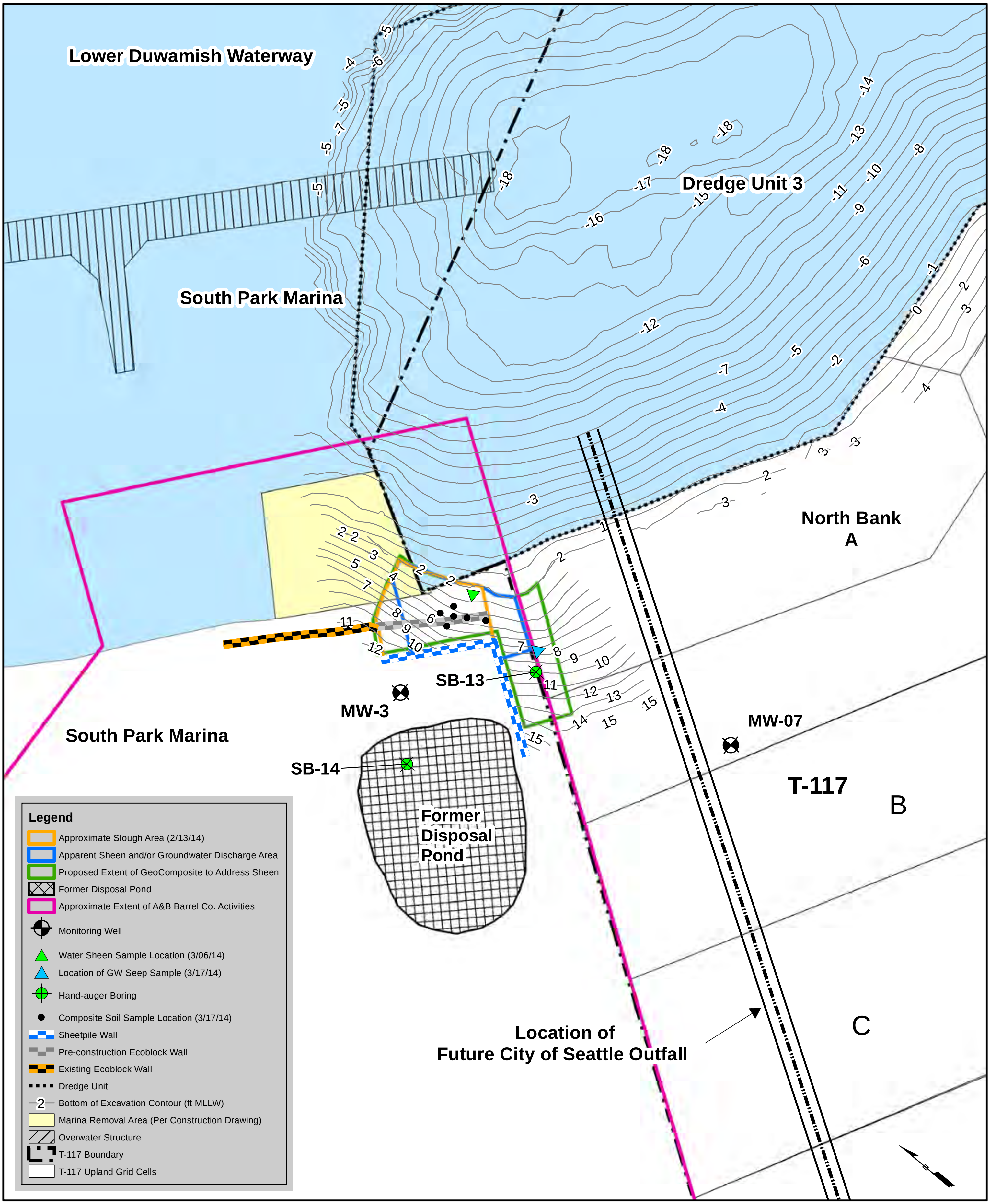
**** Only detected Pesticides, Herbicides, and VOCs are included in this summary.*

"-" not analyzed

U - not detected at the reported detection limit

J - estimated concentration

na - not available



Notes:
1. Upland contours derived from 03/17/14 Port survey.
2. Bathymetric contours generated using E-Trac survey from 3/10/2014.
3. Soil bank composite and groundwater seep sampled 3/17/14.

AECOM

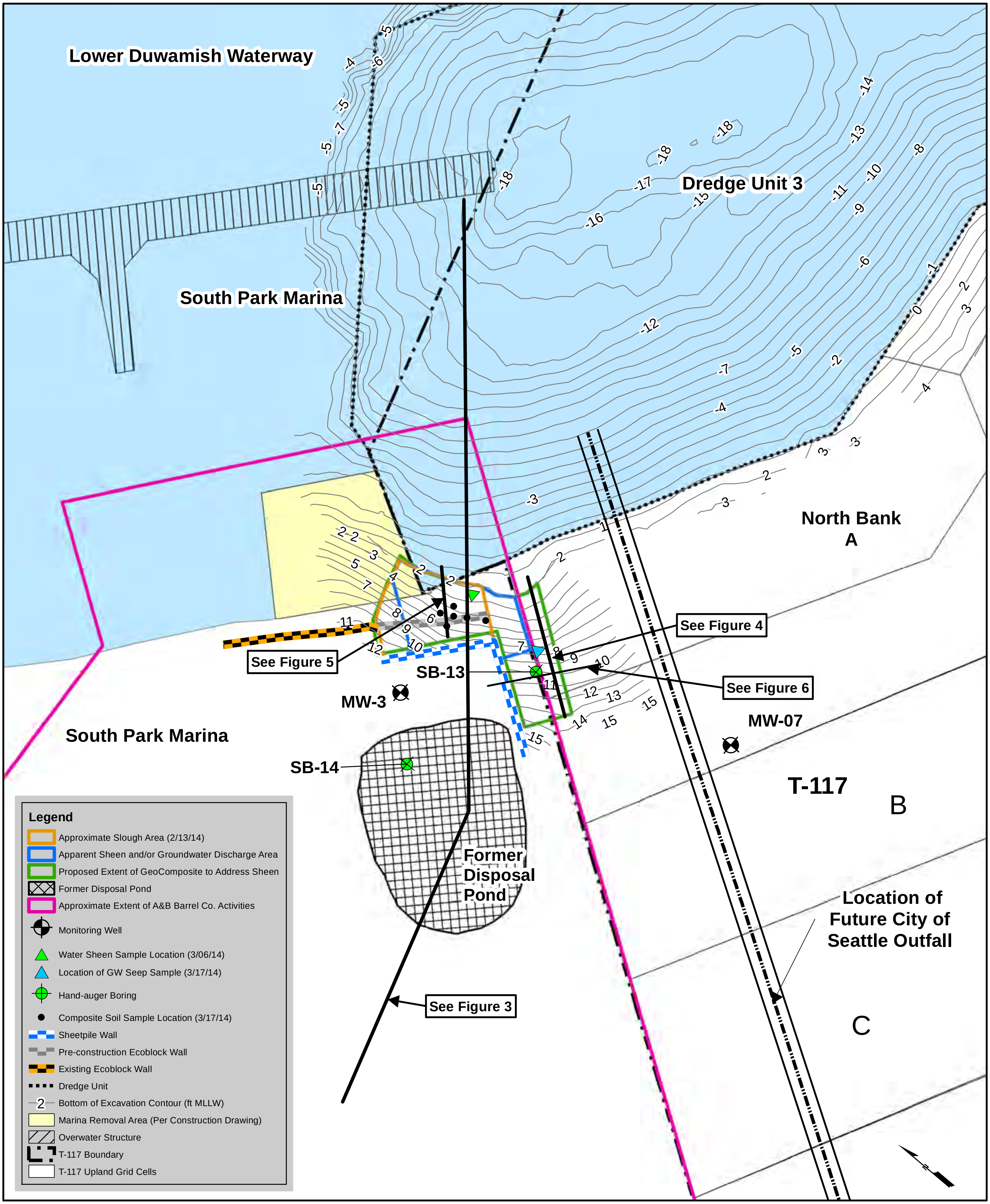
0 5 10 20 Feet

T-117 CLEANUP
SEDIMENT AND UPLAND AREAS

MARINA BANK CORNER PLAN VIEW

Date: 4/4/2014	DRWN:mvi/sea	Revision: 2	Project No: 6028925	FIGURE 1

Path: P:\ENV\PROJECTS\WA\Port of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\Marina_Corner.mxd



Notes:
1. Upland contours derived from 03/17/14 Port survey.
2. Bathymetric contours generated using E-Trac survey from 3/10/2014.
3. Soil bank composite and groundwater seep sampled 3/17/14.

AECOM

0 5 10 20 Feet

T-117 CLEANUP
SEDIMENT AND UPLAND AREAS

MARINA BANK CORNER
PLAN VIEW SHOWING
SECTION LOCATIONS

Date: 4/4/2014	DRWN:mvi/sea	Revision: 2	Project No: 6028925	FIGURE 2

Path: P:\ENV\PROJECTS\W\Port of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\Marina_CornerSectionLocations.mxd

JOB TITLE: T117 - Marina Bank Cross Section

JOB NO.: #60288925

ORIGINATOR: AGF

REVIEWER:

SCALE:

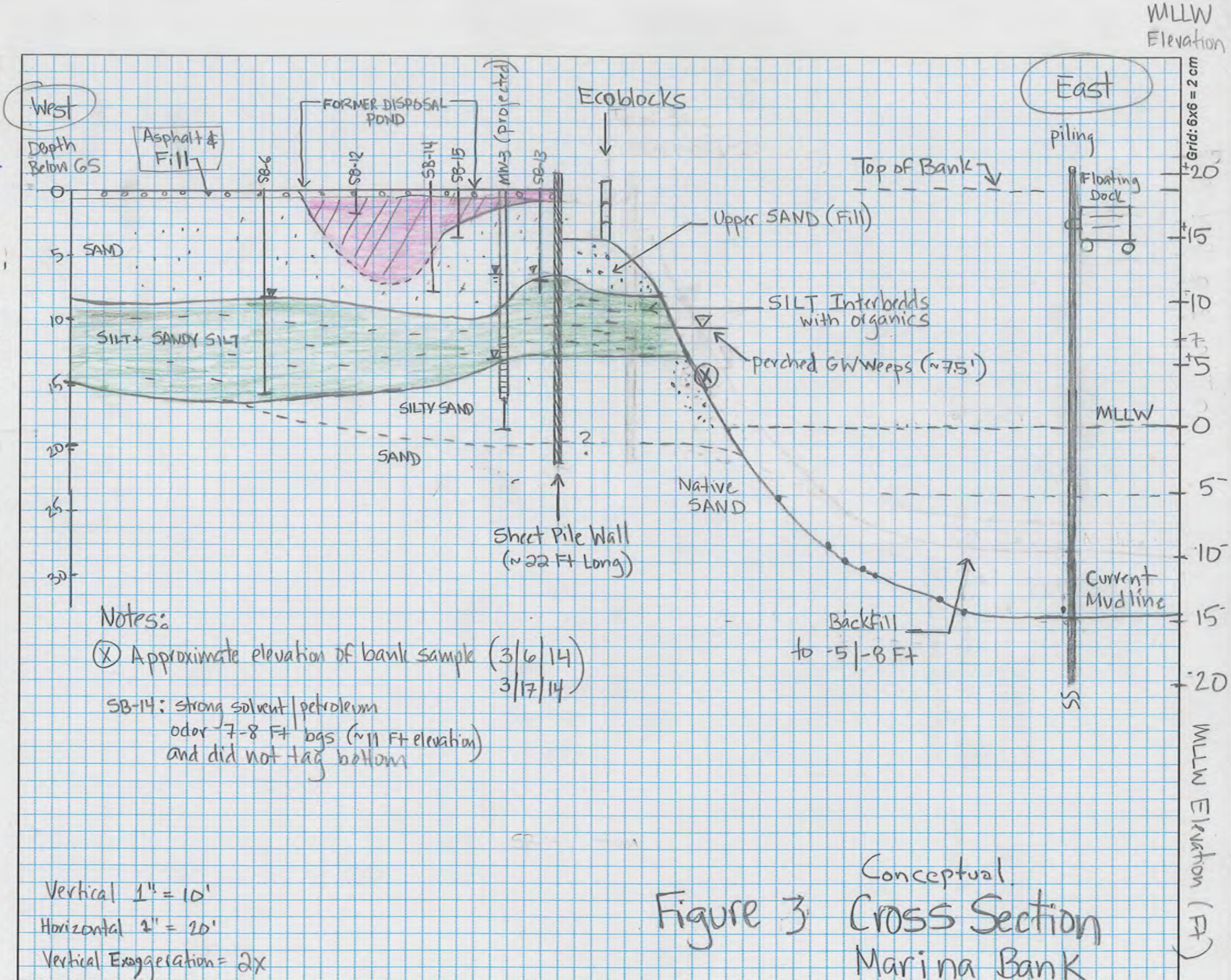
CALCULATION NO.:

DATE: 3/8/14 Rev 3/11/14 w/ bathy

DATE: Rev 3/17/14 sheet pile walls

SHEET NO. ___ OF ___

AECOM

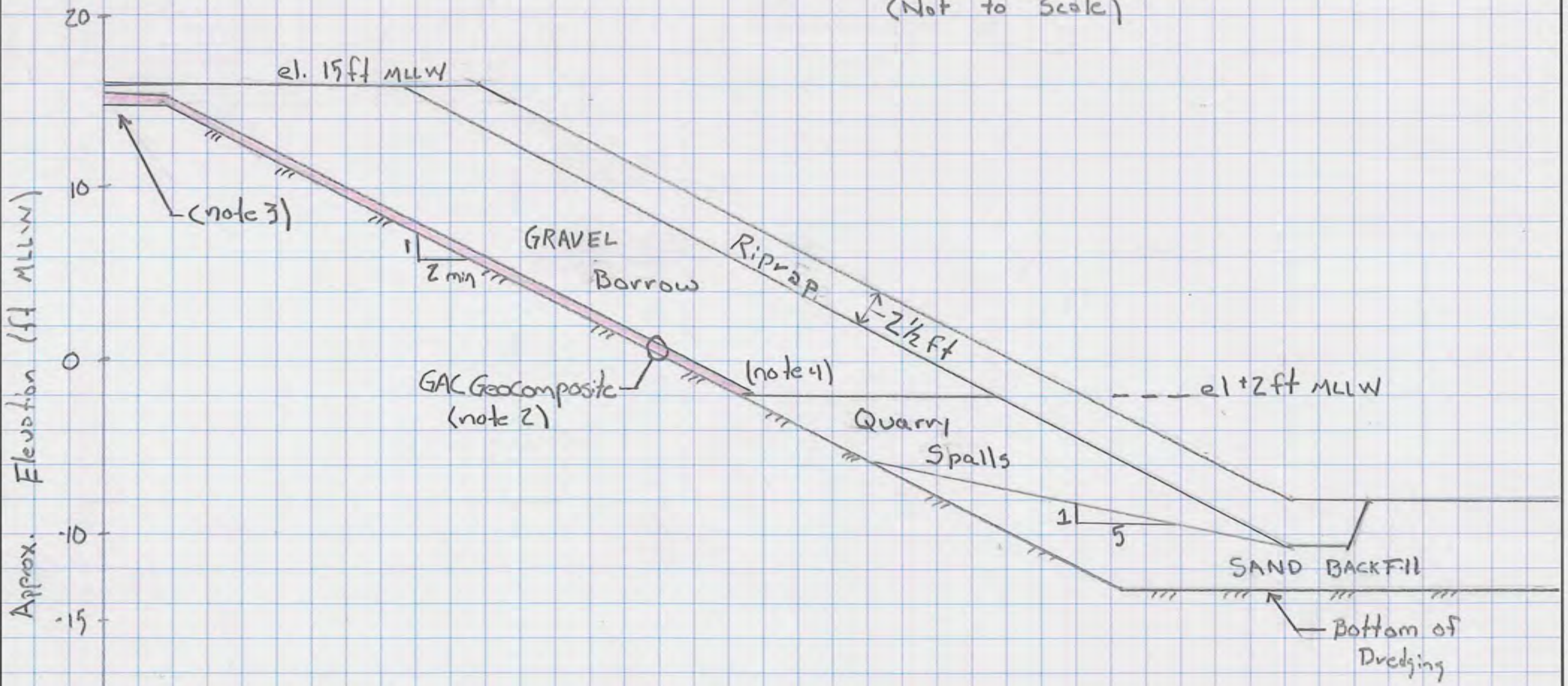


~Scales are approximately drawn~

JOB TITLE Terminal 117 NTCRA
JOB NO. 60288925
ORIGINATOR NJG
REVIEWER
SCALE N.T.S
CALCULATION NO.
DATE 3/14/14
DATE
SHEET NO. OF

Grid: 5x5 = 1 in

Conceptual
Figure 4 - Cross Section, North Bank
(Not to Scale)



Notes

1) Backfill from "Typical Section of Quarry spall Backfill" by Crete dated 2/7/2014.

2) GeoComposite shall extend as low as practical, min to el. +2 ft MLLW.

3) Geocomposite shall extend past the top of slope the minimum distance required for anchoring. Anchor at top of slope per Detail 2, sheet C029 of the project plans.

4) Geocomposite anchored at toe by overburden, no trench needed.

AECOM

JOB TITLE T.117 NTCRA
JOB NO. 60288925
ORIGINATOR NTG
REVIEWER
SCALE 1" = 10' both directions

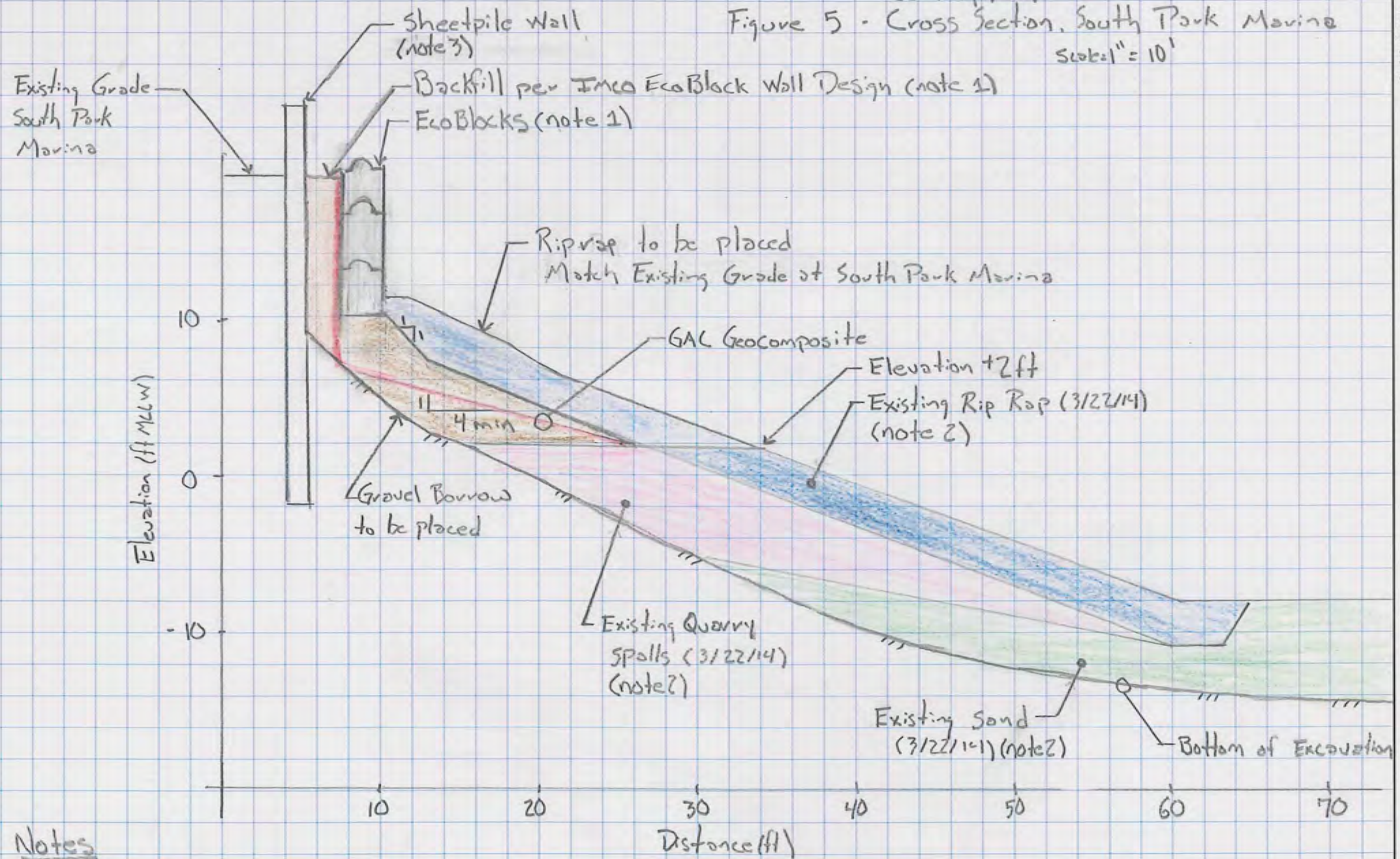
CALCULATION NO.
DATE 3/25/14, Rev 4/1/14
DATE
SHEET NO. ____ OF ____

Grid: 5x5 = 1 in

Conceptual

Figure 5 - Cross Section, South Park Marina

Scale: 1" = 10'



Notes

1) Ecoblock wall to be designed by Imco, Design is pending

2) Bathymetric survey showing extent of Backfill placed below +2ft MLLW (as of 3/22/14) not available. Estimated extent shown based on Project Plans.

3) Sheetpile wall to be removed after Ecoblock wall construction.

AECOM

JOB TITLE T117 NTCRA
JOB NO. 60288925
ORIGINATOR NJG
REVIEWER
SCALE NTS
CALCULATION NO.
DATE 4/2/14
DATE
SHEET NO. OF

Grid: 5x5 = 1 in

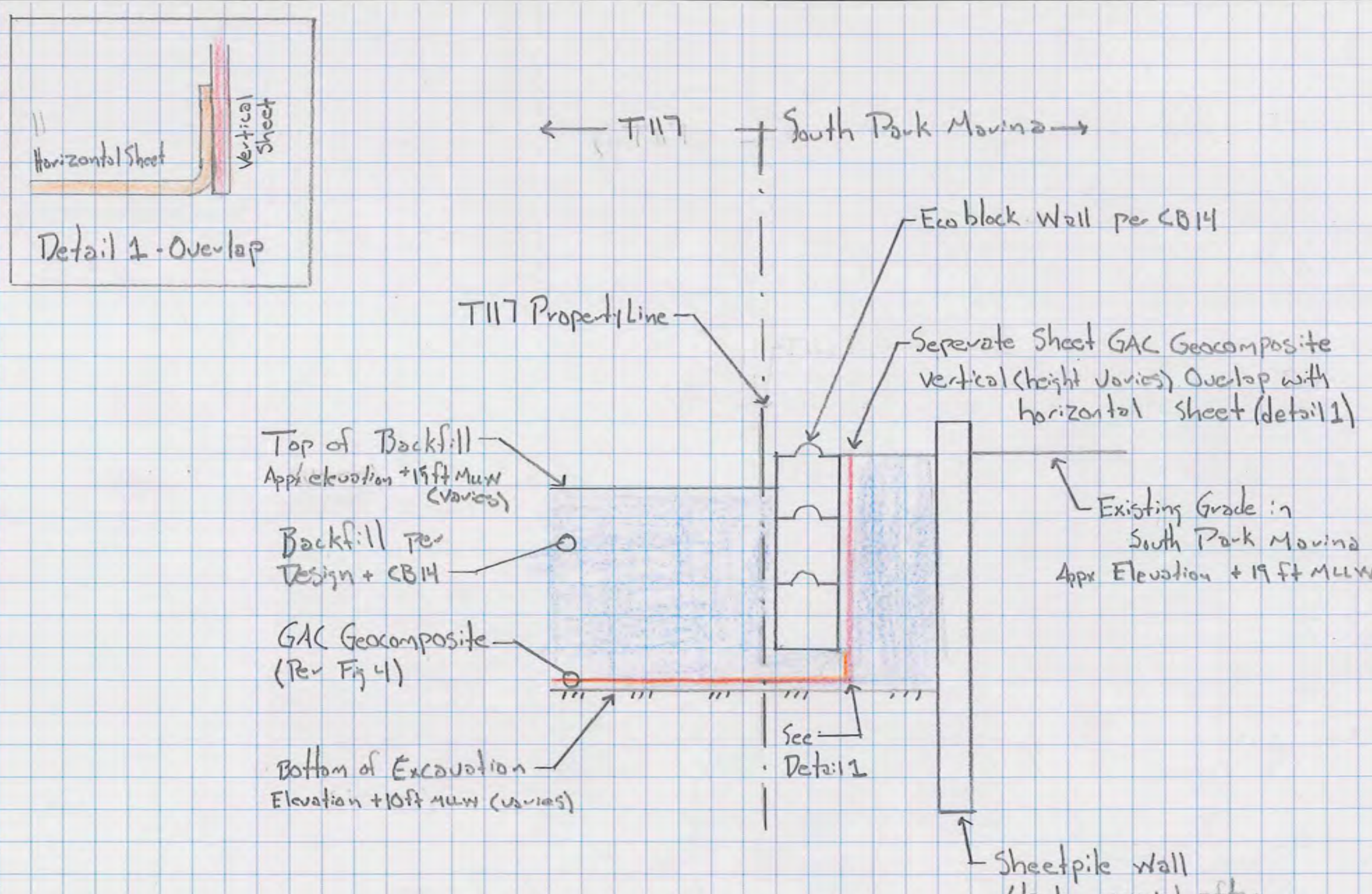


Figure 6 - Conceptual North Bank A to South Park Marina Section

Not to Scale

ATTACHMENT 1 – PHOTOS OF OBSERVED SHEEN

Attachment 1 – Photos of Observed Sheen

Photo 1: Excavation of North Bank A at corner of South Park Marina, 1/4/14, 00:21 (source: AECOM)

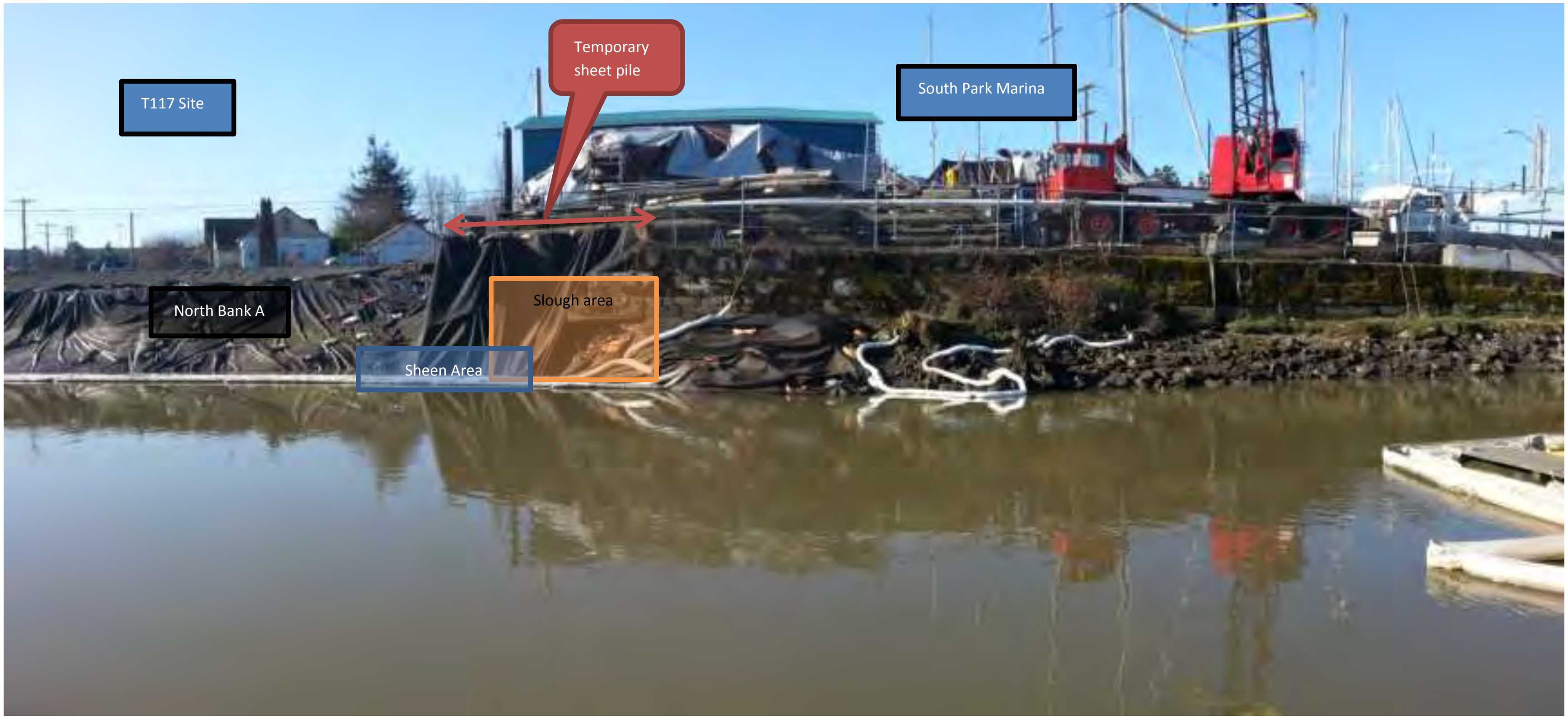
Photo 2: Sheen in DU3 observed lingering near southeast corner of the South Park Marina looking south (sheet pile wall in foreground), 2/1/14, 16:11 (source: AECOM)

Attachment 1 – Photos of Observed Sheen

Photo 3: Sheen in DU3, photograph taken approximately 15 ft north of the southeast corner of the South Park Marina, looking east. 2/1/14, 14:37 (source: AECOM)

Photo 4: Sheen at base of sheet pile wall at the southeast corner of the South Park Marina, looking down, 2/21/14, 12:25 (AECOM)

ATTACHMENT 2 – PANORAMA OF NORTH BANK A AND THE SOUTH PARK MARINA



Attachment 2 – Panorama of North Bank A and the South Park Marina taken 3/12/14

ATTACHMENT 3 – MANUFACTURER PRODUCT DATA

FilterMat™ The Complete Choice.

FilterMat™ AC
activated carbon benefits

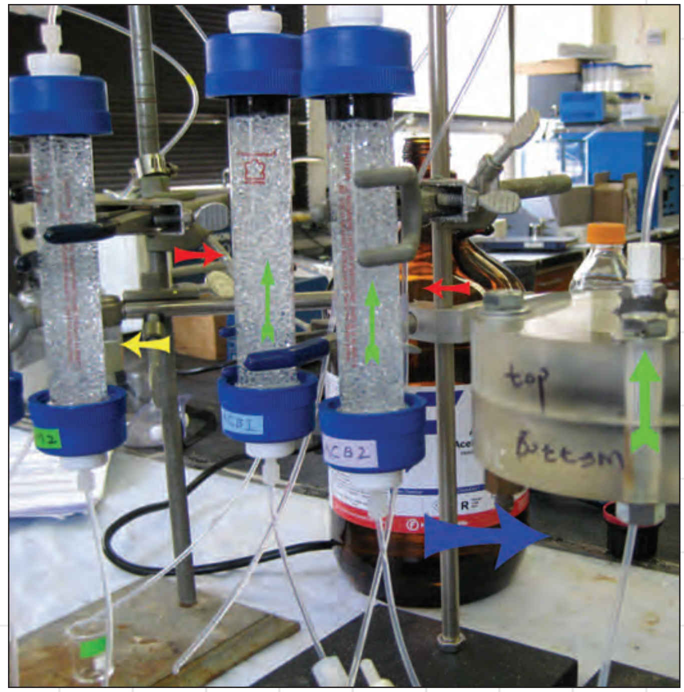
The primary benefits of HUESKER's **FilterMat™ AC** composite include:

- The use of smaller carbon particles, resulting in a higher adsorbent capacity,
- The combination of multiple layers of activated carbon types for targeting selective contaminates, and
- The creation of a controlled tortuous path for liquid flow through the functional particles.

These three features combine to give higher initial efficiencies, lower pressure drops, and greater adsorptive capacity than competitive technologies.

FilterMat™ AC's nonwoven structure maximizes access to the carbon adsorption surfaces. The bond between the bicomponent fiber and the carbon granule covers a very small portion of the surface. In fact, approximately 99% of the carbon's outer surface area is left open. These point bonds are sufficient to immobilize the particles within the nonwoven structure, eliminating shedding and dusting of particles downstream of the filter. Another feature of the nonwoven product is the creation of uniform void space between the granular particles. This creates a tortuous path for flow through the nonwoven medium, providing uniform access to the carbon granules at the same time that it lowers pressure drop. The void space is created by evenly distributing the carbon granules throughout the nonwoven in three dimensions.

Column studies that were conducted to simulate capping of contaminated sediments showed an added benefit created by the tortuous path through the 3-dimensional matrix is a reduction in "bypass". Bypass refers to situations where portions of the flow never come in contact with the functional particles.



This can happen for any filter when the carbon loading gets very low. However, the high pressure drop through packed particles and non-uniform packing in loose beds creates another path for liquid flow to travel preferentially through loosely packed sections or around the edges of the bed. This leads to higher velocities through portions of the bed while other sections are effectively bypassed by the liquid flow, increasing the initial breakthrough of the contaminant through the filter.

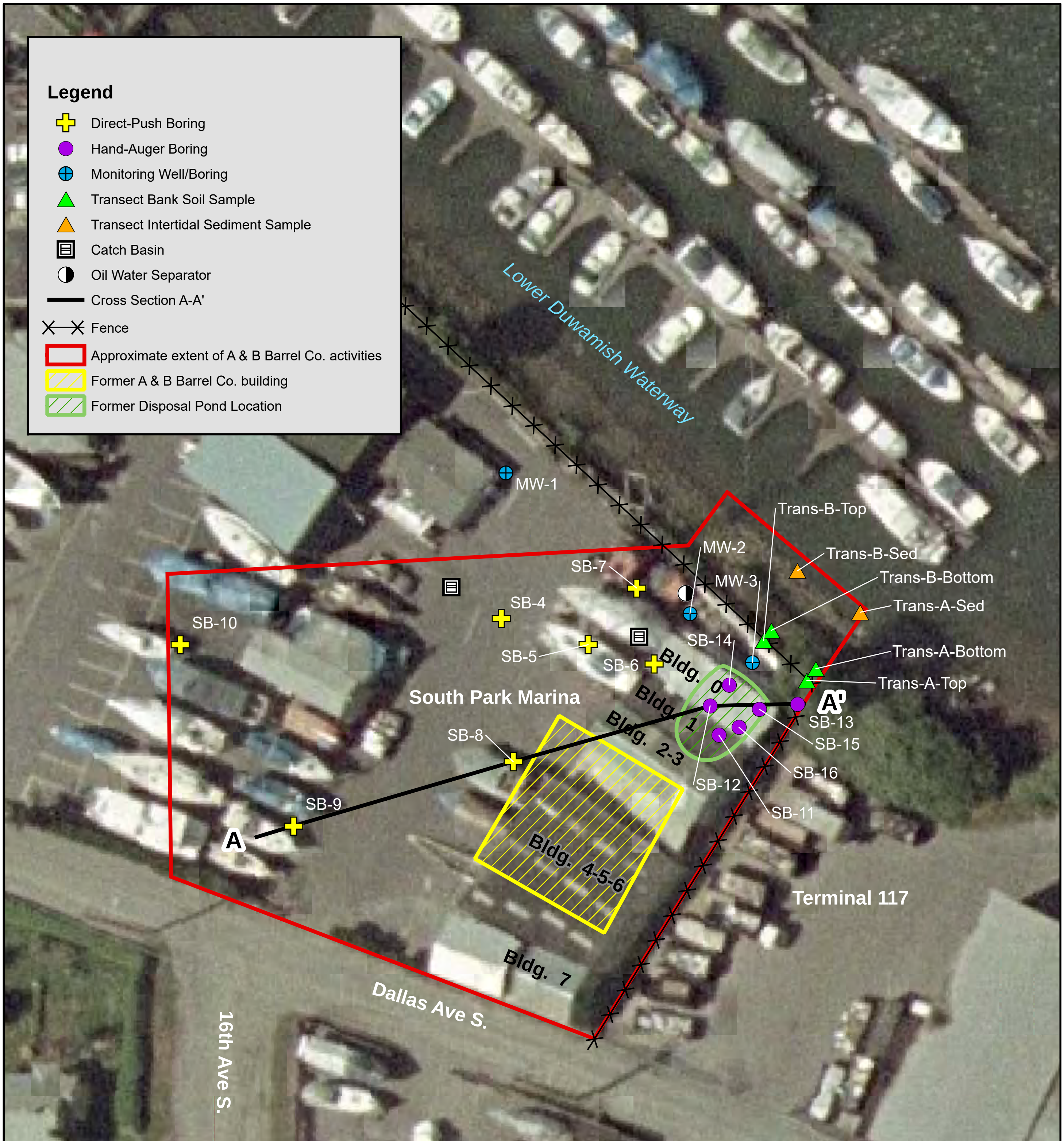
HUESKER's **FilterMat™ AC** standard roll size is 16 feet wide by 100 feet long for ease of installation. Custom roll lengths are available upon request. HUESKER's **FilterMat™ AC** is wrapped in heavy duty plastic for protection during shipping along with two lifting straps for ease of removal at the jobsite. **FilterMat™ AC** is typically shipped to the jobsite on flatbed trucks which allows easy unloading with slings or a lifting bar.

Deployment of HUESKER's **FilterMat™ AC** wide rolls can reduce the installation time and associated costs, and can be installed from the shoreline, from barges and marine vessels with the assistance of divers.

APPENDIX A.6

Marina Corner Transect Sample Locations

SAIC, 2008a, Additional Site Characterization Activities Data Report Final, Lower Duwamish Waterway, South Park Marina, Prepared for Washington State Department of Ecology, dated June 2008



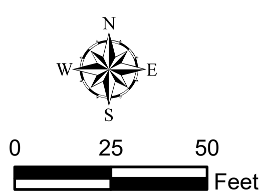


FIGURE 2

South Park Marina Site Map

DEPARTMENT OF ECOLOGY State of Washington

SAIC From Science to Solutions

APPENDIX A.7

T-117 and Dallas Avenue Data Excerpts

Terminal 117 Cleanup

Port of Seattle and City of Seattle

REMOVAL ACTION CONSTRUCTION REPORT

PHASE 1: Sediment and Upland Cleanup

Lower Duwamish Waterway Superfund Site

Terminal 117 Early Action Area

March 31, 2016

Port of Seattle

REMOVAL ACTION CONSTRUCTION REPORT

TERMINAL 117 SEDIMENT AND UPLAND CLEANUP

Submitted to:
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Submitted by:
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Table 5-1 Upland Confirmation Sampling Results

	Dataset statistics: Total PCBs (mg/kg)	cPAHs (mg/kg)	Diesel (mg/kg)	TPH (mg/kg)	Silver (mg/kg)	Dioxin/furan TEQ (ng/kg)
T-117 RvAL:	**0.65**	**0.14**	**200**	**2000**	**2**	**11**
Calculated UCL:	0.32	0.022	38	230	-	1.70
UCL statistic:	95% KM (Chebyshev) UCL	95% KM (Chebyshev) UCL	95% KM (BCA) UCL	95% KM (Chebyshev) UCL	*not calculated**	95% H-UCL
Rule 1 - UCL Exceeds RvAL?:	No	No	No	No	na	No
# of samples in confirmation dataset:	53	53	53	53	19	16
# of allowable RvAL exceedances (<10% of dataset):	5	5	5	5	1	1
Final # of RvAL exceedances:	4	0	1	0	0	0
% RvAL exceedances:	8%	0%	2%	0%	0%	0%
Rule 2 - RvAL exceedance in ≥ 10% of projected samples?:	No	No	No	No	No	No

** Calculation of the 95% UCL requires at least six (6) detected concentrations*

								Confirmation soil sample results: Total PCBs (mg/kg)				cPAHs (mg/kg)				Diesel (mg/kg)				TPH (mg/kg)				Silver (mg/kg)				Dioxin/furan TEQ (ng/kg)				Rule 3 -
Excav. Phase	**Grid cell**	**Sample Round**	**Sample ID**	**Design elev (ft MLLW)**	**Sample elev (ft MLLW)**	**Sample Date**	**Initial Report Date to Port**	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	**Exceeds 2x RvAL?**
pre-conf	01	1	SB-01-8,3,-1	8,3,-1	8,3,-1	6/29/2012	10/8/2012	0.031		No	0.048	0.0033	J	No	0.024	6.1		No	0.031	29	JN	No	0.015	0.3	U	No	0.15	0.285	J	No	0.026	No
pre-conf	02	1	SB-02-8,1	8,1	8,1	6/30/2012	10/8/2012	0.025		No	0.038	0.0033	J	No	0.024	200		No	1.0	250	JN	No	0.13	0.3	U	No	0.15	0.626	J	No	0.057	No
pre-conf	03	2	SB-03-4	6	4	6/30/2012	10/8/2012	0.028		No	0.043	0.0035	J	No	0.025	9.1		No	0.046	44	JN	No	0.022	0.3	U	No	0.15	0.277	J	No	0.025	No
pre-conf	04	3	SB-04-4	8	4	6/30/2012	10/8/2012	0.23		No	0.35	0.0044		No	0.031	51		No	0.26	180		No	0.090	0.3	U	No	0.15	0.482	J	No	0.044	No
pre-conf	05	1	SB-05-3	3	3	7/2/2012	10/8/2012	0.0042		No	0.0065	0.0033	J	No	0.024	5.4		No	0.027	15	JN	No	0.0075	0.3	U	No	0.15	2.70	J	No	0.25	No
pre-conf	06	1	SB-06-6	6	6	6/30/2012	10/8/2012	0.26		No	0.40	0.015	J	No	0.11	9.8		No	0.049	57		No	0.029	0.3	U	No	0.15	0.978	J	No	0.089	No
pre-conf	07	2	SB-07-6,5	8,7	6,5	6/29/2012	10/8/2012	0.24		No	0.37	0.0042	J	No	0.030	25	U	No	0.13	110		No	0.055	0.3	U	No	0.15	1.63	J	No	0.15	No
pre-conf	08	2	SB-08-2	3	2	6/29/2012	10/8/2012	0.089		No	0.14	0.037		No	0.26	110		No	0.55	980		No	0.49	0.3	U	No	0.15	0.934	J	No	0.085	No
pre-conf	09	2	SB-09-8,5,3	9,6,4	8,5,3	6/29/2012	10/8/2012	0.074		No	0.11	0.072		No	0.51	210		Yes	1.1	1200		No	0.60	0.5		No	0.25	5.03	J	No	0.46	No
4	A	1	SS-A-R1-16	17	16	9/30/2013	10/2/2013	0.51		No	0.78	0.015	U	No	0.11	5.0	U	No	0.025	30		No	0.015	-				-				No
3	B	3	SS-B-R3-16	18	16	9/6/2013	9/10/2013	0.0040	U	No	0.0062	0.0038	U	No	0.027	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
3	C	1	SS-C-R1-1618	16,18	16,18	8/8/2013	8/12/2013	0.061		No	0.094	0.0089		No	0.064	5.0	U	No	0.025	40		No	0.020	-				-				No
3	D	2	SS-D-R2-1618	17,19	16,18	8/16/2013	8/19/2013	0.0040	U	No	0.0062	0.0038	U	No	0.027	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
3	E	1	SS-E-R1-19	19	19	8/8/2013	8/12/2013	0.0040	U	No	0.0062	0.0038	U	No	0.027	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
4	F	2	SS-F-R2-050811	12,17	5, 8, 11	11/19/2013	11/21/2013	0.043		No	0.066	0.0016		No	0.011	5.0	U	No	0.025	22		No	0.011	0.20	U	No	0.10	-				No
5	G	1	SS-G-R1-22	22	22	9/11/2013	9/13/2013	0.29		No	0.45	0.0038		No	0.027	7.9	J	No	0.040	130	J	No	0.065	0.20	U	No	0.10	-				No
5	H	2	SS-H-R2-21	22	21	9/25/2013	9/27/2013	0.14		No	0.22	0.0082		No	0.059	5.0	U	No	0.025	16		No	0.0080	0.20	U	No	0.10	-				No
5	I	2	SS-I-R2-22	23	22	9/25/2013	9/27/2013	0.032		No	0.049	0.024		No	0.17	5.0	U	No	0.025	23		No	0.012	0.20	U	No	0.10	-				No
5	J	1	SS-J-R1-091821.5	ne	9,18,21.5	11/11/2013	11/14/2013	0.020	U	No	0.031	0.0071		No	0.051	5.0	U	No	0.025	10	U	No	0.0050	0.20	U	No	0.10	0.745	J	No	0.068	No
5	K	1	SS-K-R1-101319	17,19	10,13,19	11/11/2013	11/14/2013	0.020	U	No	0.031	0.0070		No	0.050	5.0	U	No	0.025	10	U	No	0.0050	0.20	U	No	0.10	0.929	J	No	0.084	No
4	L	2	SS-L-R2-030608	9,12,14	3, 6, 8	11/21/2013	11/26/2013	0.020	U	No	0.031	0.0015	U	No	0.011	5.0	U	No	0.025	24		No	0.012	0.20	U	No	0.10	-				No
5	M	1	SS-M-R1-13	13	13	11/11/2013	11/14/2013	0.020	U	No	0.031	0.0049		No	0.035	8.7	J	No	0.044	24	J	No	0.012	0.20	U	No	0.10	-				No
5	N	1	SS-N-R1-1013	10,13	10,13	11/11/2013	11/14/2013	0.020	U	No	0.031	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	0.52		No	0.26	-				No
5	O	1	SS-O-R1-091214	9,12,14	9,12,14	11/11/2013	11/14/2013	0.024		No	0.037	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	0.20	U	No	0.10	-				No
6A	P	1	SS-P-R1-0910	9,10	9,10	12/19/2013	12/20/2013	0.57		No	0.88	0.0048		No	0.034	5.0	U	No	0.025	13		No	0.0065	-				-				No
6A	Q	1	SS-Q-R1-0911	9,11	9,11	12/19/2013	12/20/2013	0.020	U	No	0.031	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
6B	R	2	SS-R-R2-16	17	16	1/30/2014	1/31/2014	0.033		No	0.051	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
5	S	2	SS-S-R2-11	12	11	11/14/2013	11/15/2013	0.020	U	No	0.031	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
5	T	1	SS-T-R1-121718	ne	12,17,18	11/11/2013	11/14/2013	0.11		No	0.17	0.013		No	0.093	34	J	No	0.17	370	J	No	0.19	-				0.702	J	No	0.064	No
5	U	1	SS-U-R1-171920	ne	17,19,20	11/11/2013	11/14/2013	0.020	U	No	0.031	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
6A	V	1	SS-V-R1-11	11	11	12/19/2013	12/20/2013	0.054		No	0.083	0.0029		No	0.021	14		No	0.070	50		No	0.025	-				-				No
6A	W	1	SS-W-R1-0911	9,11	9,11	12/19/2013	12/20/2013	0.063		No	0.097	0.0015	U	No	0.011	6.7		No	0.034	19		No	0.0095	-				-				No
6B	X	1	SS-X-R1-10	12	10	1/22/2014	1/25/2014	0.22		No	0.34	0.057		No	0.41	35	J	No	0.18	102	J	No	0.051	-				-				No

Table 5-1 Upland Confirmation Sampling Results

								Confirmation soil sample results																									
								Total PCBs (mg/kg)				cPAHs (mg/kg)				Diesel (mg/kg)				TPH (mg/kg)				Silver (mg/kg)				Dioxin/furan TEQ (ng/kg)				Rule 3 -
Excav. Phase	Grid cell	Sample Round	Sample ID	Design elev (ft MLLW)	Sample elev (ft MLLW)	Sample Date	Initial Report Date to Port	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Conc	Qual	>RvAL	EF	Exceeds 2x RvAL?
6B	Y	1	SS-Y-R1-0409	12,17	4,9	1/22/2014	1/25/2014	0.020	U	No	0.031	0.0015	U	No	0.011	17	J	No	0.085	45	J	No	0.023	-				-				No
1	Z	1	SS-Z-R1-171618	16,17,18	16,17,18	7/18/2013	7/25/2013	0.053	J	No	0.082	0.0038	U	No	0.027	5.0	U	No	0.025	10	U	No	0.0050	-				0.353		No	0.032	No
6B	AA	2	SS-AA-R2-0309	10,12	3,9	1/30/2014	1/31/2014	0.020	U	No	0.031	0.0019		No	0.014	160		No	0.80	310		No	0.16	-				0.596	J	No	0.054	No
6B	BB	1	SS-BB-R1-0607	10,12	6,7	1/22/2014	1/25/2014	0.020	U	No	0.031	0.0015	U	No	0.011	10	J	No	0.050	10	J	No	0.0050	-				-				No
1	CC	2	SS-CC-R2-0506.507	8	5,6.5,7	9/26/2013	9/30/2013	0.051		No	0.078	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
6B	DD	1	SS-DD-R1-15	15	15	1/22/2014	1/25/2014	0.020	U	No	0.031	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
8	EE	1	SS-EE-R1-10	10	10	11/26/2013	12/2/2013	0.89		Yes	1.4	0.030	J	No	0.21	15	J	No	0.075	81	J	No	0.041	-				-				No
9	FF	1	SS-FF-R1-15	15	15	3/14/2014	3/19/2014	0.11		No	0.17	0.0015	U	No	0.011	5.0	U	No	0.025	10	U	No	0.0050	-				-				No
9	GG	1	SS-GG-R1-0911	9,11	9,11	3/11/2014	3/12/2014	0.020	U	No	0.031	0.0015	U	No	0.011	5.0	U	No	0.025	32		No	0.016	-				0.301		No	0.027	No
9	HH	2	SS-HH-R2-12	13	12	3/20/2014	3/24/2014	0.025		No	0.038	0.019		No	0.14	6.0	J	No	0.030	120	J	No	0.060	-				-				No
9	II	1	SS-II-R1-20	20	20	3/17/2014	3/19/2014	1.0		Yes	1.5	0.095		No	0.68	150	J	No	0.75	360	J	No	0.18	-				-				No
8	JJ	1	SS-JJ-R1-10	10	10	11/26/2013	12/2/2013	0.86		Yes	1.3	0.0017		No	0.012	10	J	No	0.050	42	J	No	0.021	-				-				No
8	KK	1	SS-KK-R1-11	11	11	2/28/2014	3/4/2014	0.020	U	No	0.031	0.0047		No	0.034	5.0	U	No	0.025	40		No	0.020	-				0.614	J	No	0.056	No
9	LL	1	SS-LL-R1-0912	9,12	9,12	2/28/2014	3/4/2014	0.11		No	0.17	0.012		No	0.086	5.0	U	No	0.025	16		No	0.0080	-				-				No
9	MM	2	SS-MM-R2-11	12	11	3/20/2014	3/24/2014	0.029		No	0.045	0.0015		No	0.011	5.0	U	No	0.025	51	J	No	0.026	-				-				No
9	NN	1	SS-NN-R1-16	16	16	3/14/2014	3/19/2014	1.3		Yes	2.0	0.012		No	0.086	22	J	No	0.11	63	J	No	0.032	-				-				No
9	OO	1	SS-OO-R1-16	16	16	3/14/2014	3/19/2014	0.081		No	0.12	0.034		No	0.24	25	J	No	0.13	69	J	No	0.035	-				-				No
10	PP	2	SS-PP-R2-17	ne	17	3/20/2014	3/24/2014	0.020	U	No	0.031	0.011		No	0.079	5.0	U	No	0.025	19	J	No	0.0095	-				-				No
10	QQ	1	SS-QQ-R1-1819	ne	18,19	3/3/2014	3/4/2014	0.037		No	0.057	0.011		No	0.079	7.5	J	No	0.038	31	J	No	0.016	-				-				No
8	RR	2	SS-RR-R2-081519	9,16,20	8,15,19	12/4/2013	12/6/2013	0.020	U	No	0.031	0.0067		No	0.048	5.0	U	No	0.025	10	U	No	0.0050	-				-				No

Note:

All chemistry results expressed in mg/kg dw unless explicitly noted.

= RvAL exceedance

Table 5-2 Bank Confirmation Sampling Results

			North Bank																	
Location:			**North Bank A**						**North Bank B**						**North Bank C**					
Sample ID:			**Nbank-A-R3-SS**						**Nbank-B-R3-SS**						**Nbank-C-R2-SS**					
Round:			**3**						**3**						**2**					
Sample Date:			**10/31/2013**						**10/31/2013**						**10/24/2013**					
Initial Report Date:			**11/1/2013**						**11/1/2013**						**10/25/2013**					
Matrix:			**Soil**						**Soil**						**Soil**					
Total organic carbon (%):			**n/a**						**n/a**						**n/a**					
Chemical	Sediment RvAL	Soil RvAL	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF
Arsenic	X																			
Phenol	X																			
2-Methylnaphthalene	X																			
Acenaphthene	X																			
Anthracene	X																			
cPAHs	X	X	0.0094		mg/kg	0.14	No	0.067	0.024		mg/kg	0.14	No	0.17	0.087	J	mg/kg	0.14	No	0.62
Dibenzofuran	X																			
Fluoranthene	X																			
Fluorene	X																			
Phenanthrene	X																			
Total PCBs	X	X	0.022		mg/kg	0.65	No	0.034	0.065		mg/kg	0.65	No	0.10	0.47	J	mg/kg	0.65	No	0.72
Diesel		X	14	J	mg/kg	200	No	0.070	5.0	U	mg/kg	200	No	0.025	25	J	mg/kg	200	No	0.13
TPH		X	52	J	mg/kg	2000	No	0.026	17		mg/kg	2000	No	0.0085	190	J	mg/kg	2000	No	0.095
RvAL exceeded for any chemical?:			**No**						**No**						**No**					

			South Bank																	
Location:			**South Bank A**						**South Bank B**						**South Bank C**					
Sample ID:			**Sbank-A-R1-SD**						**Sbank-B-R2-SS**						**Sbank-C-R1-SD**					
Round:			**1**						**2**						**1**					
Sample Date:			**10/6/2013**						**11/1/2013**						**10/10/2013**					
Initial Report Date:			**10/8/2013**						**11/5/2013**						**10/14/2013**					
Matrix:			**Sediment**						**Soil**						**Sediment**					
Total organic carbon (%):			**0.382**						**n/a**						**0.319**					
Chemical	Sediment RvAL	Soil RvAL	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF
Arsenic	X		5.00	U	mg/kg	12	No	0.42							5.00	U	mg/kg	12	No	0.42
Phenol	X		0.060	U	mg/kg	0.42	No	0.14							0.0030	U	mg/kg	0.42	No	0.0071
2-Methylnaphthalene	X		0.0020	U	mg/kg	0.67	No	0.0030							0.0030	U	mg/kg	0.67	No	0.0045
Acenaphthene	X		0.0020	U	mg/kg	0.5	No	0.0040							0.0030	U	mg/kg	0.5	No	0.0060
Anthracene	X		0.0020	U	mg/kg	0.96	No	0.0021							0.0030	U	mg/kg	0.96	No	0.0031
cPAHs	X	X	0.0039		mg/kg	0.09	No	0.043	0.024		mg/kg	0.14	No	0.17	0.0023	U	mg/kg	0.09	No	0.026
Dibenzofuran	X		0.12	U	mg/kg	0.54	No	0.22							0.0060	U	mg/kg	0.54	No	0.011
Fluoranthene	X		0.0050		mg/kg	1.7	No	0.0029							0.0030	U	mg/kg	1.7	No	0.0018
Fluorene	X		0.0020	U	mg/kg	0.54	No	0.0037							0.0030	U	mg/kg	0.54	No	0.0056
Phenanthrene	X		0.0026		mg/kg	1.5	No	0.0017							0.0030	U	mg/kg	1.5	No	0.0020
Total PCBs	X	X	0.071		mg/kg	0.13	No	0.55	0.044		mg/kg	0.65	No	0.068	0.026		mg/kg	0.13	No	0.20
Diesel		X							6.0	J	mg/kg	200	No	0.030						
TPH		X							60	J	mg/kg	2000	No	0.030						
RvAL exceeded for any chemical?:			**No**						**No**						**No**					
			TOC <0.5%; AET substitution applied						*TOC normalization not applicable for soil RvALs*						*TOC <0.5%; AET substitution applied*					

Notes:

(1) Per the project plan, the first sample collected from the bank is compared to sediment RvAL (Round 1), subsequent cleanup passes would be compared to soil RvALs (Round 2 or 3).

(2) If the TOC is less than 0.5% in the sample, then the sample results is compared to AET dry weight value, instead of the OC-normalized RvAL.

Table 5-3 Bank Transition Sampling Results

					Dredge Unit 3 - Bank Transition Samples																	
Location:					**SG-24**						**SG-25**						**SG-26 (near sheet pile wall)**					
Sample ID:					**SG-24-R2**						**SG-25-R2**						**SG-26-R2**					
Description:					**Bank sample**						**Bank sample**						**Bank sample**					
Sample Date:					**3/12/2014**						**3/12/2014**						**3/12/2014**					
Initial Report Date:					**3/14/2014**						**3/14/2014**						**3/14/2014**					
Total organic carbon (%):					**0.107**						**0.05 U**						**0.242**					
Chemical	RvAL	Units	Alternate RvAL*	Units	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF
Arsenic	12	mg/kg			1.28		mg/kg	12	No	0.11	1.18		mg/kg	12	No	0.098	1.32		mg/kg	12	No	0.11
2-Methylnaphthalene	38	mg/kg OC	0.67	mg/kg	0.0030	U	mg/kg	0.67	No	0.0045	0.0030	U	mg/kg	0.67	No	0.0045	0.0030	U	mg/kg	0.67	No	0.0045
Acenaphthene	16	mg/kg OC	0.5	mg/kg	0.0030	U	mg/kg	0.5	No	0.0060	0.0030	U	mg/kg	0.5	No	0.0060	0.0030	U	mg/kg	0.5	No	0.006
Anthracene	220	mg/kg OC	0.96	mg/kg	0.0030	U	mg/kg	0.96	No	0.0031	0.0030	U	mg/kg	0.96	No	0.0031	0.0030	U	mg/kg	0.96	No	0.0031
Dibenzofuran	15	mg/kg OC	0.54	mg/kg	0.0030	U	mg/kg	0.54	No	0.0056	0.0030	U	mg/kg	0.54	No	0.0056	0.0030	U	mg/kg	0.54	No	0.0056
Fluoranthene	160	mg/kg OC	1.7	mg/kg	0.0081		mg/kg	1.7	No	0.0048	0.0030	U	mg/kg	1.7	No	0.0018	0.0046		mg/kg	1.7	No	0.0027
Fluorene	23	mg/kg OC	0.54	mg/kg	0.0030	U	mg/kg	0.54	No	0.0056	0.0030	U	mg/kg	0.54	No	0.0056	0.0030	U	mg/kg	0.54	No	0.0056
Phenanthrene	100	mg/kg OC	1.5	mg/kg	0.0049		mg/kg	1.5	No	0.0033	0.0030	U	mg/kg	1.5	No	0.0020	0.0055		mg/kg	1.5	No	0.0037
cPAHs	0.09	mg/kg			0.0057		mg/kg	0.09	No	0.063	0.0023	U	mg/kg	0.09	No	0.026	0.013		mg/kg	0.09	No	0.14
Phenol	0.42	mg/kg			0.0030	U	mg/kg	0.42	No	0.0071	0.0030	U	mg/kg	0.42	No	0.0071	0.0030	U	mg/kg	0.42	No	0.0071
Total PCBs	12	mg/kg OC	0.13	mg/kg	0.062		mg/kg	0.13	No	0.48	0.020	U	mg/kg	0.13	No	0.15	0.10		mg/kg	0.13	No	0.77
RvAL exceeded for any chemical?:					**No**						**No**						**No**					
					TOC <0.5%; AET substitution applied						*TOC <0.5%; AET substitution applied*						*TOC <0.5%; AET substitution applied*					

Notes:

(1) The alternate RvAL, based on AET dry weight value, is used for sediment screening only when TOC is <0.5% or >4%. Otherwise, sediment samples are compared to oc-normalized values as appropriate.

(2) The "bank transition area" is located from +2 ft to +0.0 ft MLLW elevation, at the intersection of the upland and inwater compliance areas. It is the transition between different remedial technologies.

Table 5-4 Sediment Confirmation Sampling Results

					Dredge Unit 3																	
Row:					**Nearshore**						**Nearshore**						**Offshore**					
Location:					**SG-06**						**SG-07**						**SG-08**					
Sample ID:					**SG-06-R2**						**SG-07-R2**						**SG-08-R2**					
Round:					**2**						**2**						**2**					
Initial Report Date:					**3/14/2014**						**3/14/2014**						**3/14/2014**					
Total organic carbon (%):					**0.634**						**0.05 U**						**2.14**					
Chemical	RvAL	Units	Alternate RvAL[1]	Units	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF
Arsenic	12	mg/kg			4.71		mg/kg	12	No	0.39	1.85		mg/kg	12	No	0.15	7.13		mg/kg	12	No	0.59
2-Methylnaphthalene	38	mg/kg OC	670	µg/kg	0.47	U	mg/kg OC	38	No	0.012	3	U	ug/kg	670	No	0.005	0.14	U	mg/kg OC	38	No	0.0037
Acenaphthene	16	mg/kg OC	500	µg/kg	0.47	U	mg/kg OC	16	No	0.029	3	U	ug/kg	500	No	0.006	0.14	U	mg/kg OC	16	No	0.0088
Anthracene	220	mg/kg OC	960	µg/kg	0.47	U	mg/kg OC	220	No	0.0021	3	U	ug/kg	960	No	0.0031	0.14	U	mg/kg OC	220	No	0.0006
Dibenzofuran	15	mg/kg OC	540	µg/kg	0.47	U	mg/kg OC	15	No	0.031	3	U	ug/kg	540	No	0.0056	0.14	U	mg/kg OC	15	No	0.0093
Fluoranthene	160	mg/kg OC	1700	µg/kg	2.5		mg/kg OC	160	No	0.016	4.8		ug/kg	1700	No	0.0028	0.7		mg/kg OC	160	No	0.0044
Fluorene	23	mg/kg OC	540	µg/kg	0.47	U	mg/kg OC	23	No	0.020	3	U	ug/kg	540	No	0.0056	0.14	U	mg/kg OC	23	No	0.0
Phenanthrene	100	mg/kg OC	1500	µg/kg	1.3		mg/kg OC	100	No	0.013	3	U	ug/kg	1500	No	0.002	0.36		mg/kg OC	100	No	0.0036
cPAHs	90	µg/kg			13		ug/kg	90	No	0.14	5.1		ug/kg	90	No	0.057	34		ug/kg	90	No	0.38
Phenol	420	µg/kg			3.0	U	ug/kg	420	No	0.0071	3.0	U	ug/kg	420	No	0.0071	3.0	U	ug/kg	420	No	0.0071
Total PCBs	12	mg/kg OC	0.13	mg/kg	5.8		mg/kg OC	12	No	0.48	0.38		mg/kg	0.13	Yes	2.9	1.5		mg/kg OC	12	No	0.13
Dioxin/furan TEQ[2]	13	ng/kg			-						1.13		ng/kg	13	No	0.087	-					
RvAL exceeded for any chemical?:					**No**						**Yes**						**No**					

TOC <0.5%; AET substitution applied

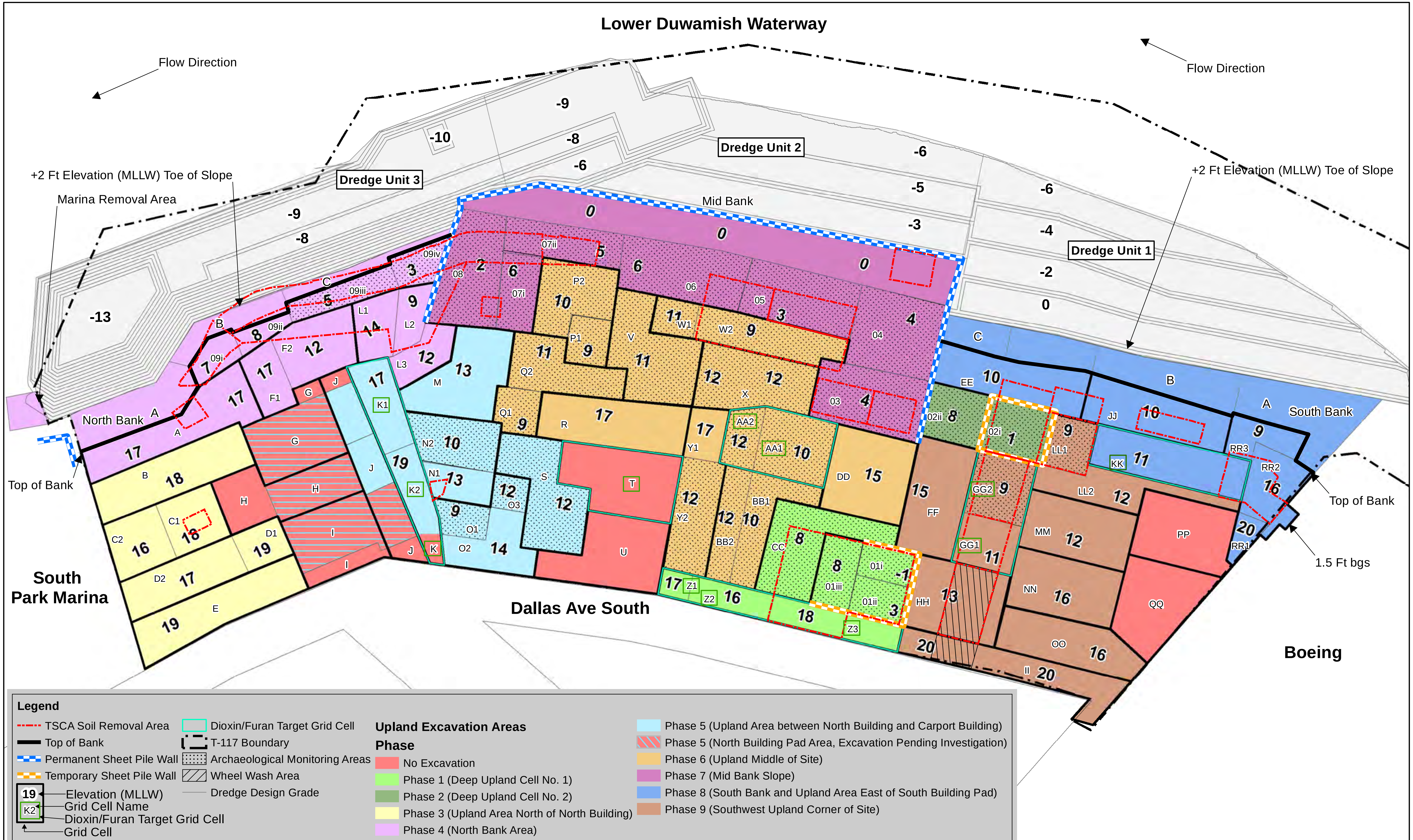
					Dredge Unit 3											
Row:					**Offshore**						**Offshore**					
Location:					**SG-09**						**SG-10**					
Sample ID:					**SG-09-R2**						**SG-10-R2**					
Round:					**2**						**2**					
Initial Report Date:					**3/14/2014**						**3/14/2014**					
Total organic carbon (%):					**0.642**						**1.01**					
Chemical	RvAL	Units	Alternate RvAL[1]	Units	Conc	Qual	Unit	RvAL	>RvAL	EF	Conc	Qual	Unit	RvAL	>RvAL	EF
Arsenic	12	mg/kg			2.3		mg/kg	12	No	0.19	4.02		mg/kg	12	No	0.34
2-Methylnaphthalene	38	mg/kg OC	670	µg/kg	0.5	U	mg/kg OC	38	No	0.012	0.3	U	mg/kg OC	38	No	0.0079
Acenaphthene	16	mg/kg OC	500	µg/kg	0.5	U	mg/kg OC	16	No	0.0290	0.3	U	mg/kg OC	16	No	0.019
Anthracene	220	mg/kg OC	960	µg/kg	0.5	U	mg/kg OC	220	No	0.0021	0.3	U	mg/kg OC	220	No	0.0014
Dibenzofuran	15	mg/kg OC	540	µg/kg	0.5	U	mg/kg OC	15	No	0.031	0.3	U	mg/kg OC	15	No	0.02
Fluoranthene	160	mg/kg OC	1700	µg/kg	1.1		mg/kg OC	160	No	0.0069	2.1		mg/kg OC	160	No	0.013
Fluorene	23	mg/kg OC	540	µg/kg	0.5	U	mg/kg OC	23	No	0.02	0.38		mg/kg OC	23	No	0.017
Phenanthrene	100	mg/kg OC	1500	µg/kg	0.6		mg/kg OC	100	No	0.0061	2		mg/kg OC	100	No	0.02
cPAHs	90	µg/kg			7.1		ug/kg	90	No	0.079	21		ug/kg	90	No	0.23
Phenol	420	µg/kg			3.0	U	ug/kg	420	No	0.0071	3.0	U	ug/kg	420	No	0.0071
Total PCBs	12	mg/kg OC	0.13	mg/kg	3.1	U	mg/kg OC	12	No	0.26	8.3		mg/kg OC	12	No	0.69
Dioxin/furan TEQ[2]	13	ng/kg			0.441		ng/kg	13	No	0.034	-					
RvAL exceeded for any chemical?:					**No**						**No**					

Notes:
(1) The alternate RvAL, based on AET dry weight value, is used for sediment screening only when TOC is <0.5% or >4%. Otherwise, sediment samples are compared to oc-normalized values as appropriate.
(2) Dioxin/furan TEQ is reported for informational purposes only; results are not used for decision-making purposes

Table 5-5 Sediment Perimeter Sampling Results

	Criteria				Location:	PERIM-1		PERIM-2		PERIM-3		PERIM-4		PERIM-5			
					Sample ID:	SG-PERIM-1-PRE	SG-PERIM-1-POST	SG-PERIM-2-PRE	SG-PERIM-2-POST	SG-PERIM-3-PRE	SG-PERIM-3-POST	SG-PERIM-4-PRE	SG-PERIM-4-POST	SG-PERIM-5-PRE	SG-PERIM-6-PRE (field dup)	SG-PERIM-5-POST	SG-PERIM-6-POST (field dup)
					Sample date:	11/22/2013	5/12/2014	11/22/2013	5/12/2014	11/22/2013	5/12/2014	11/22/2013	5/12/2014	11/22/2013	5/12/2014	11/22/2013	5/12/2014
Chemical	RvAL	SCO	Units	LAET	Units TOC (%):	0.566	1.05	1.17	4.31	1.28	0.871	1.33	1.22	2.30	2.24	1.38	1.21
Metals																	
Arsenic	12	57	mg/kg dw			9.24	8.02	9.54	9.97	8.21	2.92	8.59	3.49	15.8	15.0	4.26	4.40
Cadmium		5.1	mg/kg dw			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chromium		260	mg/kg dw			10 U	7.39 J	15.5	16.9 J	13.4	10.5 J	14.3	9.94 J	16.6	16.1	12.7 J	12.5 J
Copper		390	mg/kg dw			16.2	17.6	35.4	35.7	27.8	17.4	31.5	16.8	41.2	49.8	21.8	21.2
Lead		450	mg/kg dw			11.2	16.6	13.9	16.8	11.4	5.11	11.5	6.44	17.0	16.6	7.02	6.94
Mercury		0.41	mg/kg dw			0.1 U	0.097	0.24 J	0.19	0.11 J	0.063	0.11 J	0.075	0.15 J	0.15 J	0.071	0.063
Silver		6.1	mg/kg dw			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Zinc		410	mg/kg dw			45.9 J	72.2	72.6 J	78.4	66.1 J	31.8	63.4 J	36.8	79.4 J	84.3 J	39.7	39.9
PAHs																	
2-Methylnaphthalene	38	38	mg/kg OC	0.67	mg/kg dw	0.18 U	0.48 U	0.28	0.010 U [a]	0.22	0.57 U	0.27	0.41 U	0.18 J	0.58 J	0.40	0.60
Acenaphthene	16	16	mg/kg OC	0.5	mg/kg dw	0.42	0.48 U	0.25	0.010 U [a]	0.19	0.57 U	0.30	0.41 U	1.7 U	1.8 U	0.36 U	0.99
Acenaphthylene		66	mg/kg OC	1.3	mg/kg dw	0.35 U	0.48 U	0.21	0.010 U [a]	0.16 U	0.57 U	0.19	0.41 U	1.7 U	1.8 U	0.36 U	0.41 U
Anthracene	220	220	mg/kg OC	0.96	mg/kg dw	0.95	0.48 U	1.7	0.016 [a]	0.55	0.57 U	0.69	0.64	4.2 J	2.5 J	0.80	1.8
Benzo(a)anthracene		110	mg/kg OC	1.3	mg/kg dw	4.1	2.9	2.9	0.057 [a]	2.6	1.3	3.4	3.0	19	16	1.2	4.5
Benzo(a)pyrene		99	mg/kg OC	1.6	mg/kg dw	5.8	3.0	3.5	0.055 [a]	3.0	1.4	3.5	2.6	14	13	1.2	4.9
Benzo(g,h,i)perylene		31	mg/kg OC	0.67	mg/kg dw	4.9	2.5	2.9	0.053 [a]	2.4	1.3	2.4	1.6	7.4	7.1	1.1	3.7
Total benzofluoranthenes		230	mg/kg OC	3.2	mg/kg dw	13	6.7	9.32	0.14 [a]	7.4	3.3	4.1	5.9	35	33	2.6	8.35
Chrysene		110	mg/kg OC	1.4	mg/kg dw	6.9	4.2	5.0	0.093 [a]	3.7	1.8	4.2	3.5	17	17	1.9	5.9
Dibenzo(a,h)anthracene		12	mg/kg OC	0.23	mg/kg dw	1.0	0.54	0.62	0.010 U [a]	0.55	0.57 U	0.53	0.41 U	1.9	1.8 U	0.36 U	0.62
Dibenzofuran	15	15	mg/kg OC	0.54	mg/kg dw	0.23	0.26	0.26	0.0074 [a]	0.21	0.23 U	0.32	0.28	0.39 J	1.5 J	0.37	0.61
Fluoranthene	160	160	mg/kg OC	1.7	mg/kg dw	13	8.4	8.5	0.15 [a]	5.5	3.4	9.0	8.2	57	45	3.3	9.1
Fluorene	23	23	mg/kg OC	0.54	mg/kg dw	0.49	0.48 U	0.68	0.010 U [a]	0.24	0.57 U	0.38	0.41 U	2.2	1.8 U	0.39	1.1
Indeno(1,2,3-cd)pyrene		34	mg/kg OC	0.6	mg/kg dw	5.3	2.7	3.2	0.050 [a]	2.7	1.3	2.6	1.8	8.3	8.0	1.0	3.6
Naphthalene		99	mg/kg OC	2.1	mg/kg dw	0.35 U	0.48 U	0.21	0.010 U [a]	0.16	0.57 U	0.17	0.41 U	1.7 U	1.8 U	0.36 U	0.55
Phenanthrene	100	100	mg/kg OC	1.5	mg/kg dw	7.4	4.2	4.1	0.064 [a]	2.2	1.5	3.4	3.9	27 J	8.5 J	2.0	8.3
Pyrene		1000	mg/kg OC	2.6	mg/kg dw	13	7.4	7.9	0.13 [a]	5.7	2.9	8.3	7.9	41	33	3.1	12
Total HPAHs		960	mg/kg OC	12	mg/kg dw	66.4	38.3	44	0.73 [a]	33.5	16.6	38	34	200	170	15.3	52
Total LPAHs		370	mg/kg OC	5.2	mg/kg dw	9.4	4.2	7.2	0.080 [a]	3.4	1.5	5.1	4.6	33 J	11 J	3.2	12
cPAHs	0.09		mg/kg dw			0.046	0.046	0.060	0.081	0.056	0.017	0.061	0.046	0.48	0.43	0.023	0.080
Phthalates																	
Bis(2-ethylhexyl)phthalate		47	mg/kg OC	1.3	mg/kg dw	12	12 J	10 J	0.44 J [a]	7.8 J	9.1 J	7.5	6.3 J	4.8	6.7	8.7 J	11 J
Butyl benzyl phthalate		4.9	mg/kg OC	0.063	mg/kg dw	1.0 U	0.95 U	1.5 J	0.029 [a]	0.64 J	1.1 U	0.75	0.82 U	0.65 J	1.5 J	0.72 UJ	0.83 U
Diethyl phthalate		61	mg/kg OC	0.2	mg/kg dw	0.71 U	0.95 U	0.35	0.020 U [a]	0.31 U	1.1 U	0.30 U	0.82 U	0.17 U	0.20	0.72 U	0.83 U
Dimethyl phthalate		53	mg/kg OC	0.071	mg/kg dw	0.48	0.95 U	0.54	0.020 U [a]	0.43	1.1 U	0.41	0.82 U	0.57	0.58	0.72 U	0.83 U
Di-n-butyl phthalate		220	mg/kg OC	1.4	mg/kg dw	3.5 U	0.95 U	1.7 U	0.040 [a]	1.6 U	1.1 U	1.5 U	0.82 U	0.87 U	0.89 U	0.72 U	0.83 U
Di-n-octyl phthalate		58	mg/kg OC	6.2	mg/kg dw	0.57 U	1.2	0.27 U	0.020 U [a]	0.31	1.1 U	0.24 U	0.82 U	0.24 J	0.42 J	0.72 U	0.83 U
Other SVOCs																	
1,2,4-Trichlorobenzene		0.81	mg/kg OC	0.031	mg/kg dw	0.99	0.19 U	0.66	0.0040 U [a]	0.31	0.23 U	0.45	0.16 U	0.39	0.26	0.14 U	0.17 U
1,2-Dichlorobenzene		2.3	mg/kg OC	0.035	mg/kg dw	0.71 U	0.19 U	0.35	0.0040 U [a]	0.31 U	0.23 U	0.30 U	0.16 U	0.22	0.18 U	0.14 U	0.17 U
1,4-Dichlorobenzene		3.1	mg/kg OC	0.11	mg/kg dw	0.42 U	0.19 U	0.30	0.0040 U [a]	0.19 U	0.23 U	0.18 U	0.16 U	0.13	0.17	0.14 U	0.17 U
2,4-Dimethylphenol		0.03	mg/kg dw			0.019 U	0.010 U	0.019 U	0.020 U	0.019 U	0.010 U	0.019 U	0.010 U	0.019 U	0.019 U	0.010 U	0.010 U
2-Methylphenol		0.06	mg/kg dw			0.0064 U	0.0020 U	0.0064 U	0.0040 U	0.0064 U	0.0020 U	0.0064 U	0.0020 U	0.0064 U	0.0064 U	0.0020 U	0.0020 U
3/4-Methylphenol		0.67	mg/kg dw			0.059	0.0040 U	0.014 U	0.018	0.014 U	0.0040 U	0.014 U	0.0040	0.014 U	0.014 U	0.0040 U	0.0040 U
Benzoic acid		0.65	mg/kg dw			0.054 U	0.10 U	0.054 U	0.20 U	0.054 U	0.10 U	0.054 U	0.10 U	0.054 U	0.059 J	0.10 U	0.10 U
Benzyl alcohol		0.06	mg/kg dw			0.020	0.020 U	0.052	0.040 U	0.034	0.020 U	0.018	0.020 U	0.035 J	0.067 J	0.020 U	0.020 U
Hexachlorobenzene		0.38	mg/kg OC	0.022	mg/kg dw	0.18 UJ	0.19 U	0.085 UJ	0.0040 U [a]	0.078 UJ	0.23 U	0.075 UJ	0.16 U	0.043 UJ	0.045 UJ	0.14 U	0.17 U
Hexachlorobutadiene		3.9	mg/kg OC	0.011	mg/kg dw	0.35 U	0.19 U	0.17 U	0.0040 U [a]	0.16 U	0.23 U	0.15 U	0.16 U	0.087 U	0.089 U	0.14 U	0.17 U
n-Nitrosodiphenylamine		11	mg/kg OC	0.028	mg/kg dw	0.18 UJ	0.19 U	0.11 J	0.0040 U [a]	0.078 UJ	0.23 U	0.075 UJ	0.16 U	0.043 UJ	0.045 UJ	0.14 U	0.17 U
Pentachlorophenol		0.36	mg/kg dw			0.0062 UJ	0.010 U	0.0097 J	0.020 U	0.0062 UJ	0.010 U	0.0062 UJ	0.010 U	0.0062 UJ	0.0062 UJ	0.010 U	0.010 U
Phenol	0.42	0.42	mg/kg dw			0.020	0.0020 U	0.0057	0.0040 U	0.0054 U	0.0020 U	0.0054 U	0.0020 U	0.0070	0.0063	0.0020 U	0.0020 U
PCBs																	
Total PCBs	12	12	mg/kg OC	0.13	mg/kg dw	10	14.9	4.3	0.074 [a]	2.3	1.50	4.1	3.8	7.0	8.5	2.6	3.6 J
Dioxin/furan																	
Dioxin/furan TEQ	13		ng/kg dw			1.41 J	1.88 J	54.8 J	4.12 J	2.40 J	1.20 J	2.35 J	1.62 J	6.55 J	8.43 J	1.30 J	1.84 J

Notes:
All values are reported in RvAL/SCO units, except where noted (see footnote 'a')
Orange-highlighted values exceed the RvAL or SCO (note: arsenic is the only chemical with an RvAL different from the SCO)
There were no exceedances of CSL or 2LAET criteria
[a] TOC exceeded 4% for this sample; dry-weight result was compared to LAET/2LAET criteria.
dw - dry-weight
OC - organic carbon-normalized



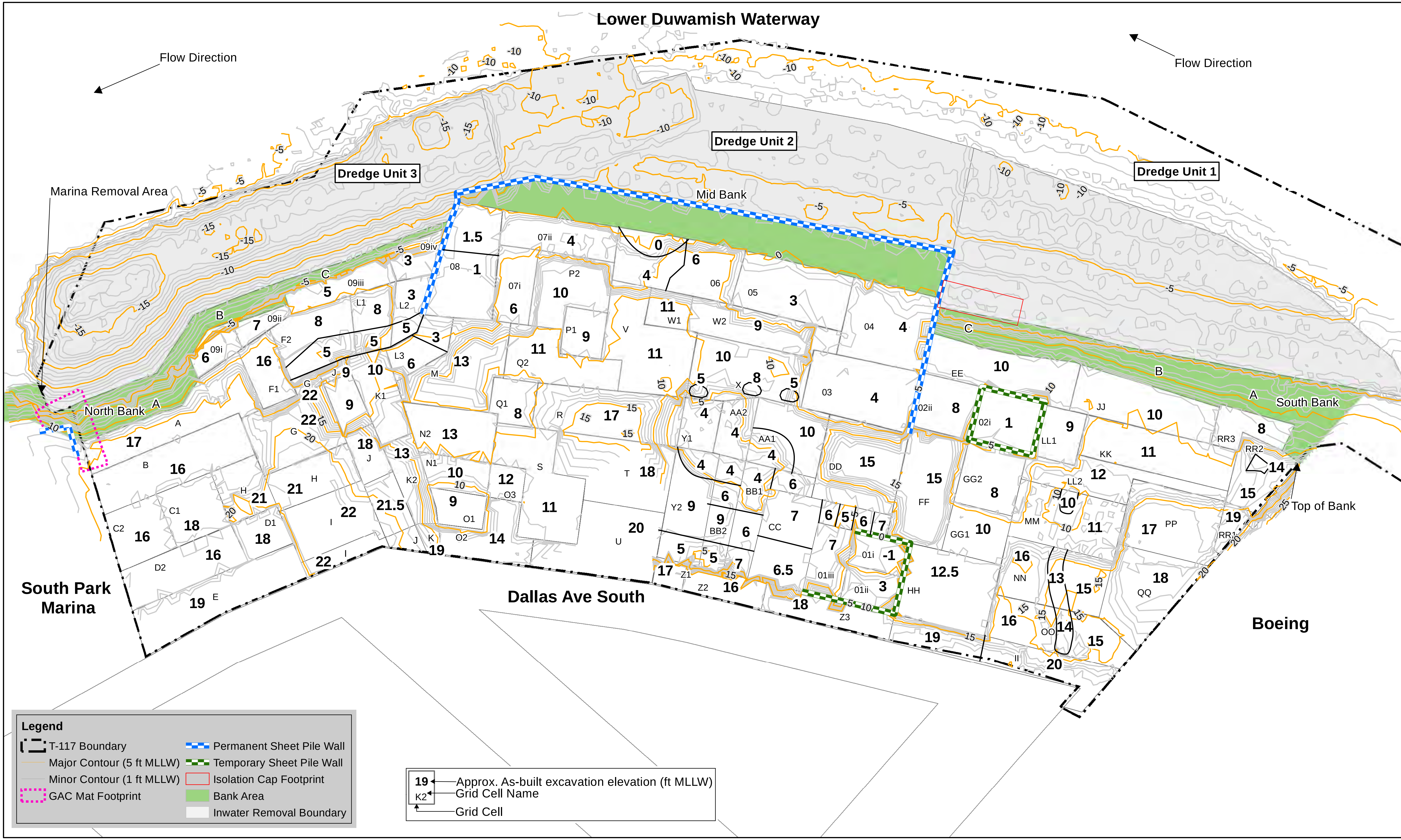
Path: P:\ENV\PROJECTS\WPort of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\RACR\Figure 3 Removal Design.mxd

Notes:
1. Source of Phasing Plan: Removal Action Workplan, by IMCO General Construction, May 28, 2013 and Final Design Report (Crete 2012).
2. Extent of land-based excavation is the toe-of-slope (+2 Ft MLLW).
3. Lettered grid cells need confirmation samples.
4. Numbered grid cells do not need confirmation samples (sampled during pre-construction).

AECOM

0 25 50 100 Feet

T-117 CLEANUP REMOVAL ACTION CONSTRUCTION REPORT			REMOVAL DESIGN	
DATE: 07/05/13	DRWN:mvi/sea	Revision: 1	Project No: 60288925	Figure 3



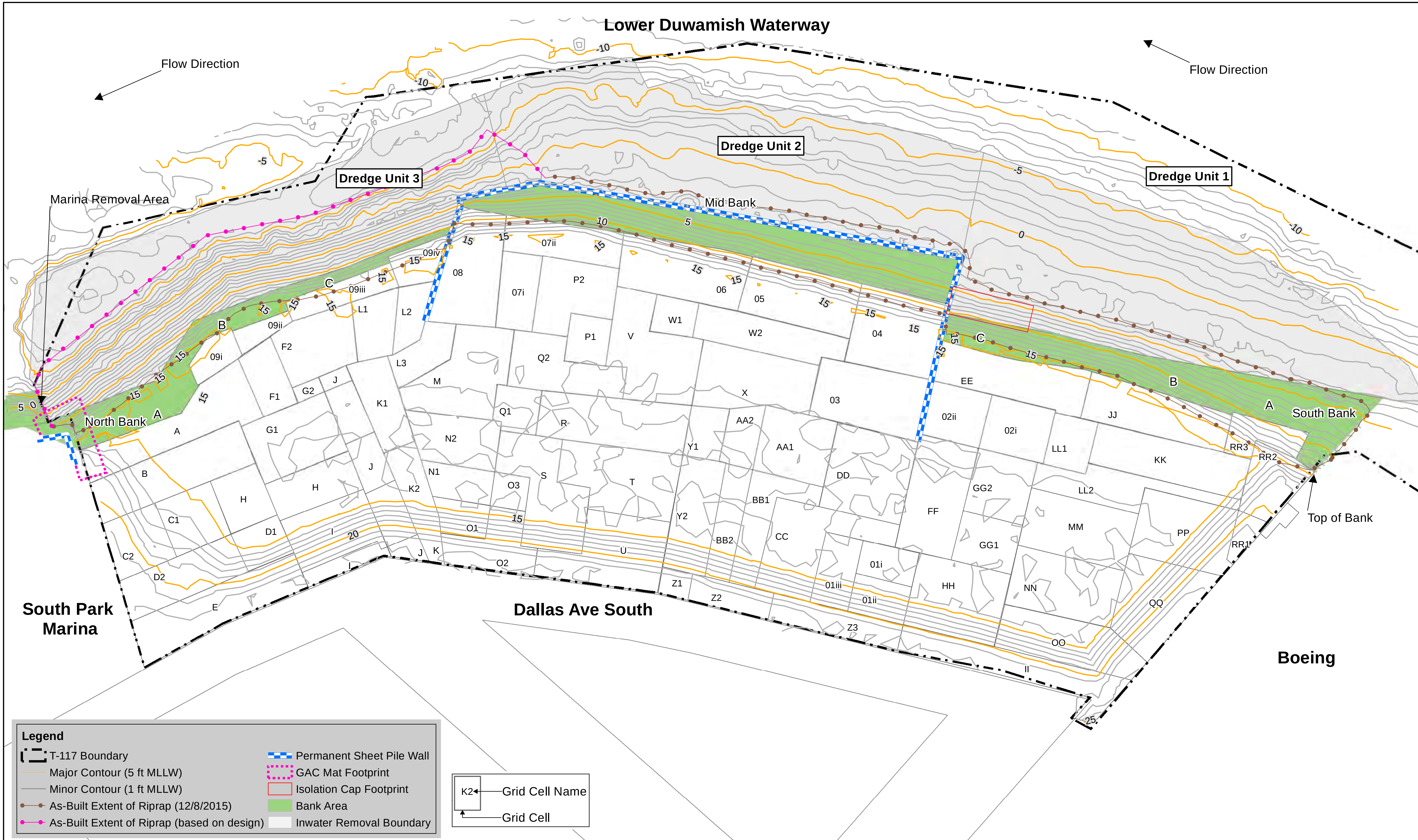
Notes:
1. As-built bottom of excavation/dredge elevations taken from Excavation/Dredging Finished Grade As-Built survey by IMCO dated 2/18/2015. Upland topographic survey data collected by IMCO and True North Land Surveying. In-water bathymetric data collected by eTrac Engineering. Contours shown on 1 foot interval.
2. Upland and inwater surveys merged by IMCO at the +2 ft MLLW elevation.

AECOM

0 25 50 100 Feet

T-117 CLEANUP REMOVAL ACTION CONSTRUCTION REPORT			UPLAND AND IN-WATER REMOVAL GRADE	
DATE: 3/25/2016	DRWN:lmh/sea	Revision: 0	Project No: 60288925	**Figure 4**

Path: P:\ENV\PROJECTS\WPort of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOMMXD\RACR\Figure 4 Upland and In-water Removal Grades.mxd



Path: P:\ENV\PROJECTS\WPort of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\RACR\Figure 5 Final Backfill grade.mxd

Notes:
1. As-built top of backfill elevations taken from Backfill Finished GradeAs-Built Survey by IMCO dated 2/18/2015. Upland topographic survey data collected by IMCO and True North Land Surveying. In-water bathymetric data collected by eTrac Engineering. Riprap included in final grade. Contours shown on 1 foot interval.
2. Upland and inwater surveys merged by IMCO at the +2 ft MLLW elevation.
3. As-Built extent of riprap surveyed by Port of Seattle 12/8/2015.

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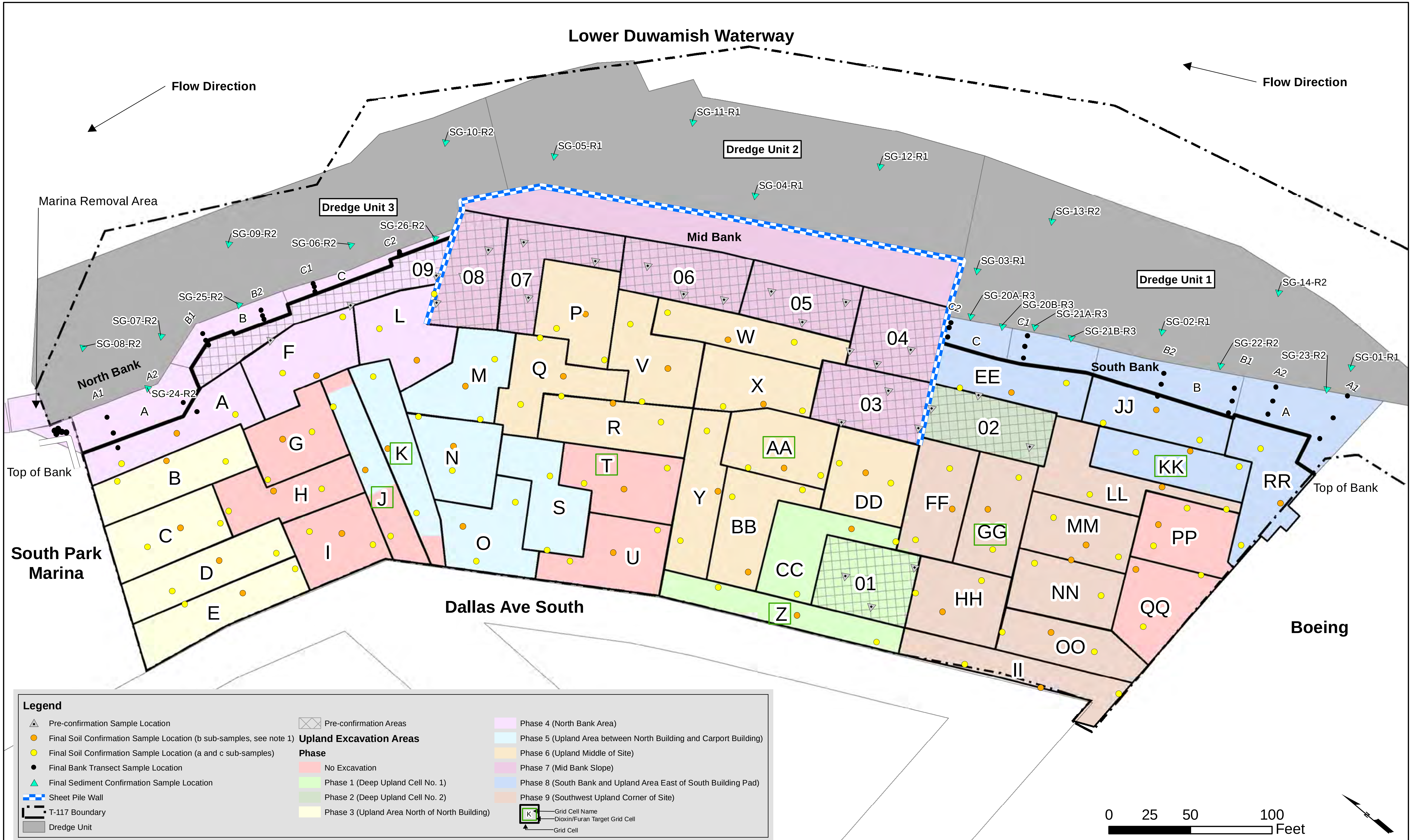
0 25 50 100 Feet

T-117 CLEANUP
REMOVAL ACTION CONSTRUCTION REPORT

FINAL BACKFILL GRADE

DATE: 3/25/2016	DRWN:lmh/sea	Revision: 0	Project No: 60288925	Figure 5



1. Soil confirmation sample locations reported in the project database will be given the coordinate of the b sub-sample location, in accordance with the QAPP.
2. Additional dredging of the bank transitions area (i.e. elevation 0 to 2 ft MLLW) was performed in the area of sediment samples SG-20A and SG-20B after samples were obtained. However, additional sediment samples were not obtained prior to backfilling.

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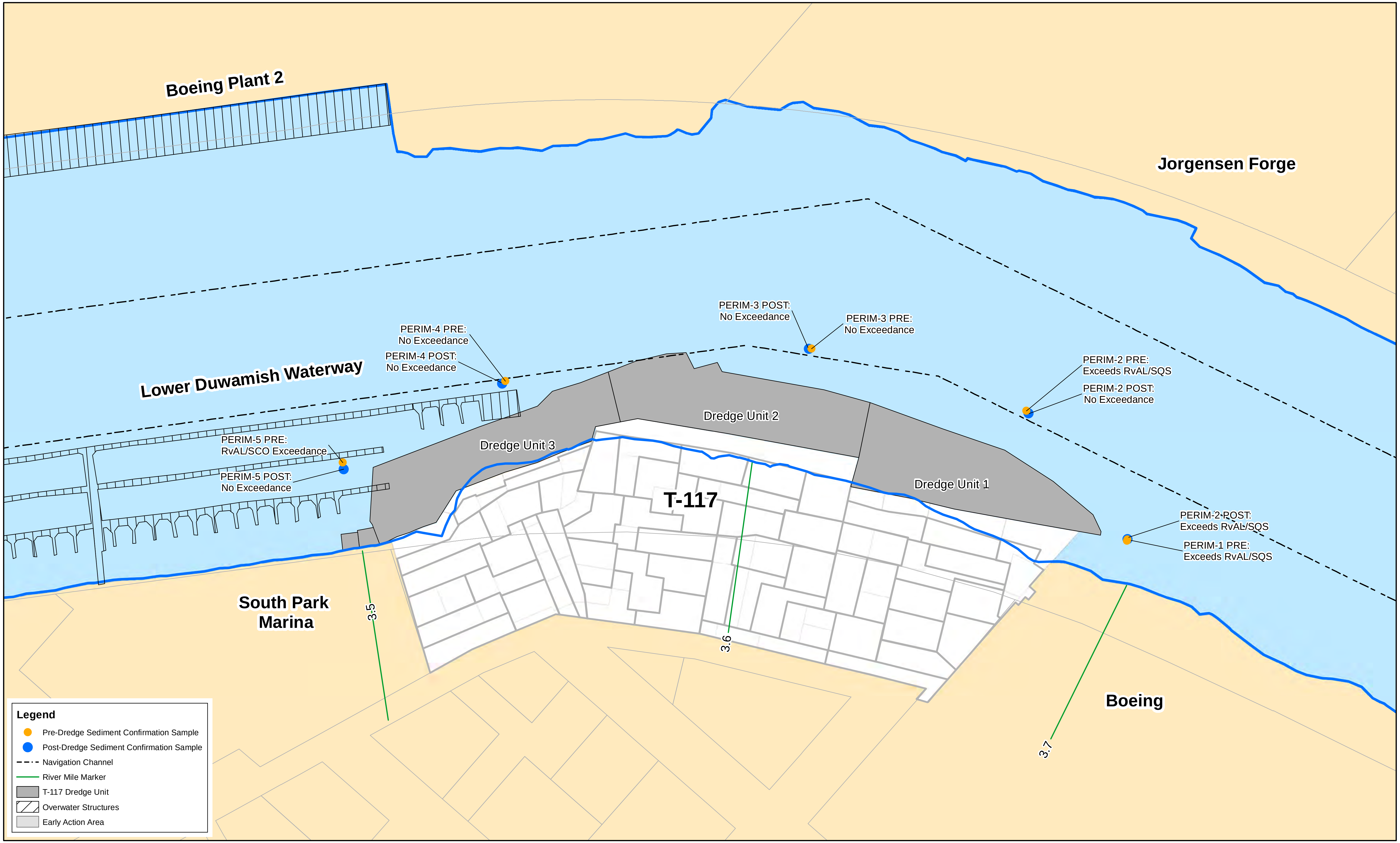
T-117 CLEANUP
REMOVAL ACTION CONSTRUCTION REPORT

FINAL SOIL, BANK, AND SEDIMENT CONFIRMATION SAMPLING LOCATIONS

DATE: 3/25/2016	DRWN:lmh/sea	Revision: 0	Project No: 60288925	Figure 6

Path: P:\ENV\PROJECTS\WPort of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\RACR\Figure 6 Confirmation Sampling LocationsV10.mxd



Path: P:\ENV\PROJECTS\W\Port of Seattle\T-117 Cleanup Oversight\900-CAD-GIS\AECOM\MXD\RACR\Figure 7 Pre_Post Confirmation Sampling.mxd

Notes:
1. Feasibility Study Sediment Sample Locations shown include samples which were removed during dredging.

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T-117 CLEANUP REMOVAL ACTION CONSTRUCTION REPORT			T-117 PRE/POST DREDGE PERIMETER SEDIMENT SAMPLE LOCATIONS	
Date: 3/25/2016	DRWN:lmh/sea	Revision: 0	Project No: 60288925	Figure 7

AECOM
710 Second Avenue, Suite 1000
Seattle, WA 98104

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206.623.3793 fax

Memorandum

To	Roy Kuroiwa, Stacy Heilgeist, Kym Anderson – Port of Seattle	Page	1
CC	Mary Mitchener – City of Seattle; Ben Starr – Integral; Kristin Kerns – USACE; Mike Byers – Crete		
Subject	Terminal 117 – Upland and Sediment NTCRA, Sheen in Seeps Bordering Dredge Unit 3		
From	Noah Garguilo, Anne Fitzpatrick, Winston Chen, Charles Vita – AECOM		
Date	April 7, 2014		

On behalf of the Port of Seattle (Port), this memorandum identifies modifications to the backfill plan in portions of North Bank A and Dredge Unit 3 (DU3) that border the South Park Marina (SPM) at Terminal 117 (T-117). These modifications are proposed to address the presence of sheen, which has periodically been observed in the bank area of DU3, and to reduce the potential for recontamination of the backfill.

The area of interest is located north of the T-117 North Bank A, in the southeast corner of the SPM. At this corner, a temporary sheet pile was installed to provide bank stability during soil and sediment excavation. The sheet pile wall was placed in an “L” shape approximately 18 ft long on both the eastern and southern sides. Ground surface elevation at the SPM is approximately +19 ft mean lower low water (MLLW). The bottom of the excavated ground surface in the North Bank A/DU3 excavation area slopes from about +15 ft MLLW to -16 ft MLLW along an approximately 2H:1V slope. Along the eastern border of the SPM, the grade transitions steeply between the SPM and the extent of excavation (Attachment 1, Photo 1).

1.0 Excavation History

North Bank A was excavated to design grade beginning September 16, 2013 (slope between +2 and +15 ft MLLW). Round 1 bank confirmation sampling indicated exceedances of the removal action levels (RvALs). An additional foot of excavation was performed beginning October 10, 2013, based on Round 1 bank confirmation exceedances. One additional foot of excavation was performed on November 6, 2013, based on Round 2 bank confirmation exceedances. Round 3 confirmation samples were below the RvALs for the T-117 contaminants of concern (COCs) (cPAHs, PCBs, Diesel, and TPH). Excavation was completed across North Bank A except for approximately 15 ft bordering the SPM where slope stabilization was needed before performing further excavation. On December 28, 2013, a utility pole on the SPM corner was relocated, and a temporary steel sheet pile wall was installed on the SPM property.

The corner of North Bank A that borders the SPM was excavated on the nights of January 2 and 3, 2014 (Photo 1). The area was excavated to final grade, and a final topographic survey of the area was performed on February 13, 2014. At times, excavation in North Bank A encountered tar-like material, which was removed when encountered. No sheen was observed on the surface water in North Bank A at

Table 1. Summary of Area Chemistry Data (PCBs and TPH)

Study	Media	Sample	Total PCBs (mg/kg dw or mg/l)	TPH (soil – mg/kg dw, GW – mg/l)		
				GRO	DRO	RRO
Marina Investigation (SAIC *SPM Data Report June 2008)*	Upland Soil (inside disposal pond) [c]	SB-14 (7.5 ft bgs)	11.9 (7 = PCB1254; 4.9 = PCB1260)	350 J	3,000 J	8,900 J
	Upland Soil (outside pond)	SB-13 (7 ft bgs)	13 (13 = PCB1254)	1.6 U	950 J	4,700 J
	Riverbank Soil	Transects A and B (highest conc.)	0.32 (PCB1260)	5.1 U	1,300 J	620 J
	Groundwater	MW-3 (abandoned)	n/a	ND[d]	ND[d]	ND[d]
2014 Marina Bank Samples *(collected March 6 and 17, 2014)*	Surface Water	w/sheen	n/a	ND[d]	ND[d]	Detected[d]
	Riverbank Soil	6-pt composite[b]	5.4 (3.5 = PCB1254; 1.9 = PCB1260)	2 U	520 J	1,500
	Groundwater Seep	Seep	0.000062 (ND = PCB1254; 0.000062= PCB1260)	0.012 U	0.11 J	0.25 U
T-117 Cleanup (on-going)	Soil Confirmation Samples	North Bank A composite (11/1/13)	0.022 (PCB1260)	n/a	14	38
T-117 Cruise and Data Report *(Windward, 2005)*	Intertidal seeps	Three areas on North Bank	--	No sheens observed. PAHs were ND		
Final EE/CA *(Windward, 2010a)*	Groundwater	MW-07 (9/23/10) (abandoned)	---	ND	0.028 J[e]	64 J[e]
LDW RI *(Windward, 2010b)*	Intertidal Seeps	None in vicinity; (closest location 44)	Not sampled	No sheen observed		
	Porewater Samples	None in vicinity	---	---	---	---

Notes:

a The EE/CA contains RvALs for other PAHs and phenol, but they are not shown here because there are no corresponding RALs

b 6-point composite sample of loose F-M sand between +3 to +7 ft MLLW elevation.

c Other analytes were detected in soils from the disposal pond above the MCTA Soil Cleanup Levels including heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, and zinc), pesticides (DDT, aldrin, dieldrin), SVOCs, and VOCs.

d Not detected by NWTPH-HCID in soil at or above 20 mg/kg gas, 50 mg/kg diesel and detected above 250 mg/kg heavy oil. Not detected in water at or above 0.2 mg/L gas, 0.5 mg/L diesel and detected above 0.5 mg/L heavy oil. MW-3 detection limits are similar.

e Compound was not detected in previous samples dating back to 2008 in MW-07. MW-07 is the closest T-117 well to this area. It has since been abandoned and the soil removed.

All results shown in mg/kg dw or mg/L.

n/a = not analyzed; ND = non detect

DRO – Diesel Range Organics; GRO – Gasoline Range Organics; RRO – Residual Range Organics; SVOCs – semi volatile organic compounds; VOCs – volatile organic compounds

Table 2 - Summary of 2014 Marina Bank Soil Sample Results

Location:	Marina Bank		Marina Bank	
Sample ID:	Marina Bank-140306		Marina Bank-140317	
Description:	6-part soil composite collected along lower marina bank		6-part soil composite collected along lower marina bank	
Sample Date:	3/6/2014		3/17/2014	
Approximate Elevation:	+5 ft MLLW		+5 ft MLLW	
Matrix:	Soil		Soil	
Chemical	Conc	Qual	Conc	Qual
TPH (HCID) (mg/kg)				
Gasoline	<20	U	-	
Diesel	<50	U	-	
Heavy Oil	250	J	-	
TPH (NWTPH) (mg/kg)				
Gasoline	-		2.0	U
Diesel	-		520	J
Motor Oil	-		1500	
TPH	-		2000	J
PCBs (mg/kg)				
Aroclor 1221	0.020	U	0.020	U
Aroclor 1232	0.020	U	0.020	U
Aroclor 1016	0.020	U	0.020	U
Aroclor 1242	0.020	U	0.020	U
Aroclor 1248	0.020	U	0.020	U
Aroclor 1254	1.6		3.5	
Aroclor 1260	1.4		1.9	
Total PCBs	3.0		5.4	
Pesticides (mg/kg)**				
4,4´-DDE	-		0.0438	
Total DDTs	-		0.0438	
Aldrin	-		0.345	
Dieldrin	-		0.314	
gamma-Chlordane	-		0.0279	
Herbicides (mg/kg) **				
Metals (mg/kg)				
Cadmium	-		1	U
Chromium	-		24.2	
Lead	-		66.4	
Mercury	-		0.1	U
VOCs (mg/kg)**	-			
Dichloromethane (methylene chloride)	-		0.15	fb
Conventionals (%)				
Total organic carbon (TOC)	-		0.527	
% Moisture			16.0	

Notes:

*** Only detected Pesticides, Herbicides, and VOCs are included in this summary.*

na - not availiable

"-" not analyzed

U - not detected at the reported detection limit

J - estimated concentration

fb - analyte present in the blank and the sample

Table 3 - Summary of 2014 Marina Bank Water Sample Results

Location:	**Marina Bank**		**Marina Bank**	
Sample ID:	**Marina Sheen-140306**		**North Bank Seep-140317****	
Description:	**Sheen from water surface in vicinity of marina bank seep**		**Groundwater seep collected from the North Bank**	
Sample Date:	**3/6/2014**		**3/17/2014**	
Approximate Elevation:	**+2 ft MLLW**		**+7.3 ft MLLW**	
Matrix:	**Surface water**		**Groundwater seep**	
Chemical	Conc	Qual	Conc	Qual
TPH (HCID) (mg/L)				
Gasoline	<0.2	U	-	
Diesel	<0.5	U	-	
Heavy Oil	0.5	J	-	
TPH (NWTPH) (mg/L)				
Gasoline	-		0.012	UJ
Diesel	-		0.11	J
Motor Oil	-		0.25	U
TPH	-		0.11	J
PCBs (µg/L)				
Aroclor 1221	-		0.010	UJ
Aroclor 1232	-		0.010	UJ
Aroclor 1016	-		0.010	UJ
Aroclor 1242	-		0.010	UJ
Aroclor 1248	-		0.010	UJ
Aroclor 1254	-		0.010	UJ
Aroclor 1260	-		0.062	
Total PCBs	-		0.062	
Pesticides (µg/L)***				
Herbicides (µg/L)***				
Metals (dissolved) (µg/L)				
Cadmium	-		1	U
Chromium	-		1.54	
Lead	-		1.02	
Mercury	-		0.1	U
VOCs (µg/L)***	-			
Tetrachloroethene	-		0.22	
Conventionals (mg/L)				
Dissolved organic carbon (DOC)	-		4.47	
Total suspended solids (TSS)	-		68	

Notes:

*** NWTPH, PCBs, pesticides and herbicides were lab-filtered per EPA-approved SAP/QAPP protocols for the Duwamish.*

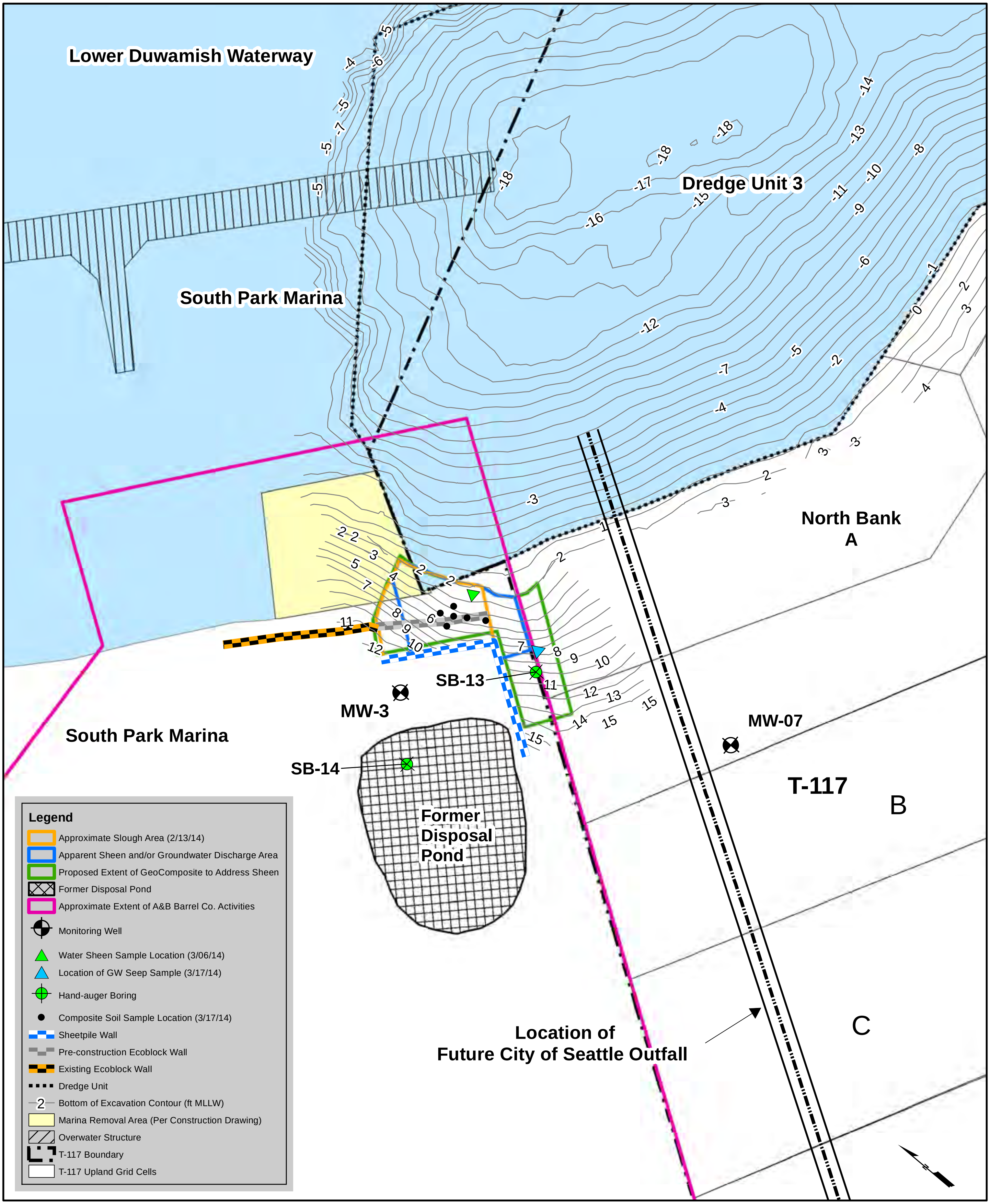
**** Only detected Pesticides, Herbicides, and VOCs are included in this summary.*

"-" not analyzed

U - not detected at the reported detection limit

J - estimated concentration

na - not available



Notes:
1. Upland contours derived from 03/17/14 Port survey.
2. Bathymetric contours generated using E-Trac survey from 3/10/2014.
3. Soil bank composite and groundwater seep sampled 3/17/14.

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0 5 10 20 Feet

T-117 CLEANUP SEDIMENT AND UPLAND AREAS			MARINA BANK CORNER PLAN VIEW	
Date: 4/4/2014	DRWN:mvi/sea	Revision: 2	Project No: 6028925	FIGURE 1

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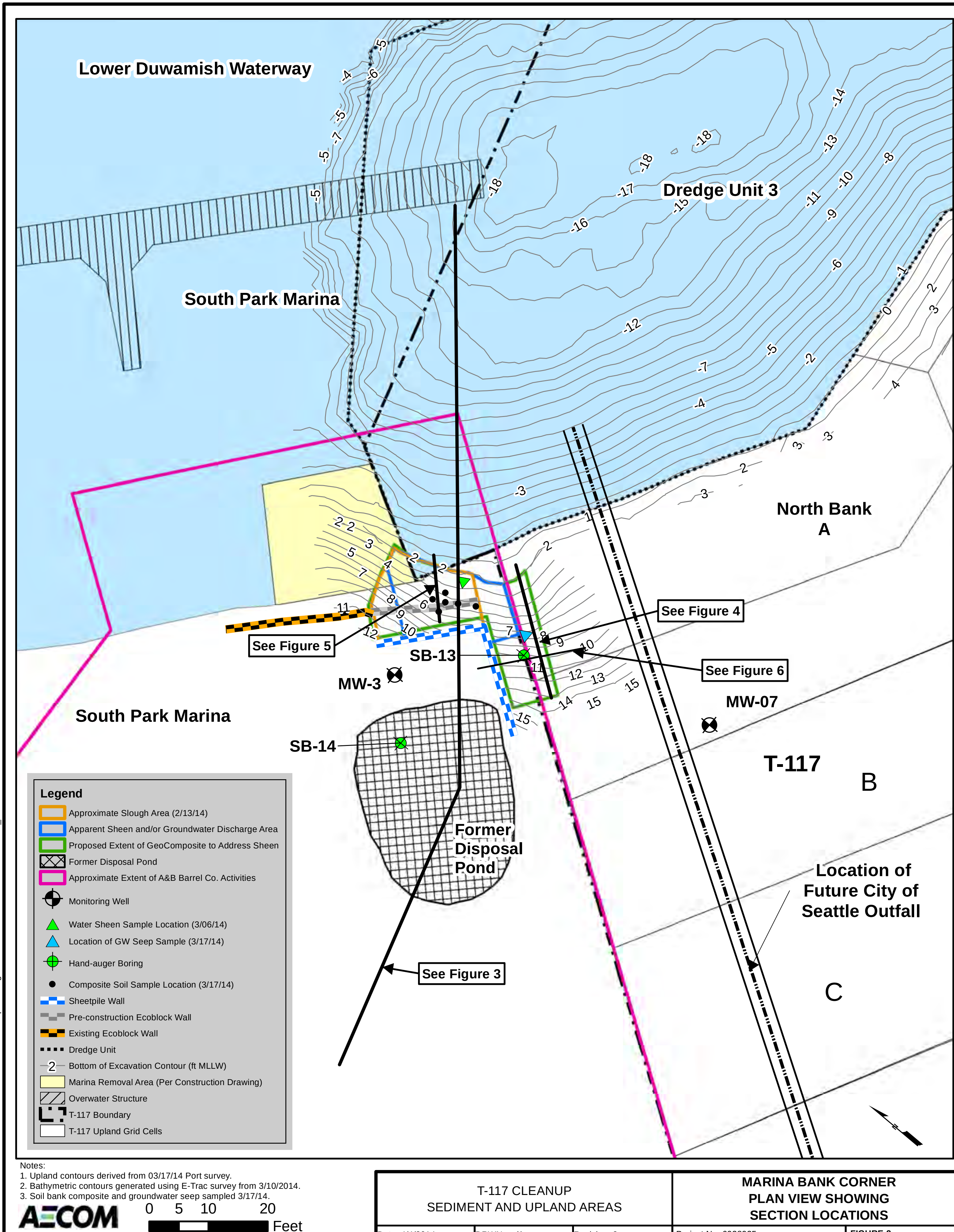

Notes:
1. Upland contours derived from 03/17/14 Port survey.
2. Bathymetric contours generated using E-Trac survey from 3/10/2014.
3. Soil bank composite and groundwater seep sampled 3/17/14.

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T-117 CLEANUP SEDIMENT AND UPLAND AREAS	MARINA BANK CORNER PLAN VIEW SHOWING SECTION LOCATIONS
Date: 4/4/2014 · DRWN:mvi/sea · Revision: 2	Project No: 6028925 · FIGURE 2

AECOM

JOB TITLE T117 - Marina Bank Cross Section

JOB NO. #60288925

ORIGINATOR AGF

REVIEWER

SCALE

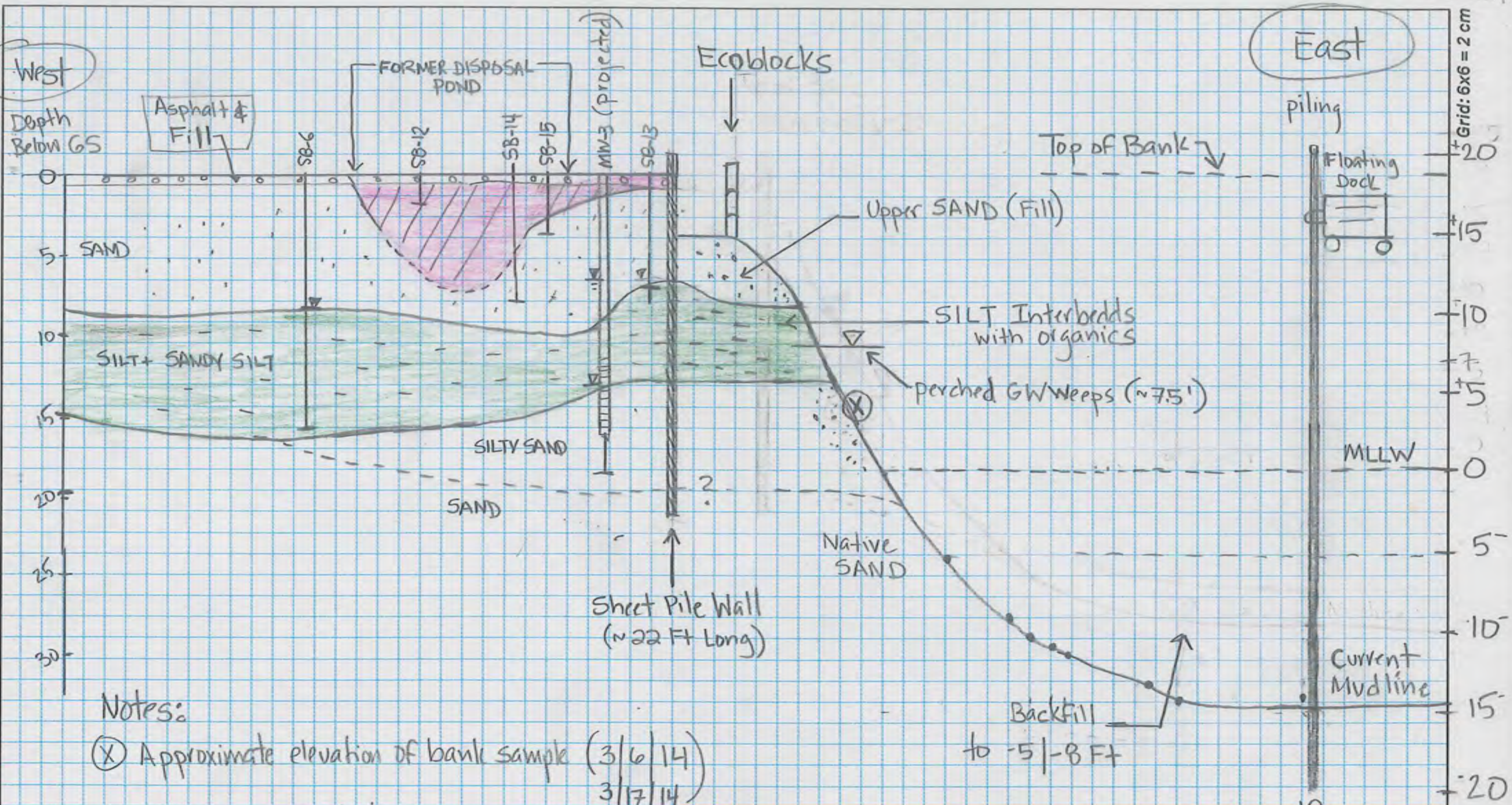
CALCULATION NO.

DATE 3/8/14 Rev 3/11/14 w/ bathy

DATE Rev 3/17/14 sheet pile walls

SHEET NO. OF

MLLW Elevation



Notes:

Ⓧ Approximate elevation of bank sample (3/6/14, 3/17/14)

SB-14: strong solvent/petroleum odor 7-8 Ft bgs (~11 Ft elevation) and did not tag bottom

Vertical 1" = 10'

Horizontal 1" = 20'

Vertical Exaggeration = 2x

Figure 3 Conceptual Cross Section Marina Bank

~Scales are approximately drawn~

Lower Duwamish Waterway Superfund Site
Terminal 117 Early Action Area

REVISED ENGINEERING EVALUATION/COST ANALYSIS

Prepared for:

The Port of Seattle
and
The City of Seattle

For submittal to:

US Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

June 3, 2010

Prepared by:

Windward environmental LLC

integral consulting inc.

AECOM

CRETE CONSULTING, INC.

Dalton, Olmsted & Fuglevand, Inc.

Environmental Consultants

List of Maps

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Map 2-15. T-117 Upland Study Area Subarea B total PCB concentrations in soil

Map 2-16. T-117 Upland Study Area Subarea C total PCB concentrations in soil

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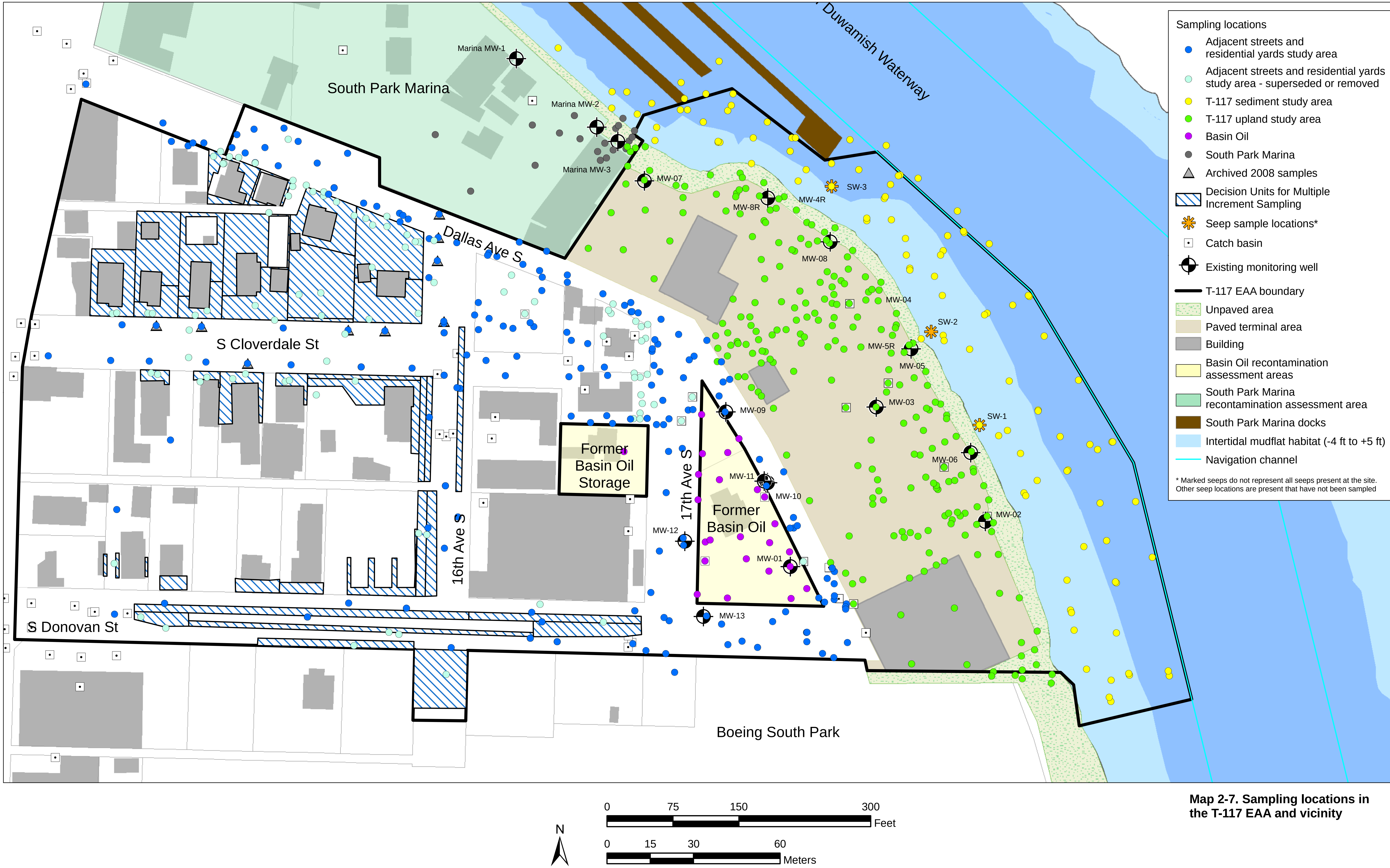
Map 7-1. Proposed NTCRA, excavation for Alternative 1

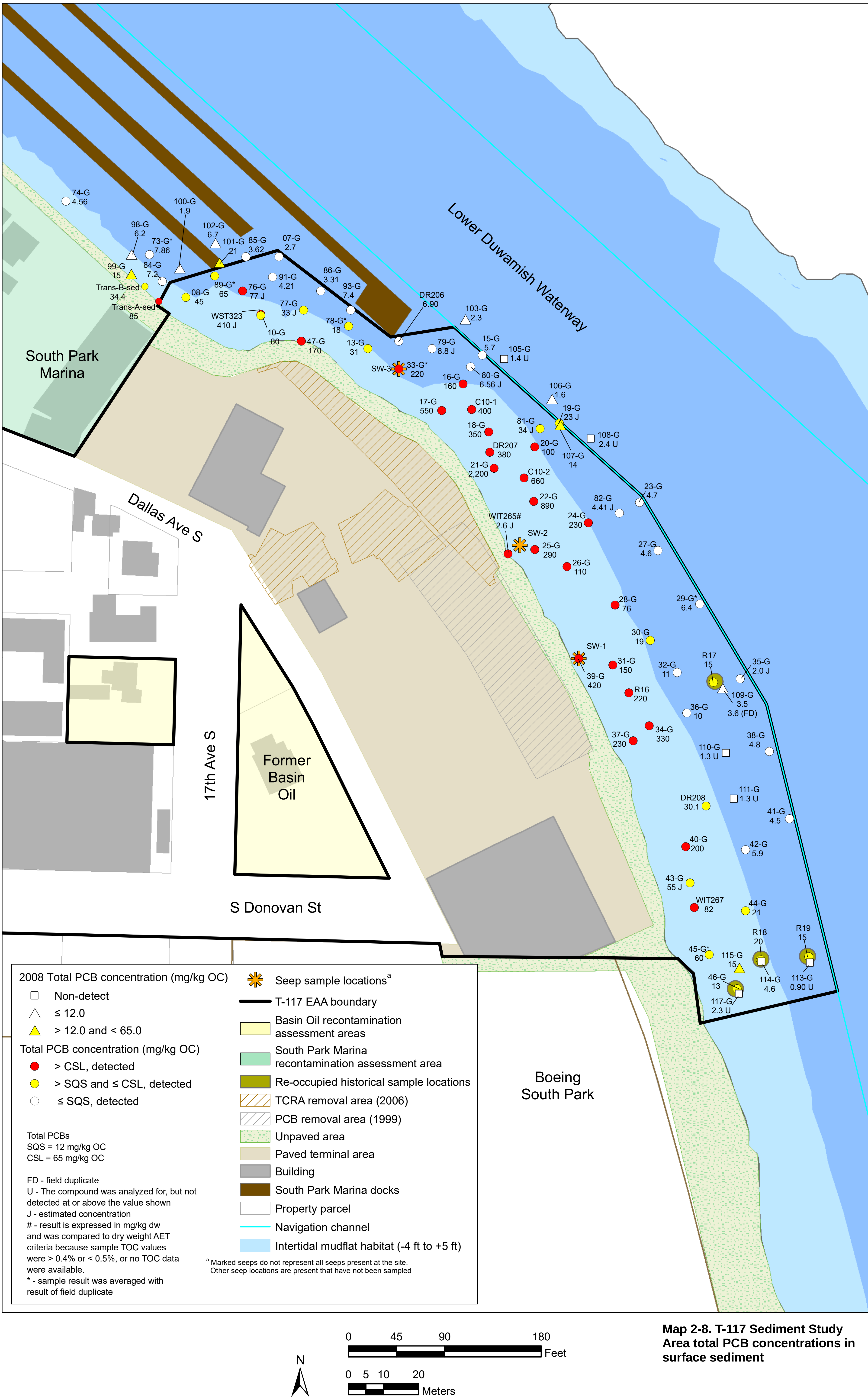
Map 7-2. Proposed NTCRA, excavation for Alternative 2

Map 7-3. Comparison of Alternative 1 and 2 removal areas



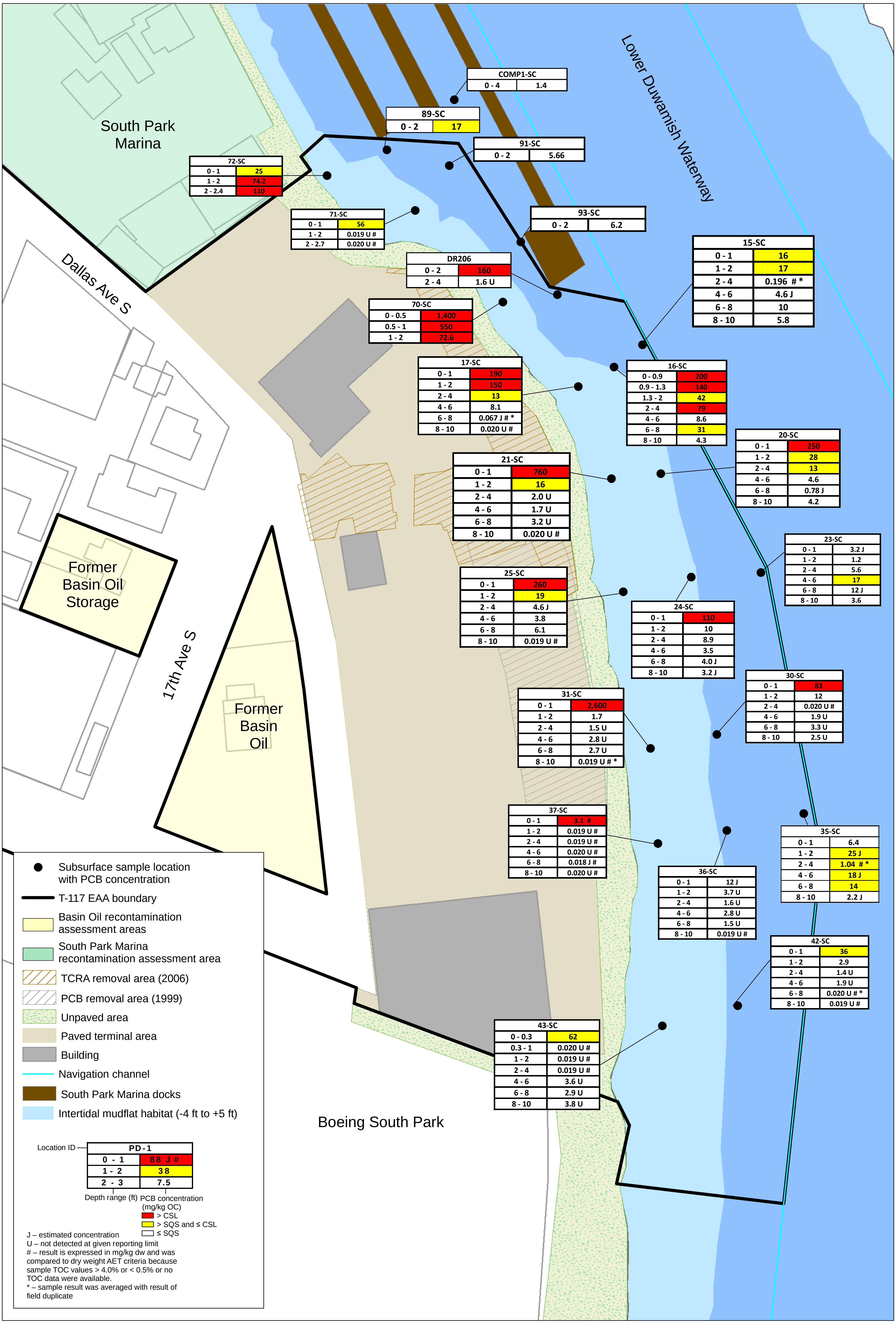
Map 2-7. Sampling locations in the T-117 EAA and vicinity

Prepared by KH 11/29/07, revised 2/20/08 & by MTY 11/23/09, 01/11/10, 03/01/10; Map 3112, W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\2008 EECA



Map 2-8. T-117 Sediment Study Area total PCB concentrations in surface sediment

Prepared by KH 11/27/2007, revised by KH 02/20/2008 & by MTY 11/20/2009; Map 3108, W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\2008 EECA



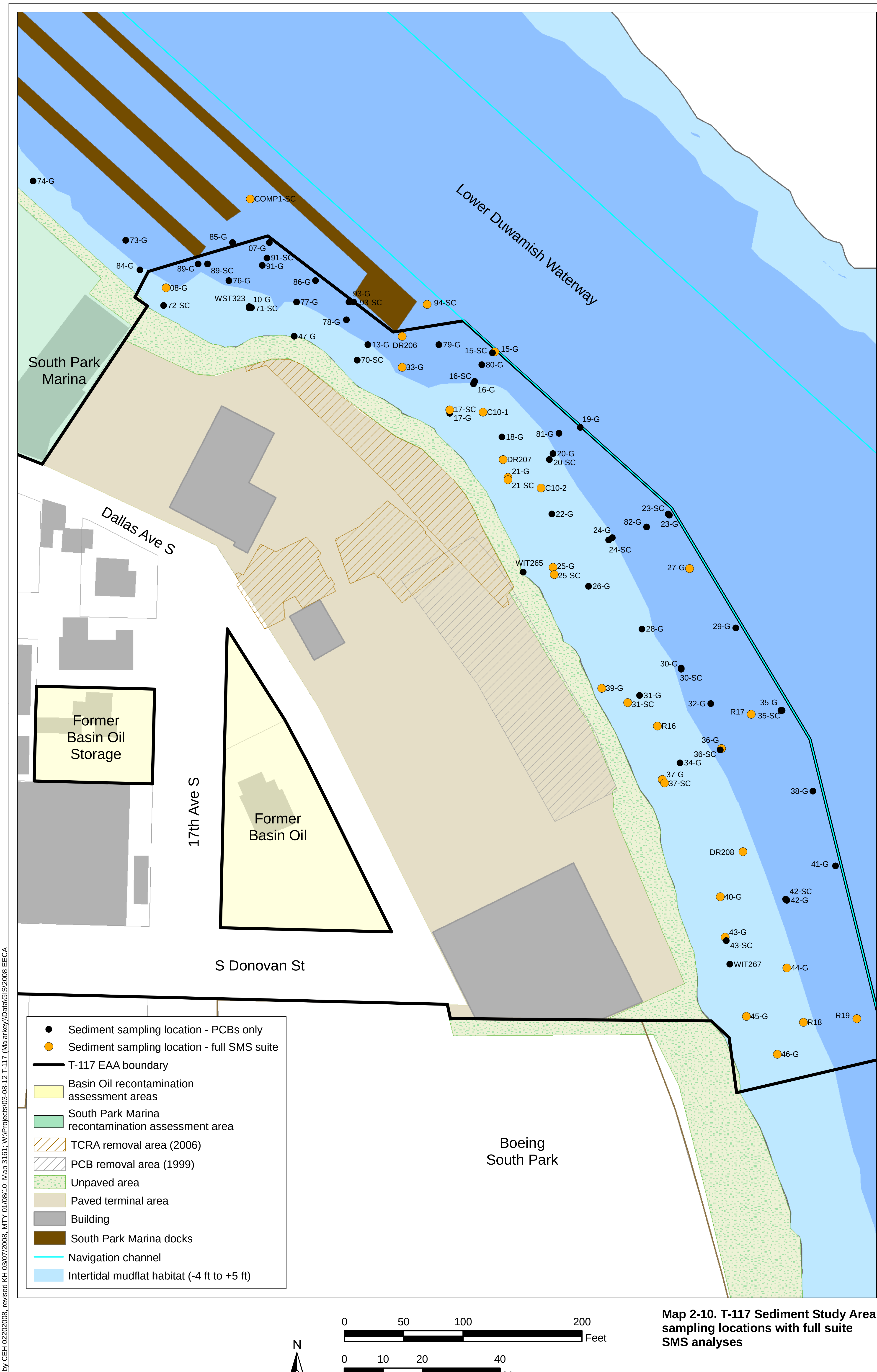
0 50 100 200 Feet

0 10 20 40 Meters

N

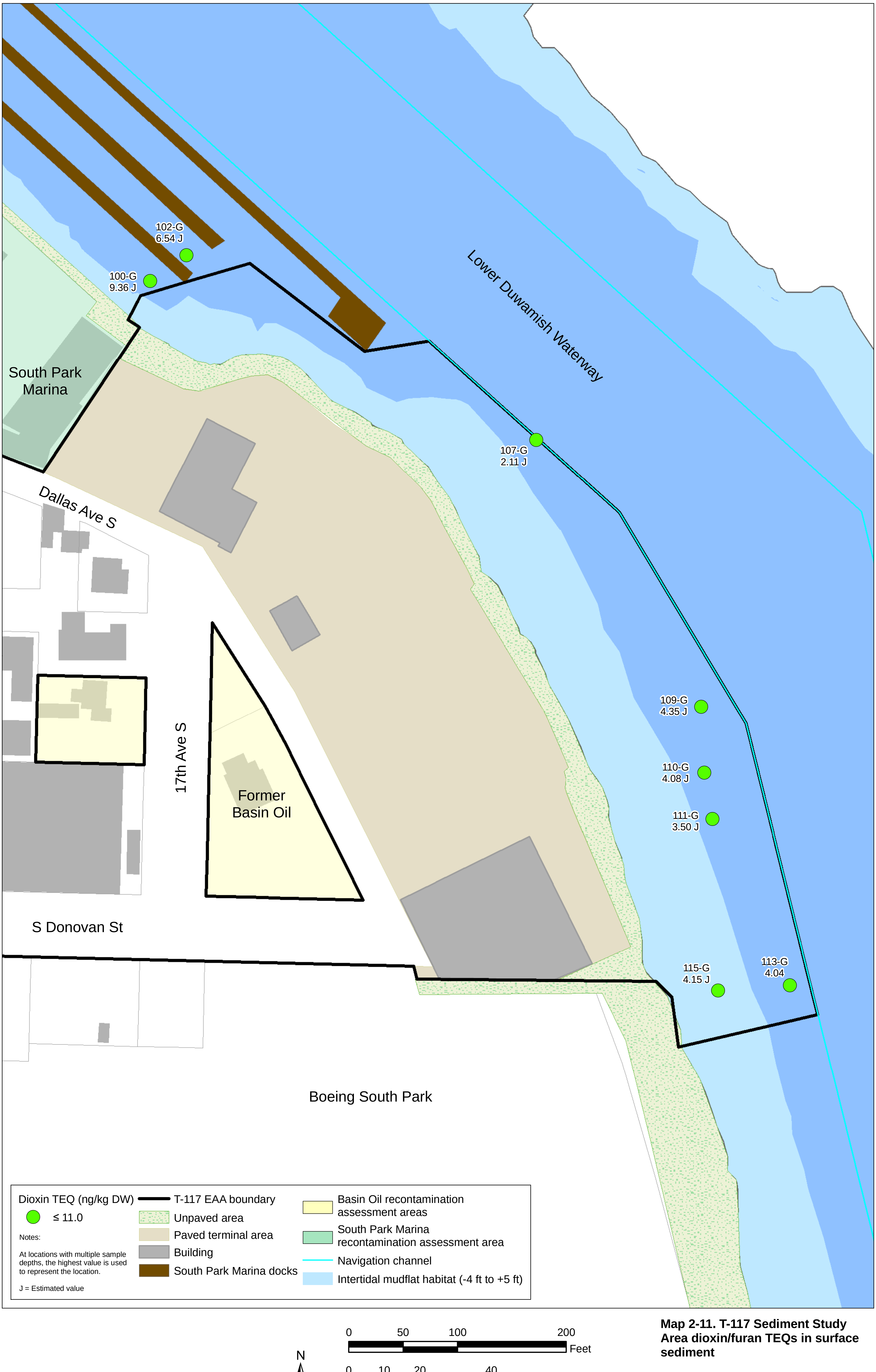
Map 2-9. T-117 Sediment Study Area total PCB concentrations in subsurface sediment

Prepared by CEH 11/26/07, revised by KH 02/15/2008, CEH 02/20/2008, MTY 01/07/2010; Map 3109, W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\2008 EECA



Map 2-10. T-117 Sediment Study Area sampling locations with full suite SMS analyses

Prepared by CEH 02202008, revised KH 03/07/2008, MTY 01/08/10; Map 3161; W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\2008 EECA



Map 2-11. T-117 Sediment Study Area dioxin/furan TEQs in surface sediment

Prepared by MTY 08/03/09; Map 3912; W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\EECA\EECA_2009

Map 2-12. T-117 Upland Study Area sampling subareas

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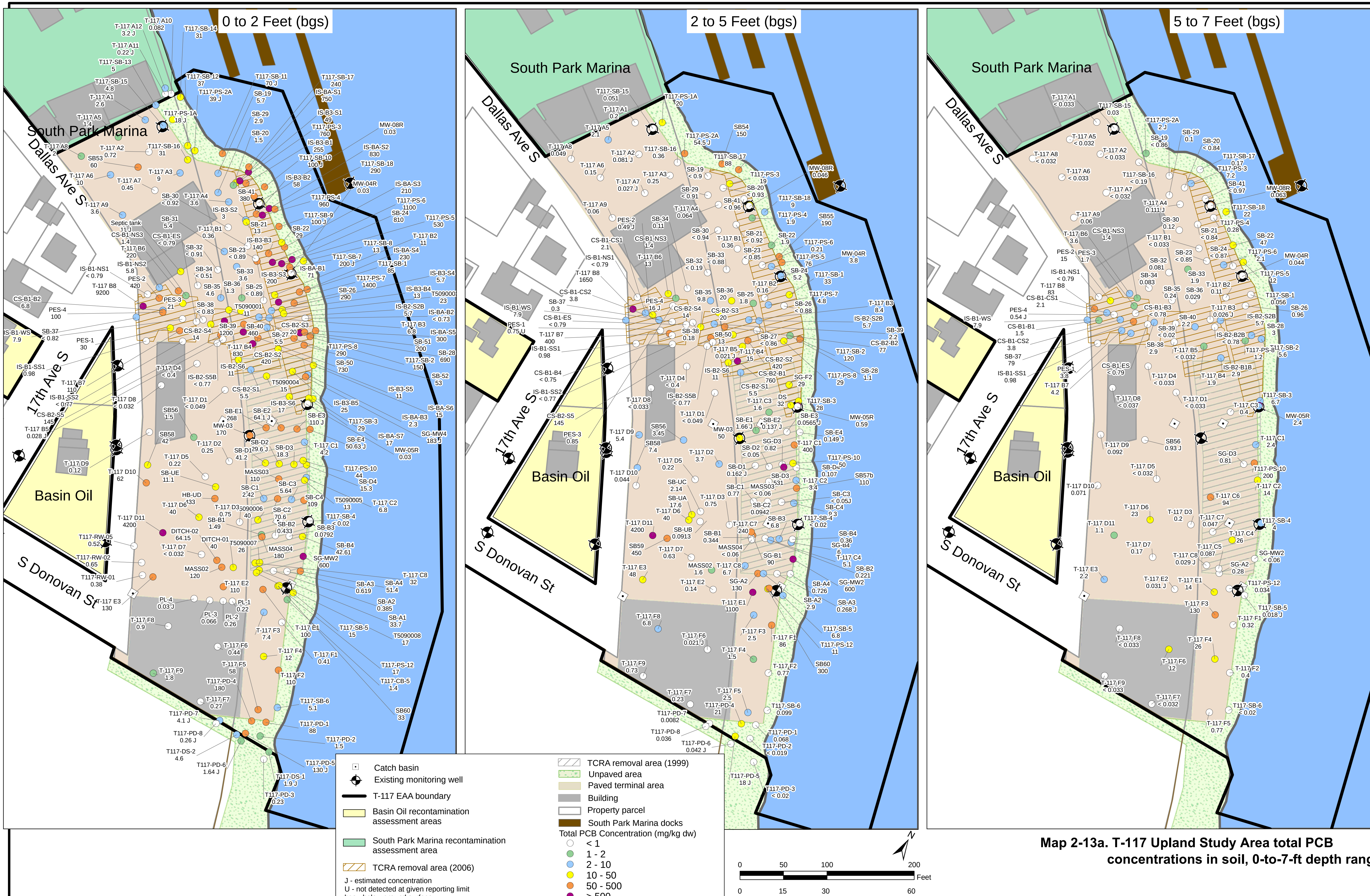

Map 2-13a. T-117 Upland Study Area total PCB concentrations in soil, 0-to-7-ft depth range

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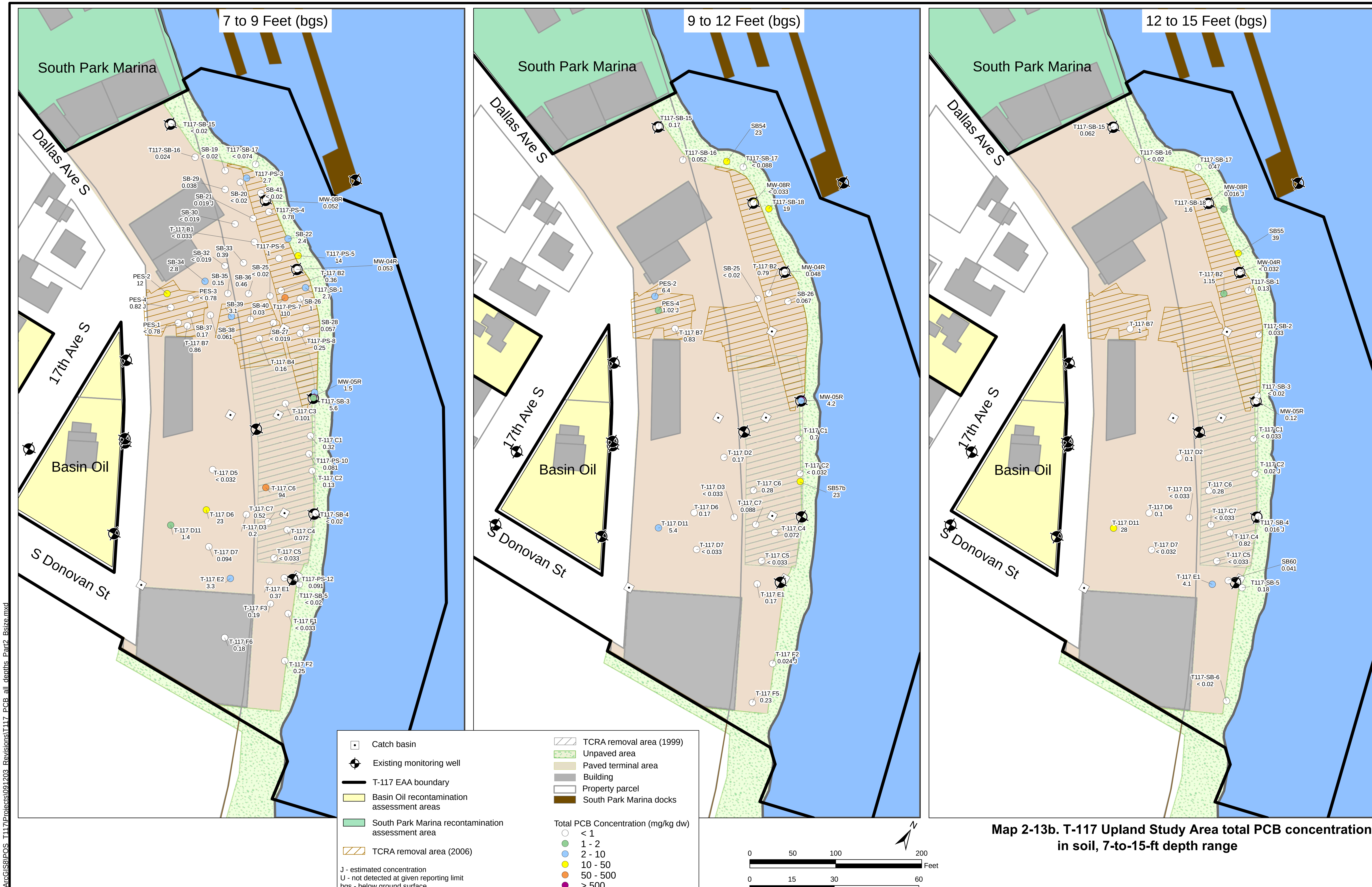

Map 2-13b. T-117 Upland Study Area total PCB concentrations in soil, 7-to-15-ft depth range

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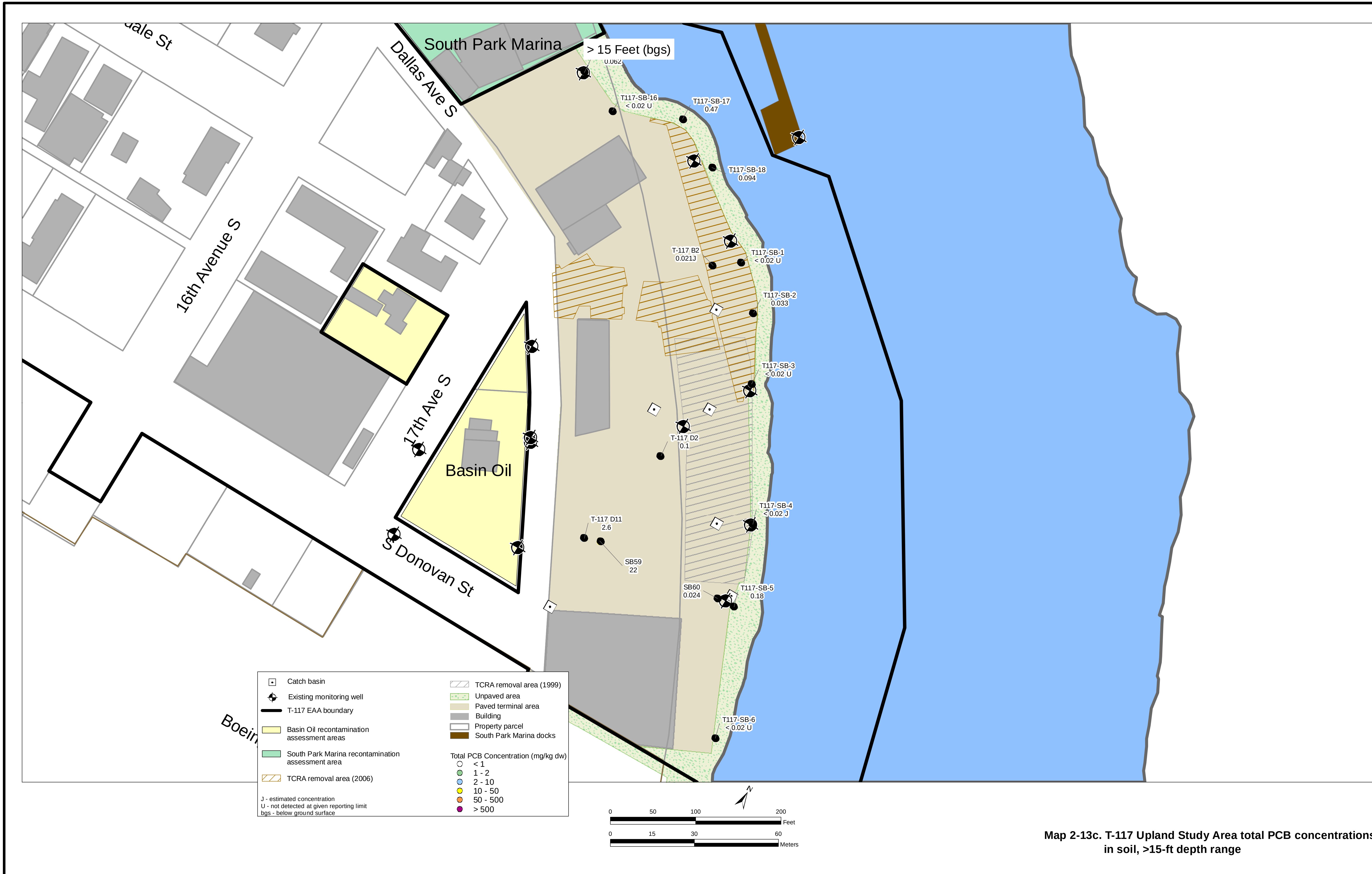
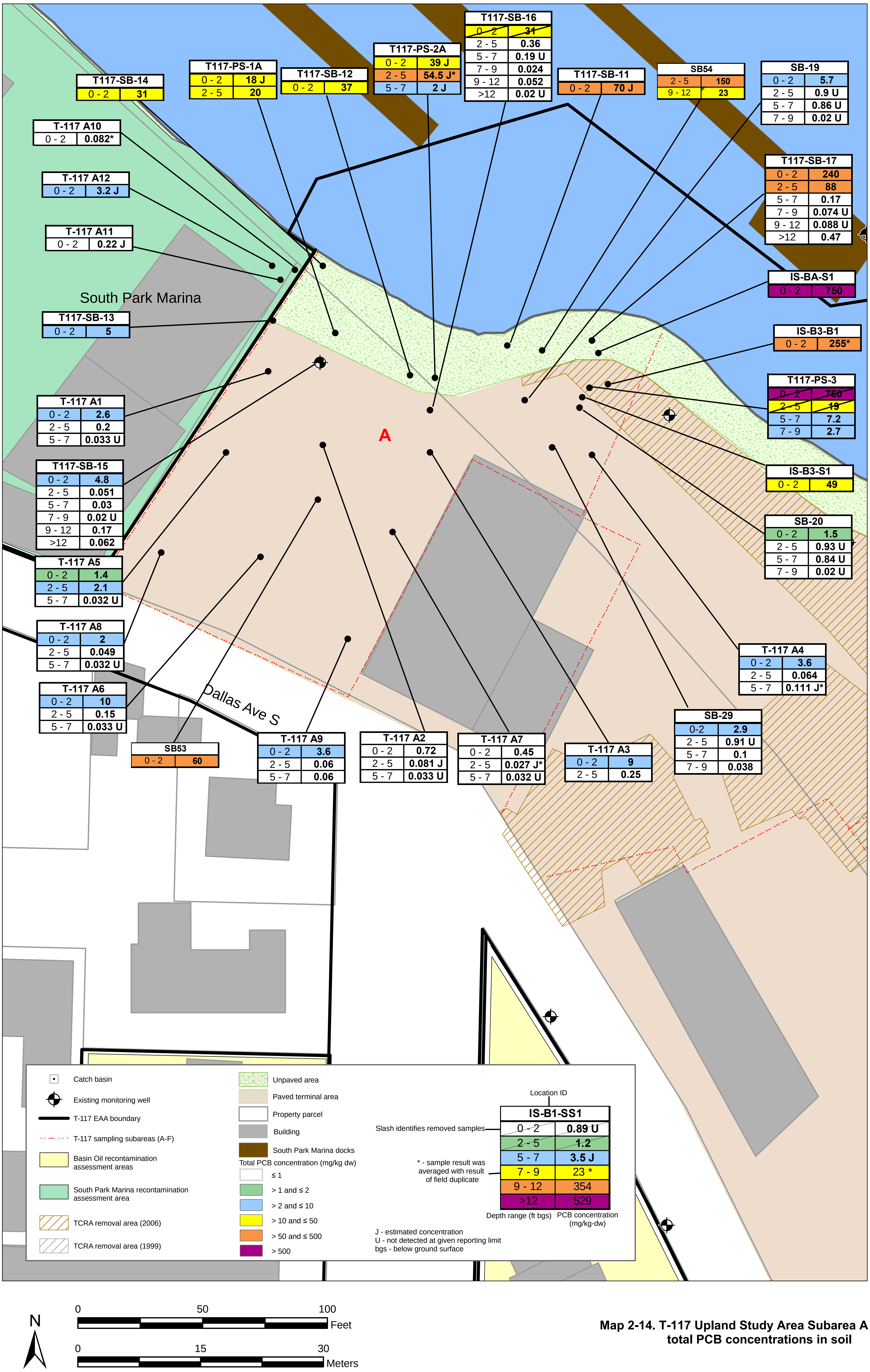


Map 2-13c. T-117 Upland Study Area total PCB concentrations in soil, >15-ft depth range



Map 2-14. T-117 Upland Study Area Subarea A total PCB concentrations in soil

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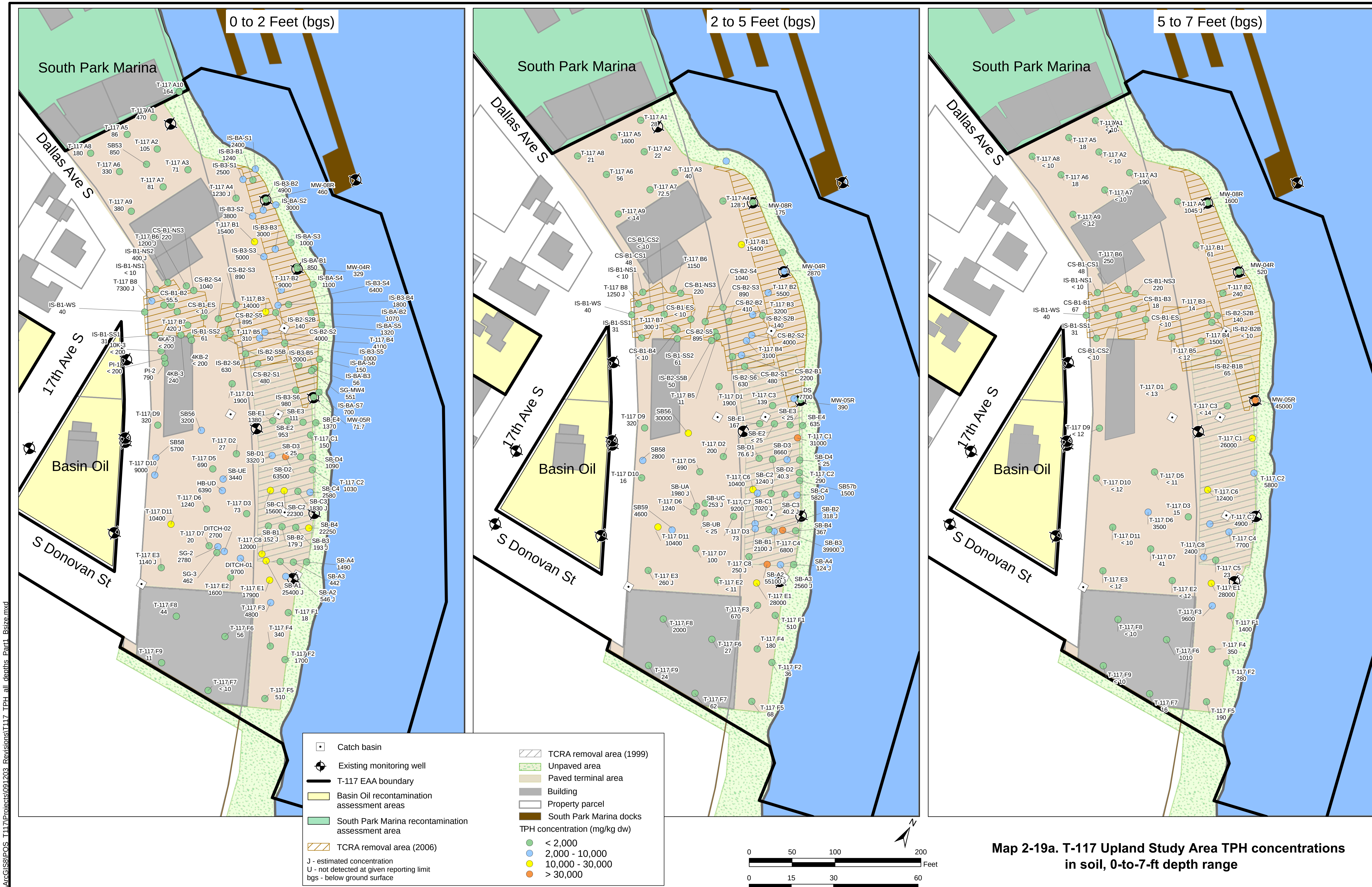

Map 2-19a. T-117 Upland Study Area TPH concentrations in soil, 0-to-7-ft depth range

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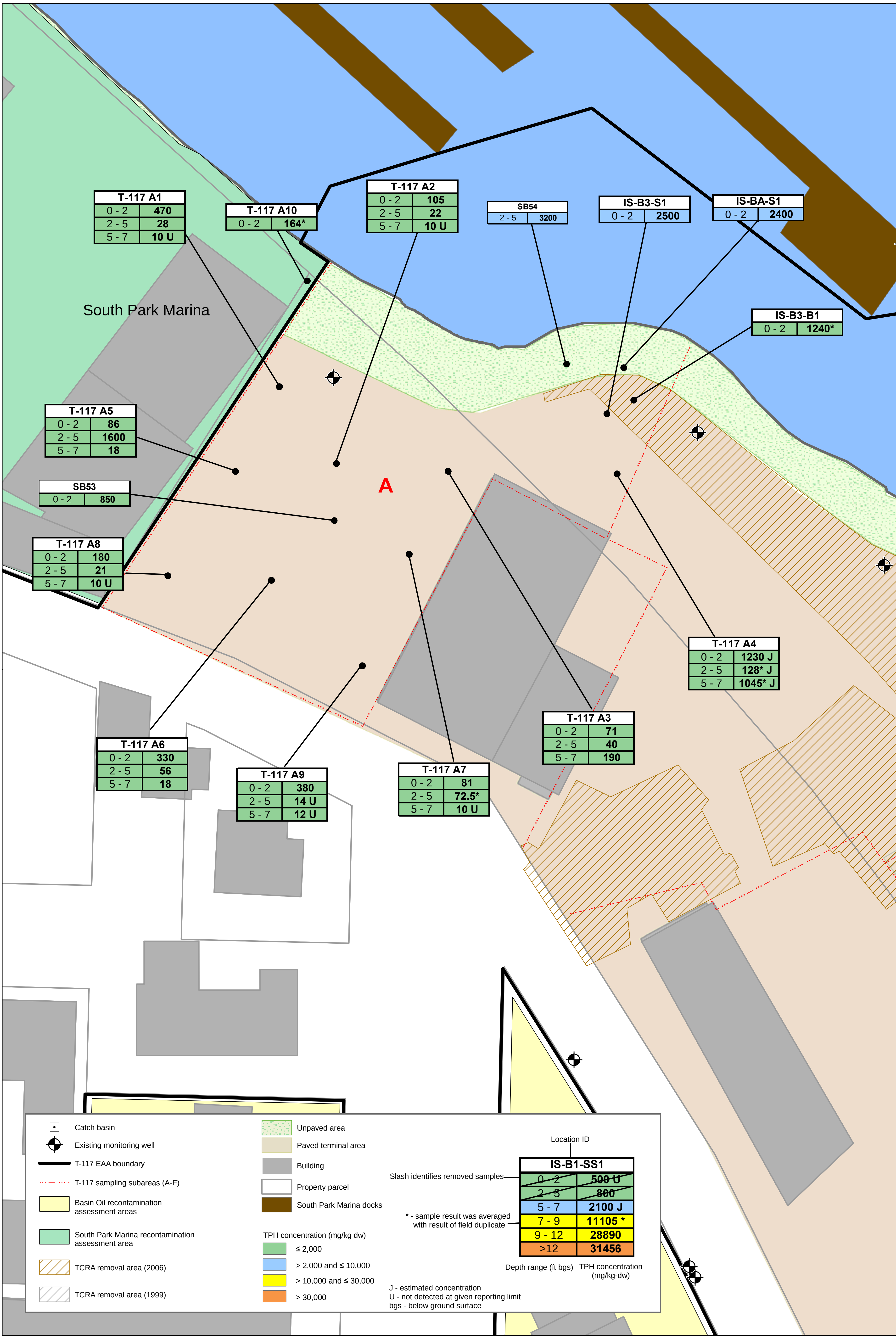
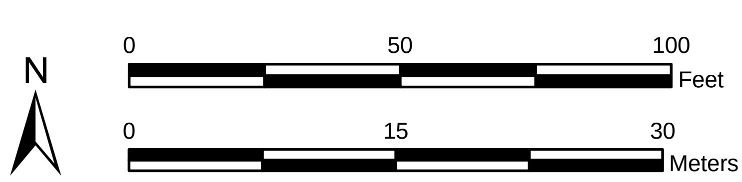
Map 2-19b. T-117 Upland Study Area TPH concentrations in soil, 7-to-15-ft depth range

Map 2-19c. T-117 Upland Study Area total TPH concentrations in soil, >15-ft depth range

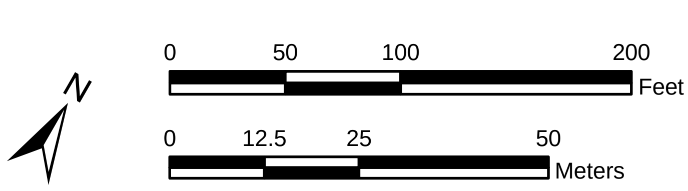
I:\ArcGIS\POS_T117\Projects\091203_Revisions\T117_TPH_all_depths_Part3_11x17.mxd





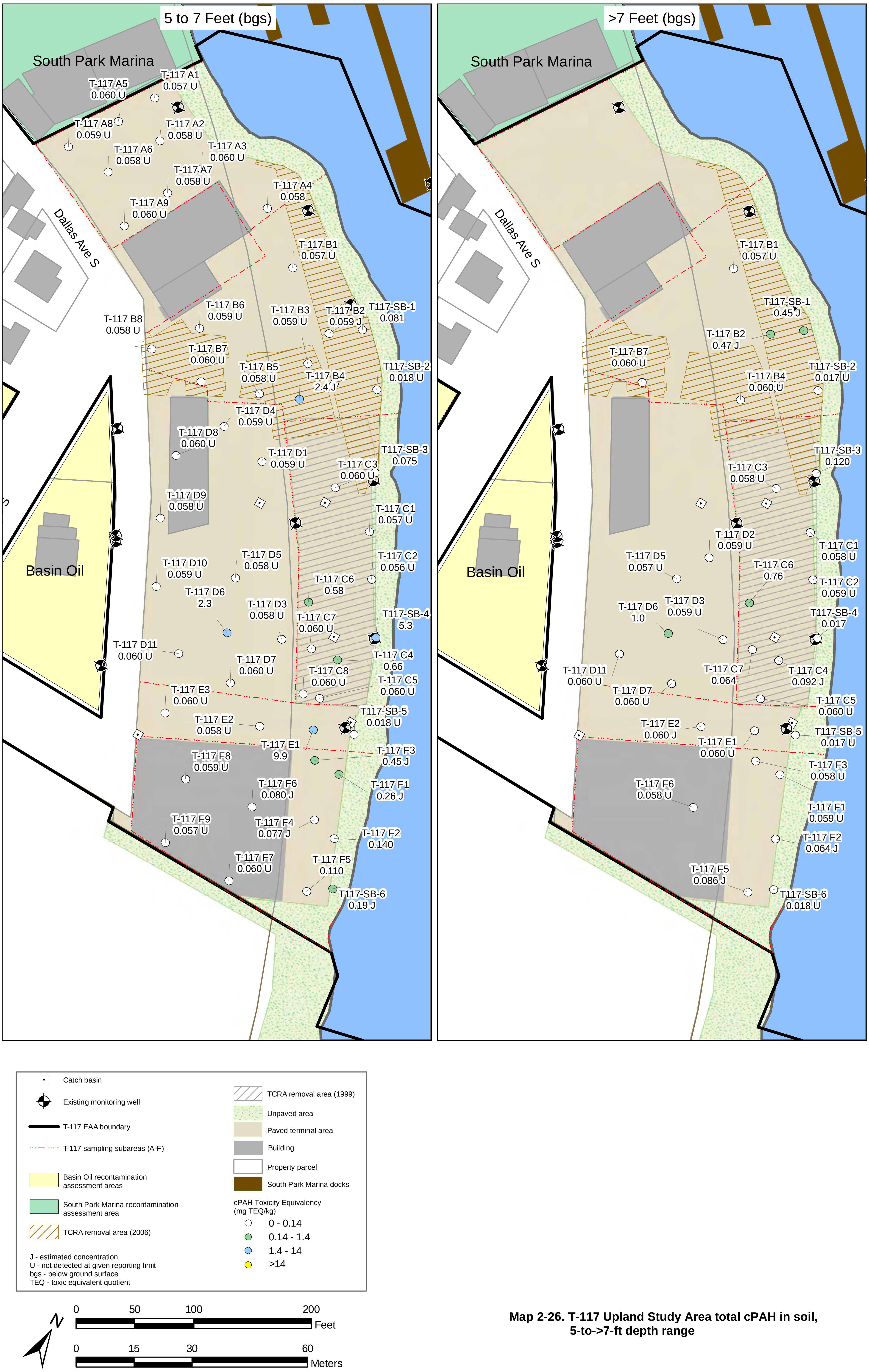
Map 2-20. T-117 Upland Study Area subarea A TPH concentrations in soil

L:\ArcGIS\BPOS_T117\Projects\091203_Revisions\T117_TPH_XL_A1.mxd



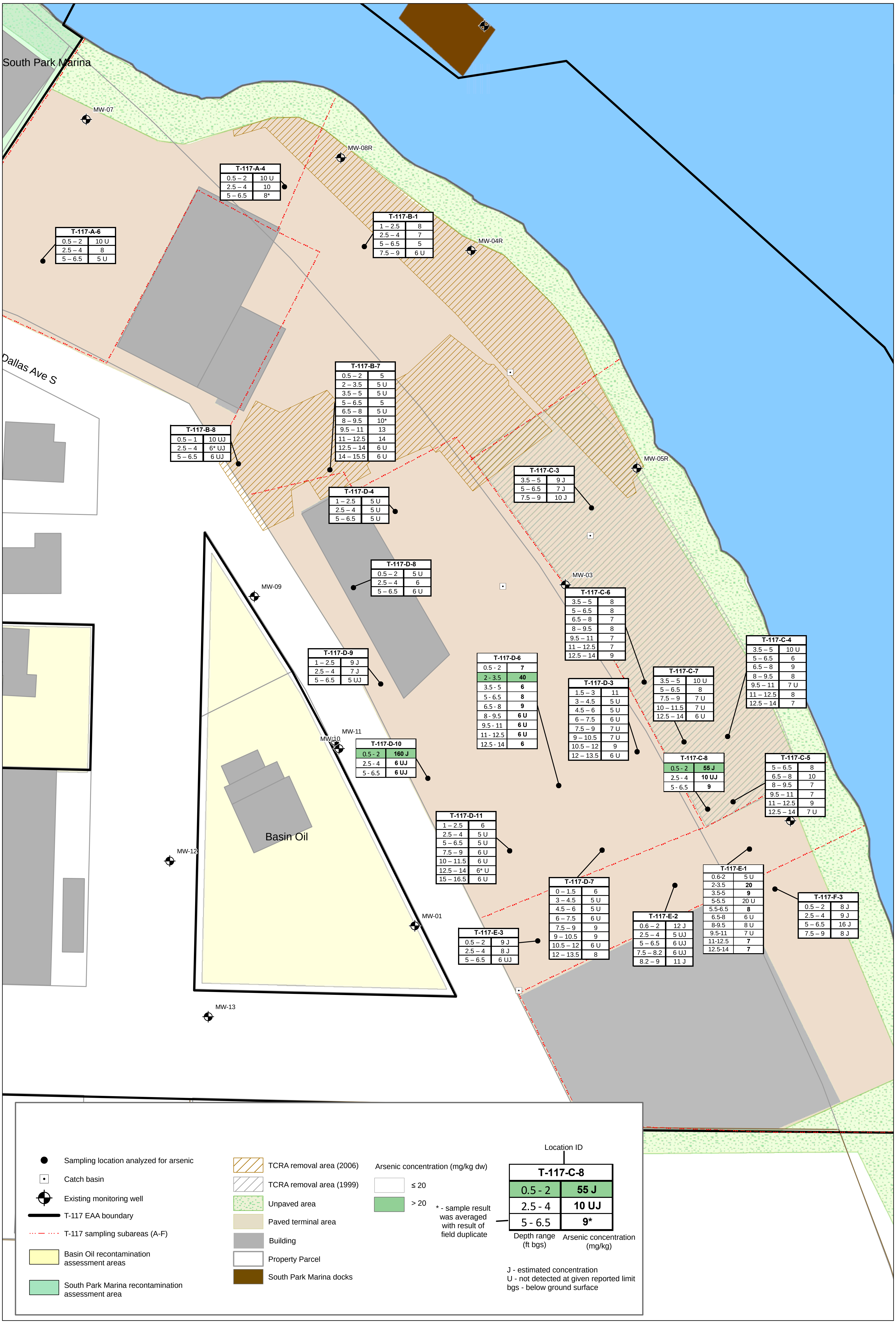
Map 2-25. T-117 Upland Study Area total cPAH in soil, 0-to-4-ft depth range

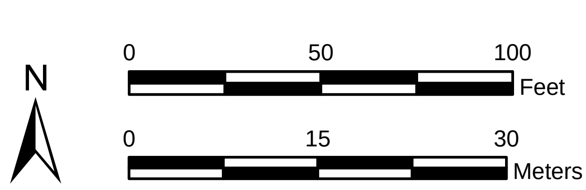
L:\ArcGIS\POS_T117\Projects\091203_Revisions\T117_cPAH_all_depths_Part1_Bsize.mxd



Map 2-26. T-117 Upland Study Area total cPAH in soil, 5-to->7-ft depth range

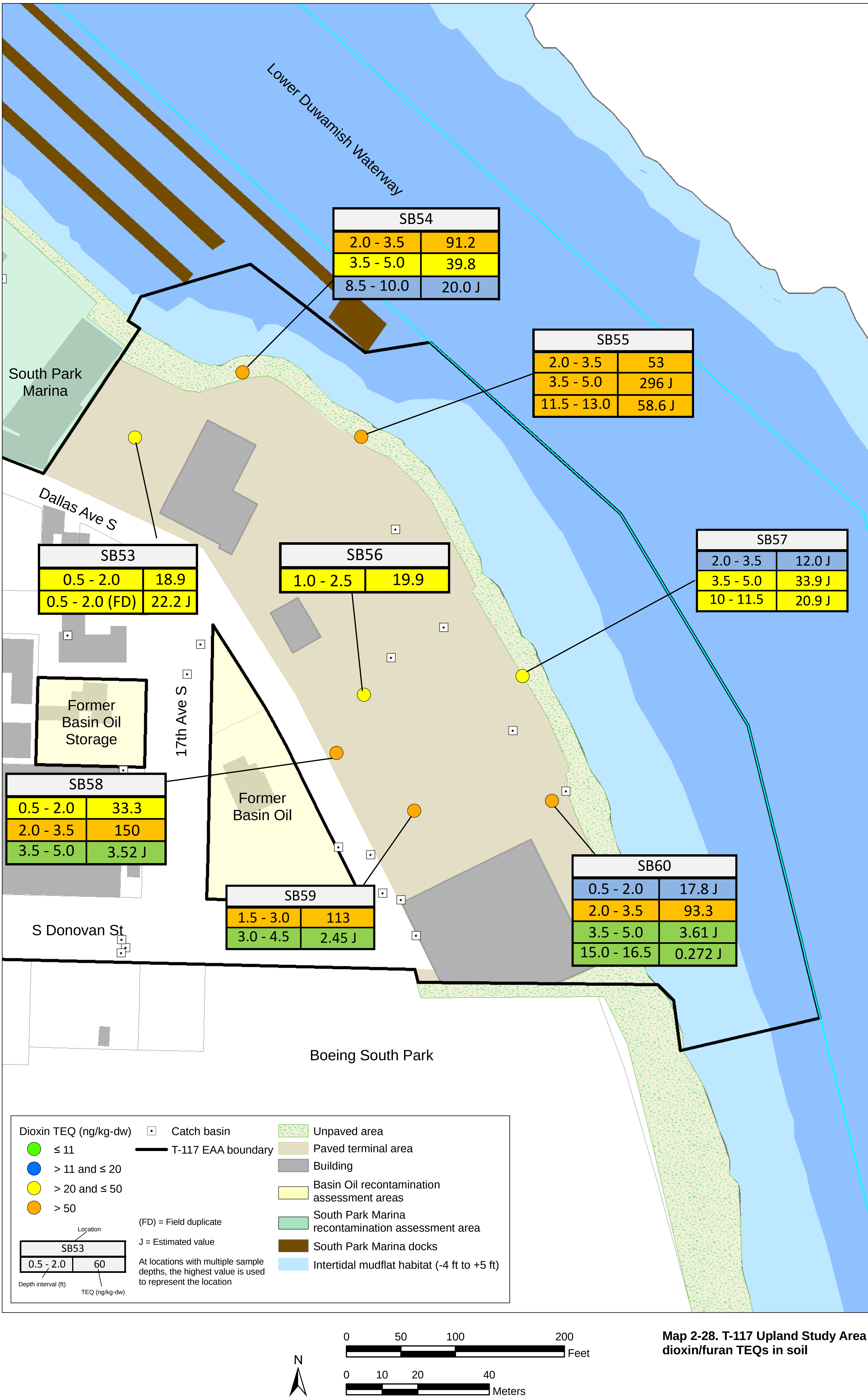
L:\ArcGIS\POS_T117\Projects\091203_Revisions\T117_cPAH_all_depths_Part2_Bsize.mxd





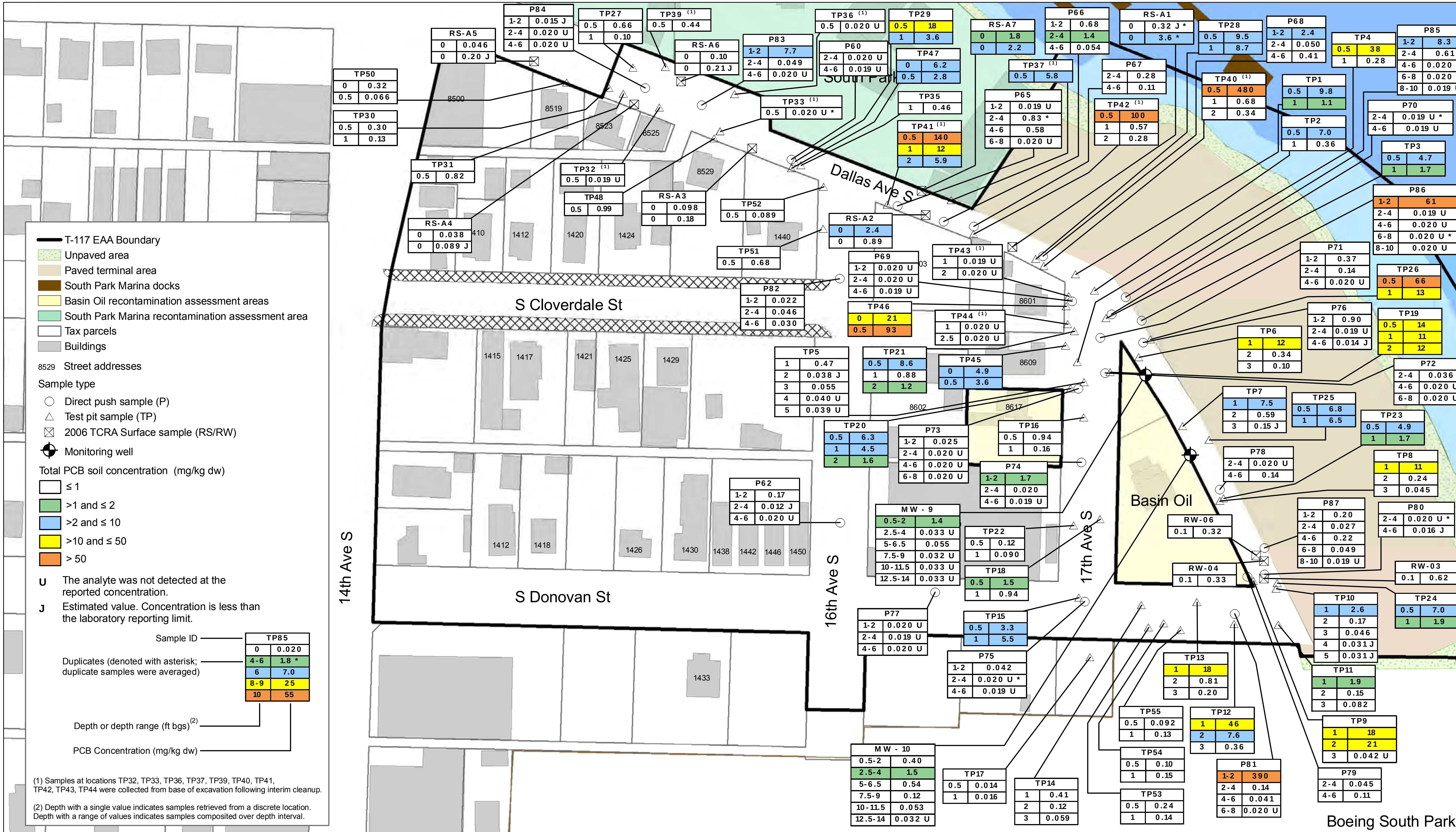
Map 2-27. T-117 Upland Study Area arsenic concentrations in soil

L:\ArcGIS\POS_T117\Projects\091203_Revisions\T117_As_all_depths.mxd



Map 2-28. T-117 Upland Study Area dioxin/furan TEQs in soil

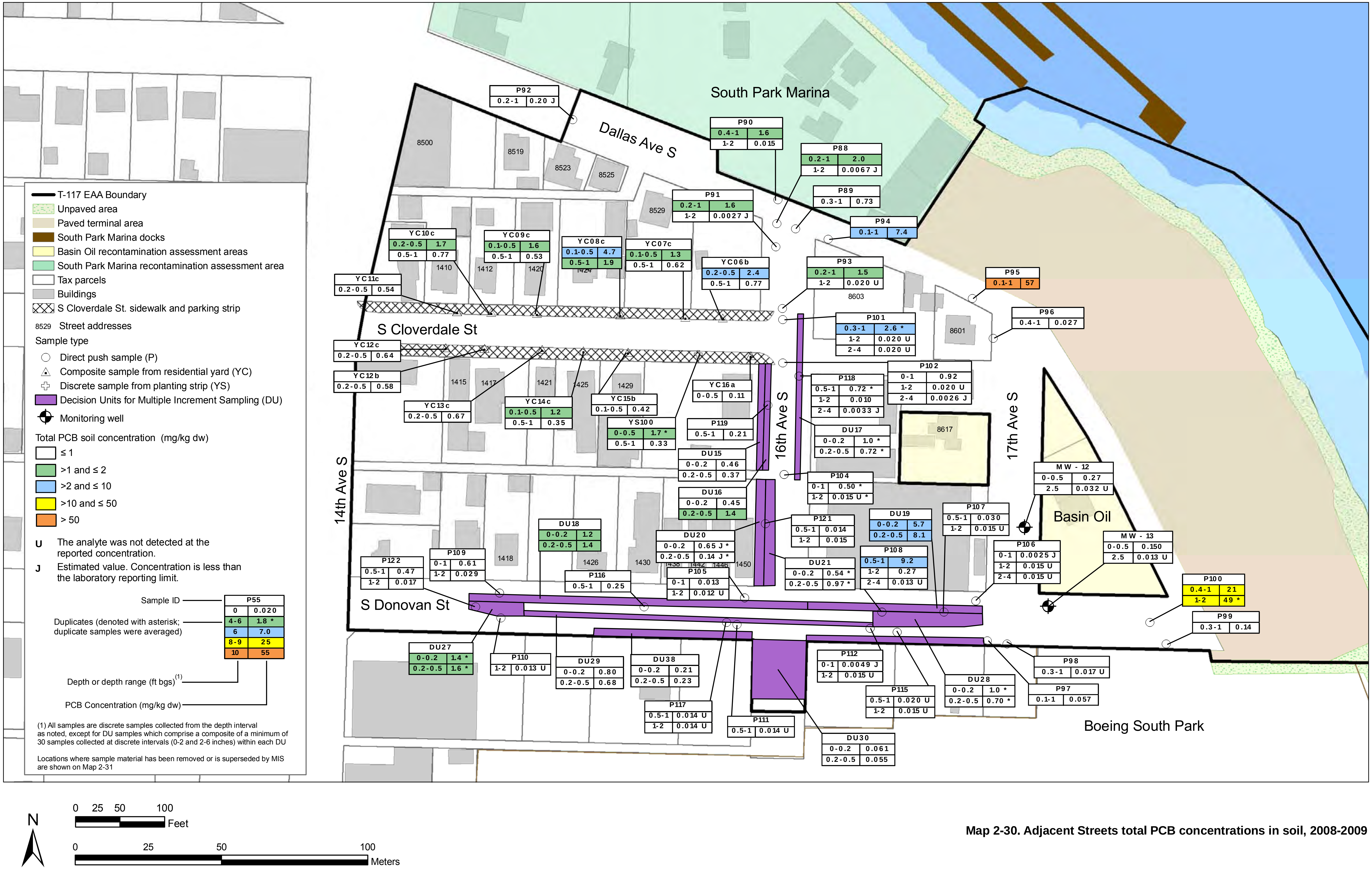
Prepared by MTY 01/19/2010; Map 4060; W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\EECA\EECA_2009



N
0 25 50 100 Feet
0 25 50 100 Meters

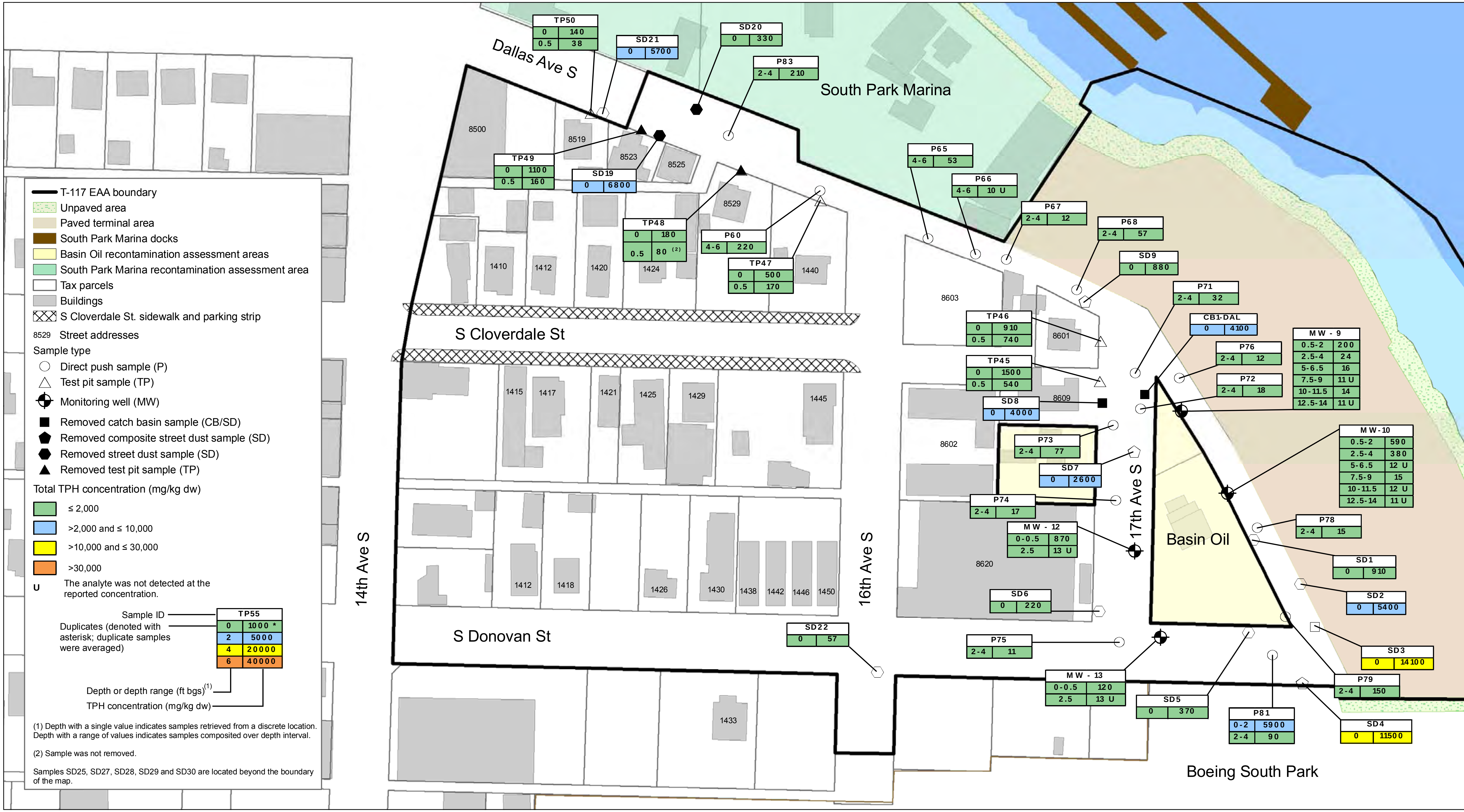
Map 2-29. Adjacent Streets total PCB concentrations in soil, 2004-2006

S:\mi\A0006_T117EAA\map_products\Report\v4\Revised_PostEPAComments\Map2_29_AdjStr_tPCBinSoil_04272010.mxd JP @ 05-05-2010



Map 2-30. Adjacent Streets total PCB concentrations in soil, 2008-2009

S:\mt\A0006_T117EAA\map_products\Report\v4Revised_PostEPAComments\Map2_30_AdjStr_tPCBinSoil0809_04272010.mxd JP @ 05-07-2010



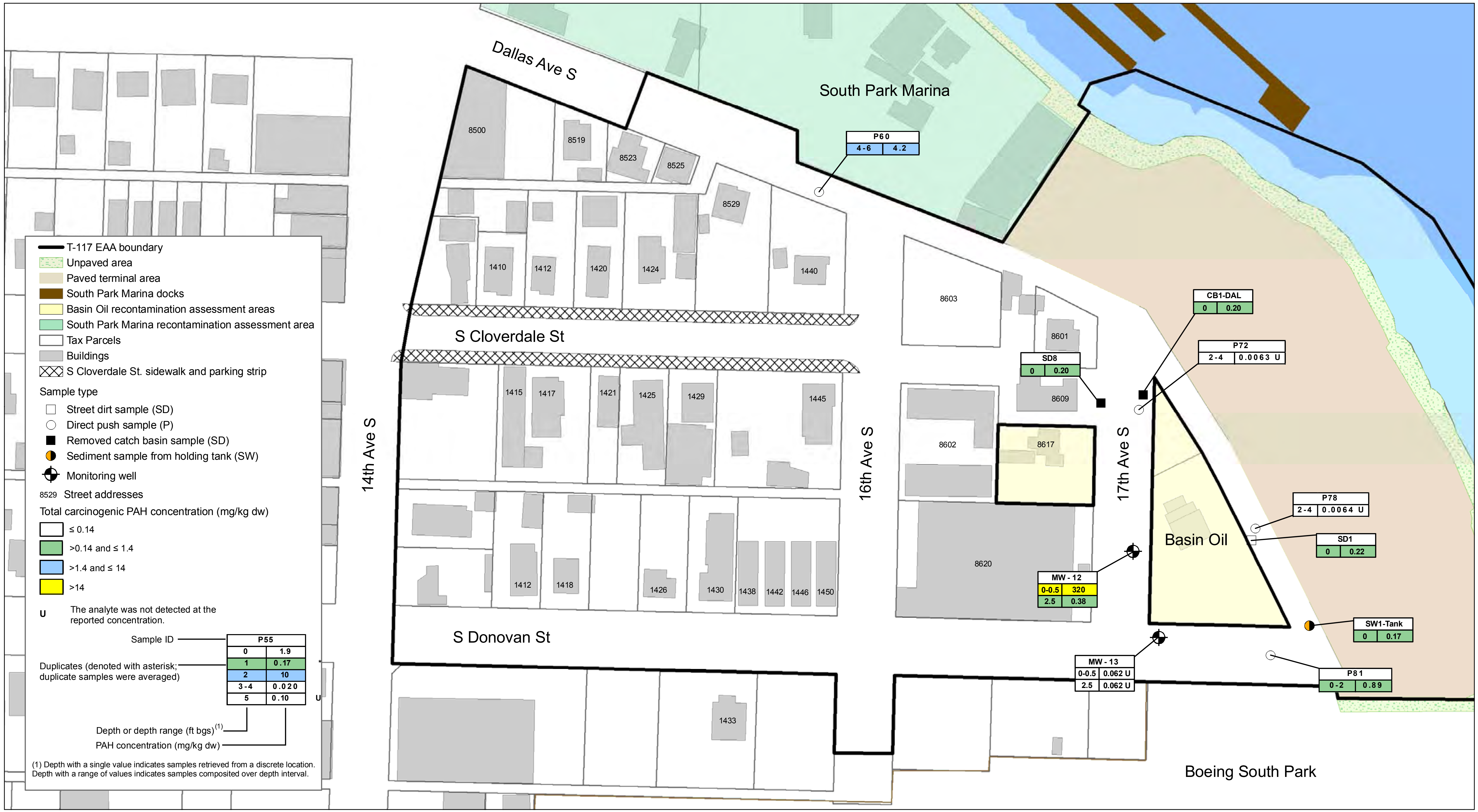
N

0 20 40 80 Feet

0 25 50 100 Meters

Map 2-32. Adjacent Streets TPH concentrations in soil

S:\mi\A0006_T117EAA\map_products\Report\v4\Revised_PostEPAComments\Map2_33_AdjStr_TPHinSoil_04272010.mxd JP @ 05-10-2010



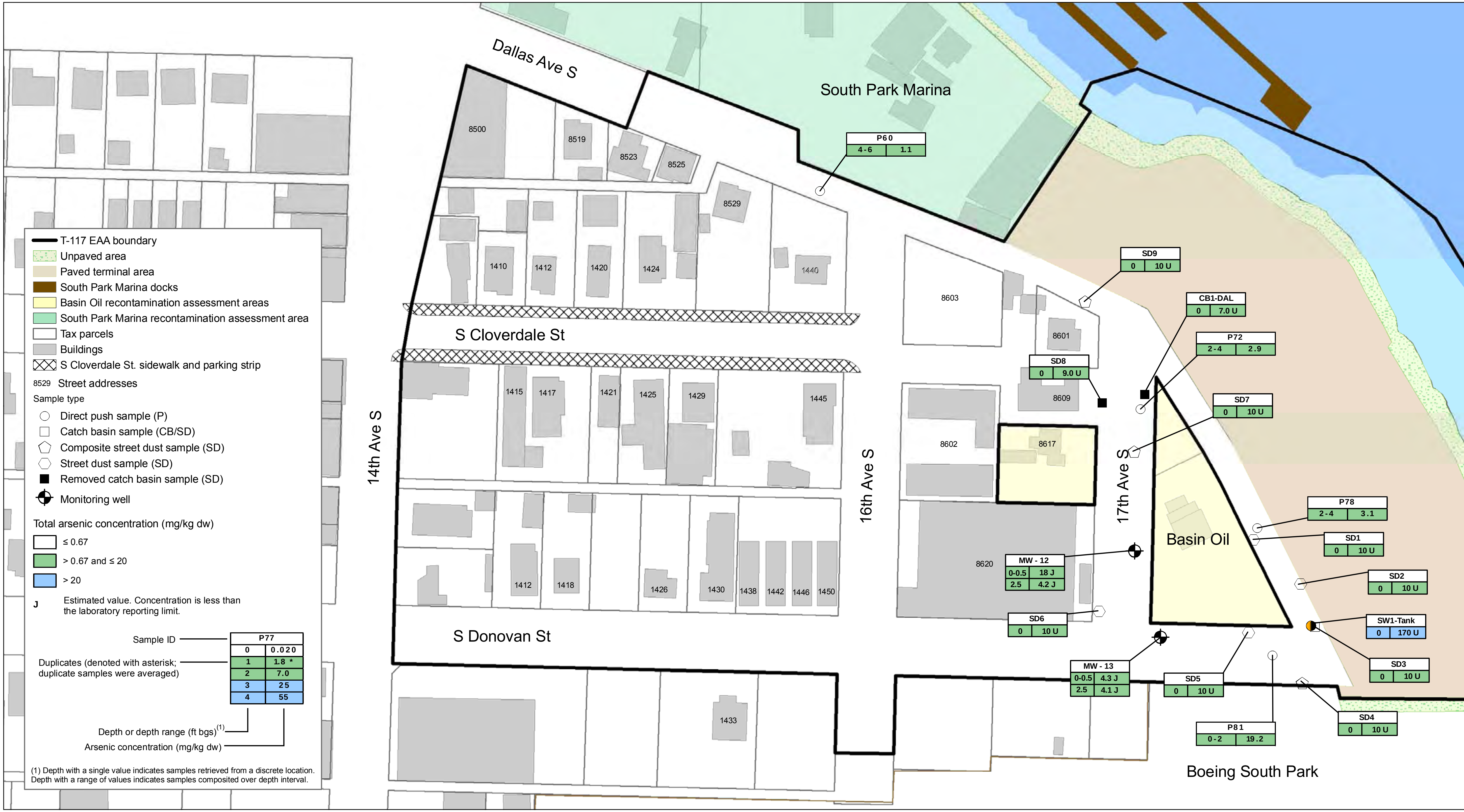
N

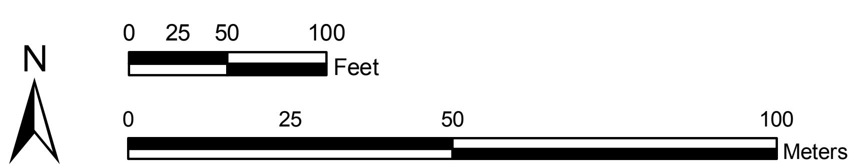
0 25 50 100 Feet

0 25 50 100 Meters

Map 2-33. Adjacent Streets cPAH TEQs in soil

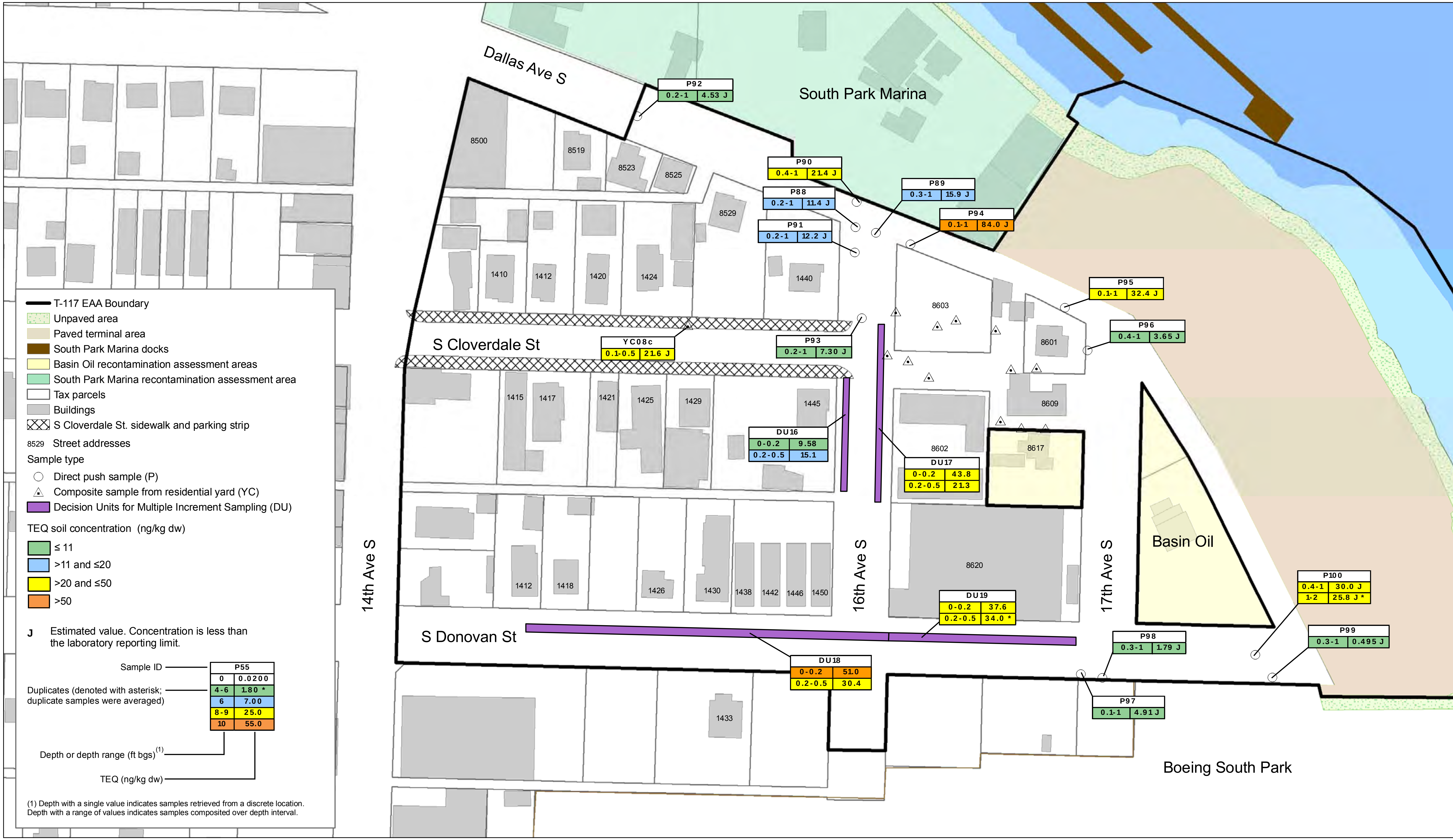
S:\mi\A0006_T117EAA\map_products\Report\v4\Revised_PostEPAComments\Map2_33_AdjStr_cPAHinSoil_04272010.mxd JP @ 05-10-2010

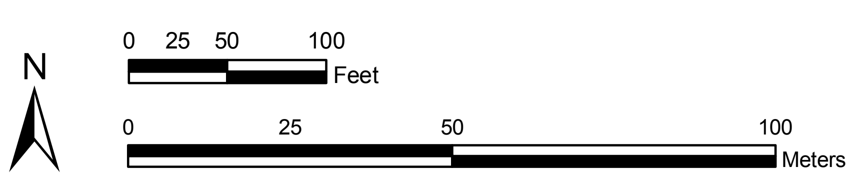




Map 2-34. Adjacent Streets arsenic concentrations in soil

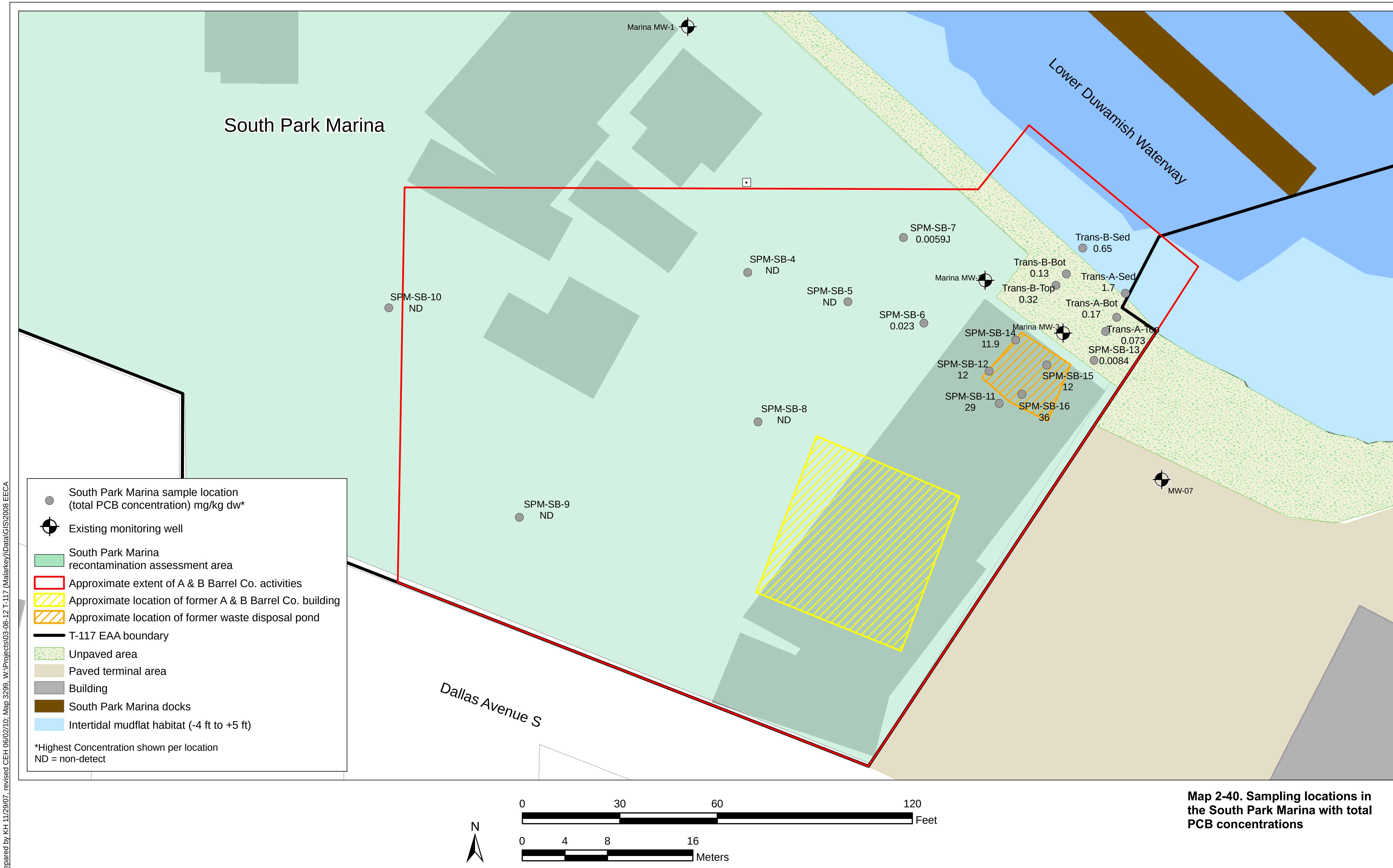
S:\mi\A0006_T117EAA\map_products\Report\v4\Revised_PostEPAComments\Map2_34_AdjStr_ArsenicinSoil_04272010.mxd JP @ 05-17-2010





Map 2-35. Adjacent Streets dioxin/furan TEQs in soil

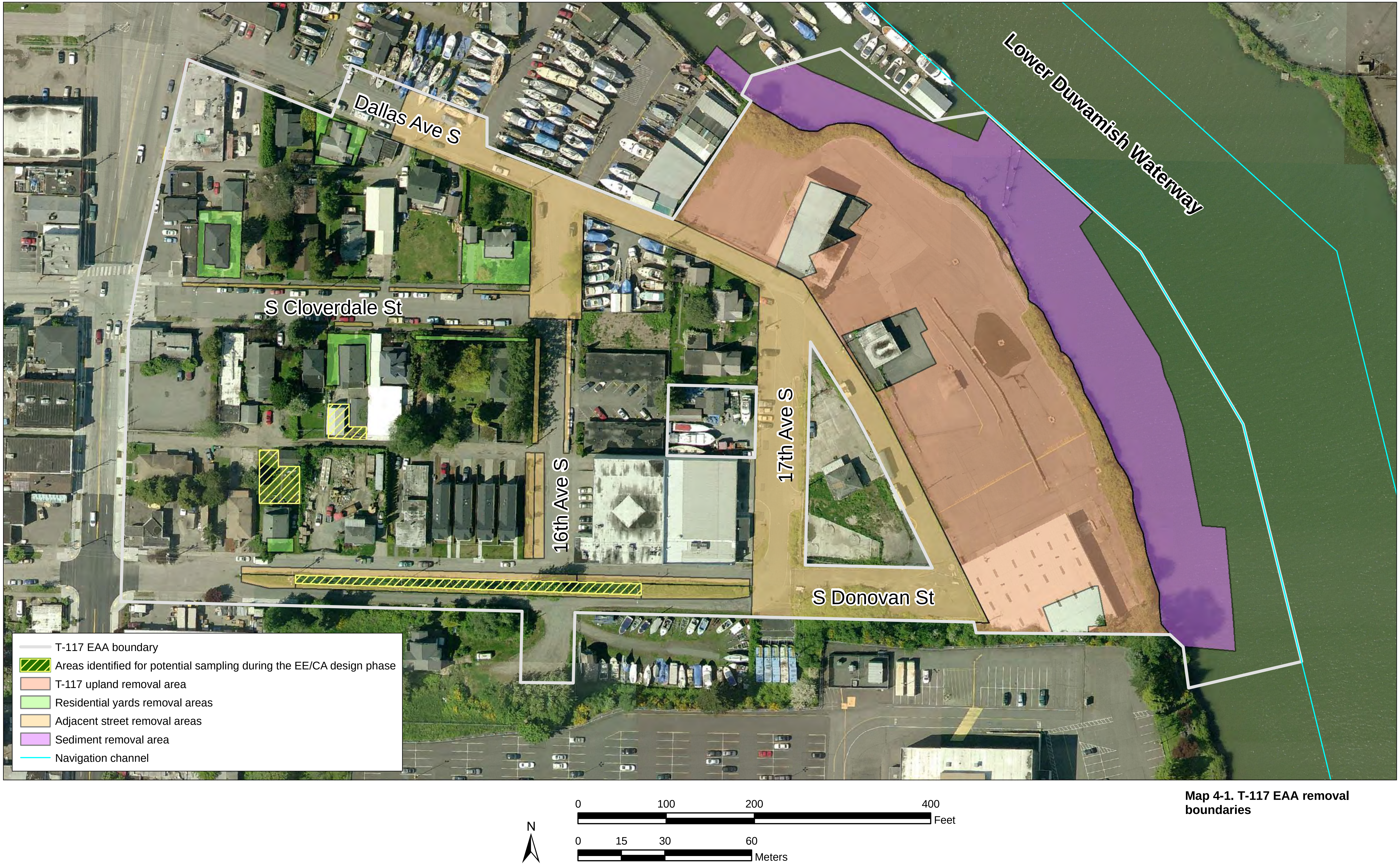
S:\mi\A0006_T117EAA\map_products\Report\v4\Revised_PostEPAComments\Map2_35_AdjStr_DFTEQinSoil_04272010.mxd JP @ 05-07-2010



Map 2-40. Sampling locations in the South Park Marina with total PCB concentrations

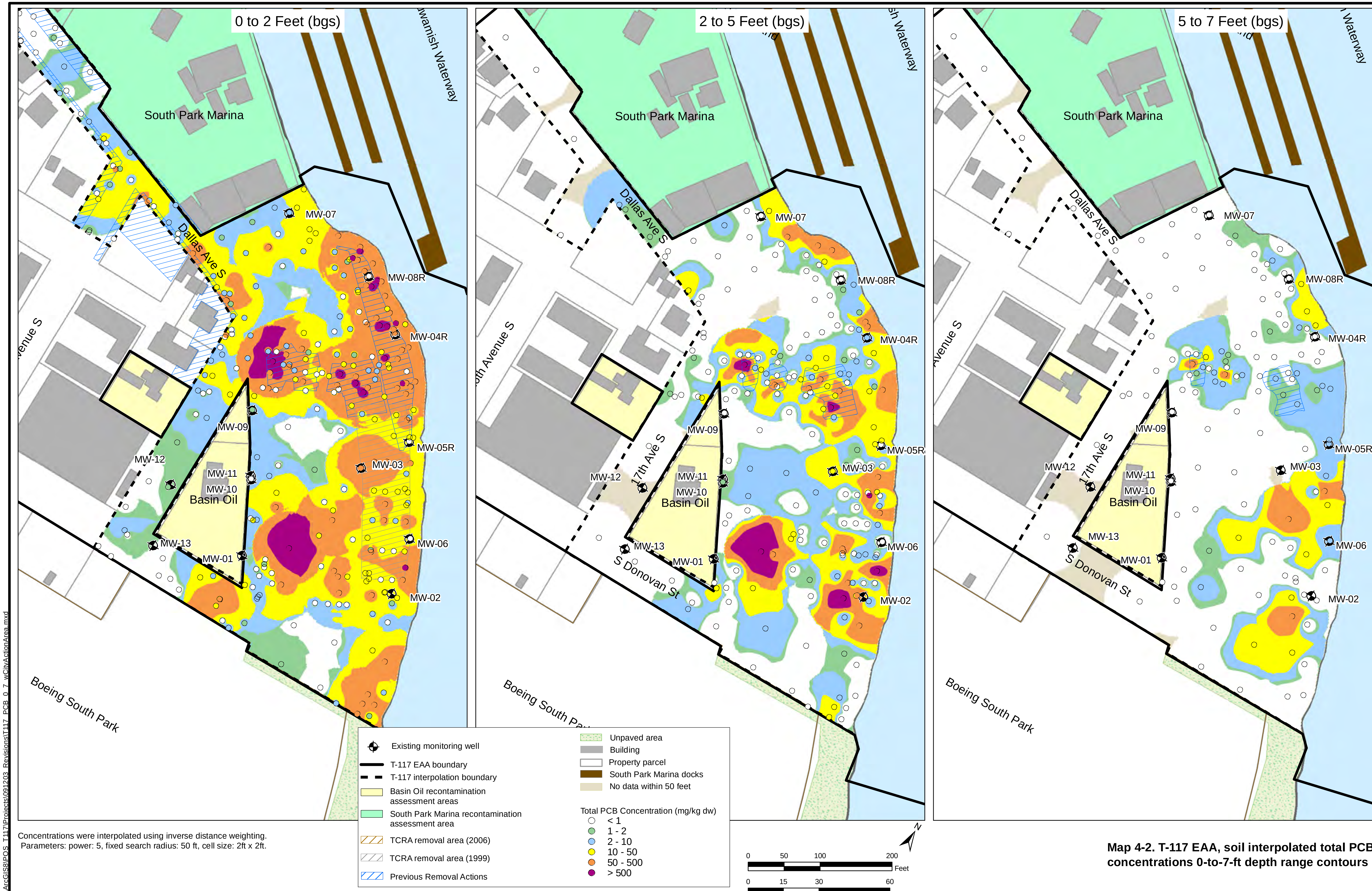
Map 3-1. T-117 EAA non-potability designation

Prepared by MVI, edited MVI 07/14/09; L:\ArcGIS8\POS_T117\Projects\091203_Revisions\T117_SitemapFigureB-2.mxd(Created in ArcGIS 9.2)



Map 4-1. T-117 EAA removal boundaries

Prepared by MTY 01/11/10, CEH 06/02/10; Map #4039; W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\EECA\EECA_2009



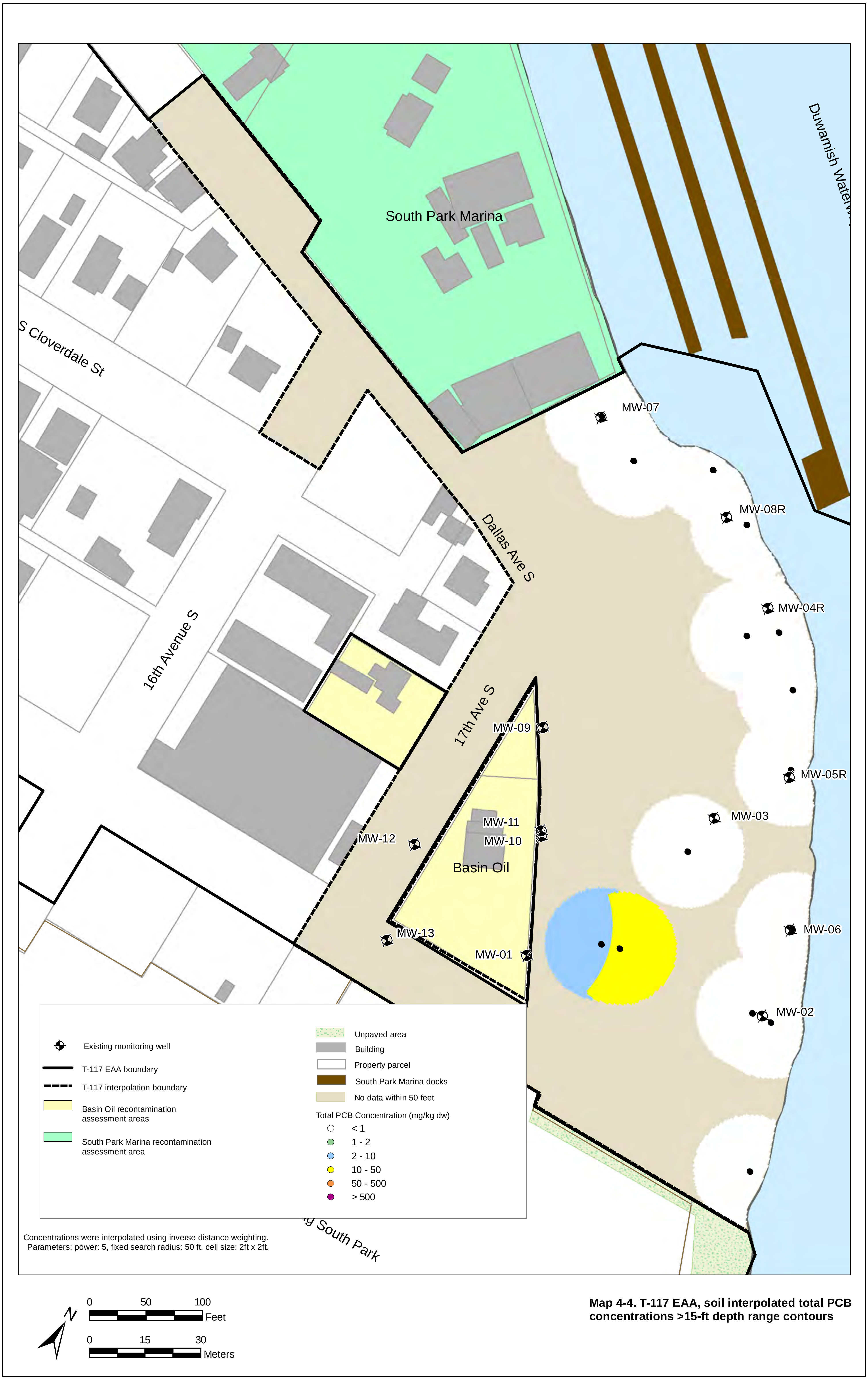
Concentrations were interpolated using inverse distance weighting.
Parameters: power: 5, fixed search radius: 50 ft, cell size: 2ft x 2ft.

Map 4-2. T-117 EAA, soil interpolated total PCB concentrations 0-to-7-ft depth range contours

Concentrations were interpolated using inverse distance weighting.
Parameters: power: 5, fixed search radius: 50 ft, cell size: 2ft x 2ft.

Map 4-3. T-117 EAA, soil interpolated total PCB concentrations 7-to-15-ft depth range contour

L:\ArcGIS8\POS_T117\Projects\091203_Revisions\T117_PCB_7_15_wCityActionArea.mxd



Map 4-4. T-117 EAA, soil interpolated total PCB concentrations >15-ft depth range contours

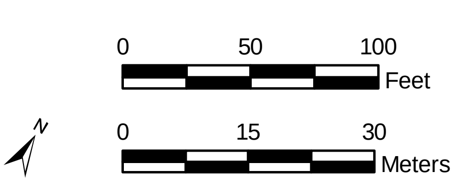
Concentrations were interpolated using inverse distance weighting.
Parameters: power: 5, fixed search radius: 50 ft, cell size: 2ft x 2ft.

Map 4-5. T-117 EAA, soil interpolated TPH concentrations 0-to-7-ft depth range contours

I:\ArcGIS8\POS_T117\Projects\091203_Revisions\T117_TPH_0_7_wCityActionArea.mxd

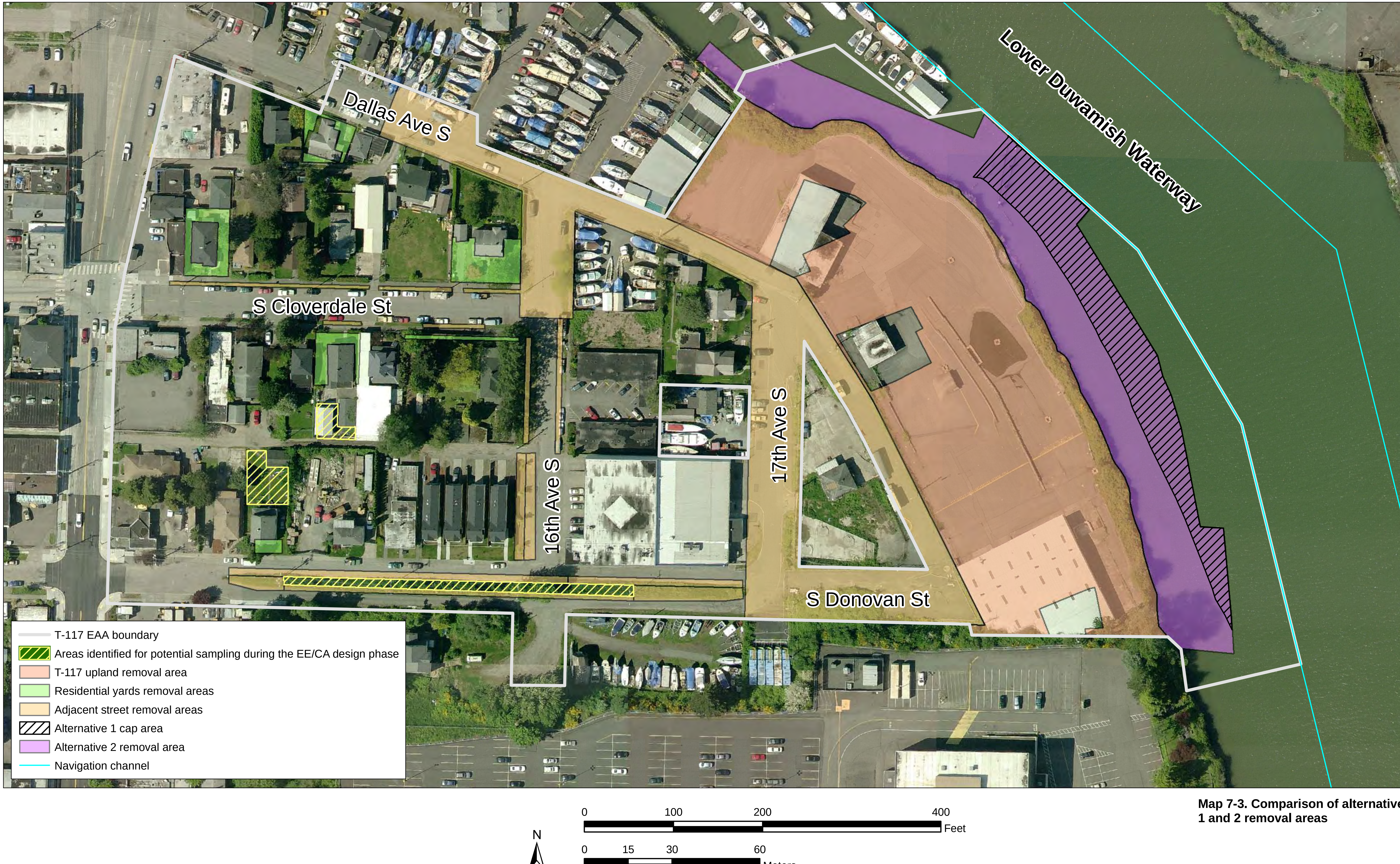
Map 4-6. T-117 EAA, soil interpolated TPH concentrations 7-to-15-ft depth range contours

I:\ArcGIS81\POS_T117\Projects\091203_Revisions\T117_TPH_7_15_wCityActionArea1.mxd



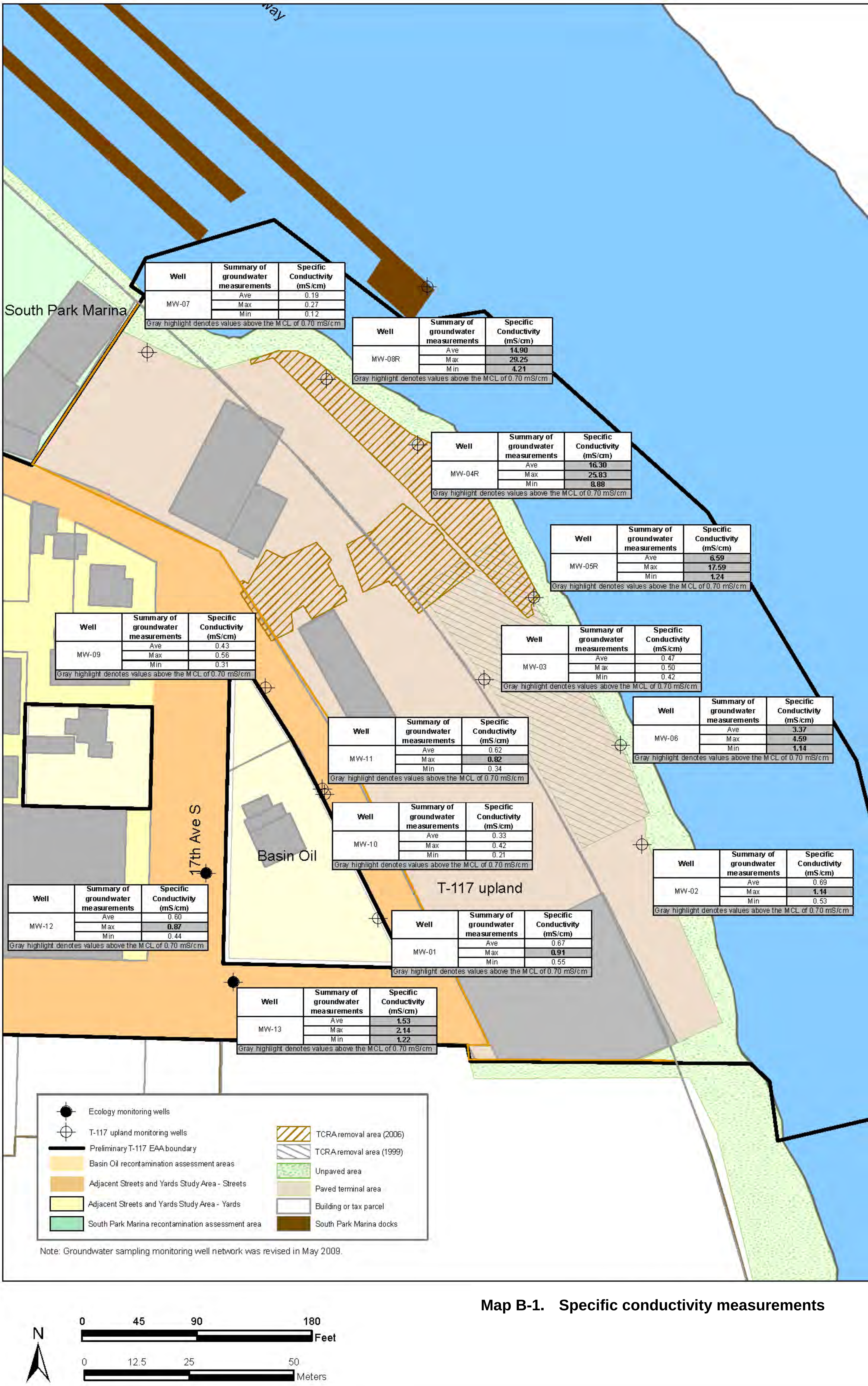
Map 4-7. T-117 EAA, soil interpolated TPH concentrations >15-ft depth range contours

L:\ArcGIS\POS_T117\Projects\091203_Revisions\T117_TPH_gtr15_wCityActionArea.mxd



Map 7-3. Comparison of alternative 1 and 2 removal areas

Prepared by MTY 05/14/10, CEH 06/02/10 Map #4252; W:\Projects\03-08-12 T-117 (Malarkey)\Data\GIS\EECA\EECA_2010



Map B-1. Specific conductivity measurements

Prepared by MV, edited MM 07/14/09; F:\PROJECTS\GIS\ArcGIS8\POS_T117\ProjectsNewFigures11_10_07\T117_SpecificConductivity_111709.mxd(Created in ArcGIS 9.2)

Terminal 117 Cleanup
Port of Seattle and City of Seattle

INTERIM GROUNDWATER MONITORING COMPLETION REPORT

-Non-Time Critical Removal Action

Lower Duwamish Waterway Superfund Site

Terminal 117 Early Action Area

September 17, 2012

Port of Seattle

City of Seattle

INTERIM GROUNDWATER MONITORING COMPLETION REPORT

-Non-Time Critical Removal Action

Lower Duwamish Waterway Superfund Site

Terminal 117 Early Action Area

September 17, 2012

PREPARED BY:

SEALASKA ENVIRONMENTAL

CRETE CONSULTING, INC.

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01	MW-01
			Sample ID	MW-1-0308	MW-01-0608	MW-01-0908	MW-01-1208	DUP 1	MW-01-0309	MW-01-0509	MW-01-0809	MW-01-1109	MW-01-0310	MW-01-0610	MW-01-0910	MW-111-0910	MW-01-1210
			Sample Date	3/11/2008	6/3/2008	9/11/2008	12/10/2008	12/10/2008	3/30/2009	5/27/2009	8/17/2009	11/3/2009	3/30/2010	6/22/2010	9/22/2010	9/22/2010	12/2/2010
			Sample Quarter	1Q	2Q	3Q	4Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	3Q	4Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	N	FD	N	N	N	N	N	N	N	FD	N
Chemical Name	**Total/Disso**	**Unit**	**creening/Action Level**														
Metals																	
Arsenic	D	mg/L	0.005 (RvAL) [1]	< 0.05	0.002	< 0.05	< 0.05	< 0.05	0.003	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	T	mg/L	0.005 (RvAL) [1]	< 0.05	0.002	< 0.05	< 0.05	< 0.05	0.002	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	D	mg/L	1.1	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	T	mg/L	1.1	< 0.005	< 0.005	< 0.005	0.01	0.005	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA
Copper	D	mg/L	0.0048	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	NA	NA	NA	NA	NA	NA	NA	NA
Copper	T	mg/L	0.0048	0.002	< 0.002	0.002	0.011 J	0.004 J	< 0.002	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	D	mg/L	4.6	< 0.01	< 0.01 J	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	T	mg/L	4.6	< 0.01	< 0.01 J	< 0.01	0.01	< 0.01	< 0.01 J	NA	NA	NA	NA	NA	NA	NA	NA
Silver	D	mg/L	0.0019 (RvAL)*	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA	NA	NA	NA
Silver	T	mg/L	0.0019 (RvAL)*	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	D	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	T	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	D	mg/L	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	T	mg/L	26	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA
NWTPH																	
Diesel Range Hydrocarbons	T	mg/L	See Total	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.11	0.062 J	0.043 J	0.063 J
Residual Range Organics (RRO)	T	mg/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.11	0.160 J	< 0.110	< 0.110
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.5	< 0.11	0.222	0.043 J	0.063 J
Gasoline Range Organics-NWTPH	T	mg/L	1	NA	NA	NA	NA	NA	NA	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.250	< 0.250	< 0.050
PCB																	
Aroclor 1254	T	ug/L	0.03 [2]	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049	< 0.0053	< 0.0050	< 0.0050	< 0.0049
Aroclor 1260	T	ug/L	0.03 [2]	< 0.01	< 0.01 J	0.088 AJ	< 0.01	0.017 AJ	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049	< 0.0053	0.0033	0.0034	0.0031 J
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.01	< 0.01 J	0.088 AJ	< 0.01	0.017 AJ	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049	< 0.0053	0.0033	0.0034	0.0031 J
VOCs																	
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	T	ug/L	470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	T	ug/L	NV	< 0.4	< 1	< 1	< 0.4	< 0.4	< 1	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	T	ug/L	3.3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	T	ug/L	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	T	ug/L	30	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH																	
Benzo(a)pyrene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02
Benzo(a)anthracene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02
Benzo(b)fluoranthene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02
Benzo(k)fluoranthene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02
Chrysene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02
Dibenzo(a,h)anthracene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02
Total cPAH TEQ	T	ug/L	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02
SVOC																	
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	NA	NA	NA	NA	NA	NA	89	4	< 1	< 0.96	< 1	< 1.1	< 1.0	0.26 J
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conventionals																	
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	1.2	1.1	< 1	235 J	537 J	< 1	< 1	1.1	< 1	NA	< 5	10.5	10.5	< 5.0
Dioxin/Furans (only detected congeners shown)																	
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-01	MW-01	MW-01	MW-01	MW-02	MW-02	MW-02	MW-02	MW-02	MW-02	MW-02	MW-02	MW-02	MW-02	MW-02
			Sample ID	MW-02-0211	MW-01-0511	MW-01-0811	MW-01-0612	MW-2-0308	MW-02-0608	MW-02-0908	MW-102-0908	MW-02-1208	MW-02-0309	MW-02-0509	MW-02-0809	MW-02-1109	MW-02-0310	MW-02-0610
			Sample Date	2/23/2011	5/16/2011	8/9/2011	6/28/2012	3/11/2008	6/3/2008	9/10/2008	9/10/2008	12/9/2008	3/31/2009	5/26/2009	8/18/2009	11/4/2009	3/30/2010	6/23/2010
			Sample Quarter	1Q	2Q	3Q	2Q	1Q	2Q	3Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N
Chemical Name	Total/Disso	Unit	creening/Action Leve															
Metals																		
Arsenic	D	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	< 0.05	0.008	0.09	0.11	0.06	0.055	NA	NA	NA	NA	NA
Arsenic	T	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	< 0.05	0.07	0.1	0.1	0.06	0.047	NA	NA	NA	NA	NA
Chromium	D	mg/L	1.1	NA	NA	NA	NA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NA	NA	NA	NA	NA
Chromium	T	mg/L	1.1	NA	NA	NA	NA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005 J	NA	NA	NA	NA	NA
Copper	D	mg/L	0.0048	NA	NA	NA	NA	**0.002**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	NA	NA	NA	NA	NA
Copper	T	mg/L	0.0048	NA	NA	NA	NA	**0.004**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	NA	NA	NA	NA	NA
Nickel	D	mg/L	4.6	NA	NA	NA	NA	< 0.01	< 0.01 J	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA	NA	NA	NA
Nickel	T	mg/L	4.6	NA	NA	NA	NA	< 0.01	< 0.01 J	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA	NA	NA	NA
Silver	D	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA
Silver	T	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA
Thallium	D	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	T	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	D	mg/L	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	T	mg/L	26	NA	NA	NA	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA	NA	NA	NA
NWTPH																		
Diesel Range Hydrocarbons	T	mg/L	See Total	**0.064** J	**0.091** J	**0.064** J	**0.075** J	**0.7**	**0.74**	**0.79**	**0.67** J	**0.84**	**0.69**	**0.82**	**0.95**	**0.8**	**0.78** J	**0.92** J
Residual Range Organics (RRO)	T	mg/L	See Total	< 0.140	< 0.220	< 0.120	**0.17** J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**0.34** J
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	**0.064** J	**0.091** J	**0.064** J	**0.245**	0.7	0.74	0.79	0.67 J	0.84	0.69	0.82	0.95	0.8	0.78 J	1.26
Gasoline Range Organics-NWTPH	T	mg/L	1	< 0.250	< 0.250	< 0.250	< 0.250	NA	NA	NA	NA	NA	NA	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
PCB																		
Aroclor 1254	T	ug/L	0.03 [2]	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.0049	< 0.005
Aroclor 1260	T	ug/L	0.03 [2]	< 0.0050	< 0.0050	**0.0021** J	< 0.0050	< 0.01	**0.012** AJ	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	**0.057**	< 0.01	< 0.0049	**0.0053**
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.0050	< 0.0050	**0.0021** J	ND	< 0.01	0.012 AJ	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	0.057	< 0.01	< 0.0049	**0.0053**
VOCs																		
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	T	ug/L	470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	T	ug/L	NV	NA	NA	NA	NA	< 0.4	< 1	< 1	< 1	< 1	< 0.4	NA	NA	NA	NA	NA
Tetrachloroethene	T	ug/L	3.3	NA	NA	NA	NA	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NA	NA	NA	NA	NA
Toluene	T	ug/L	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	T	ug/L	30	NA	NA	NA	NA	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH																		
Benzo(a)pyrene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
Benzo(a)anthracene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
Benzo(b)fluoranthene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
Benzo(k)fluoranthene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
Chrysene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
Dibenzo(a,h)anthracene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
Total cPAH TEQ	T	ug/L	0.15	< 0.02	< 0.02	< 0.02	< 0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
SVOC																		
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	< 0.99	< 1.0	< 1.0	< 1.2	NA	NA	NA	NA	NA	NA	< 1.0	< 1.0	NA	< 0.95	< 0.97
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conventionals																		
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5**	NA
Total Suspended Solids	T	mg/L	NV	< 5.0	< 5.0	< 5.0	< 5.0	**9**	**150**	**122**	**113**	**95.6**	**28**	**38**	**86.4**	**81**	NA	**116**
Dioxin/Furans (only detected congeners shown)																		
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-02	MW-02	MW-02	MW-02	MW-02	MW-02	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-04R	MW-04R
			Sample ID	MW-02-0910	MW-02-1210	MW-02-0211	MW-02-0511	MW-02-0811	MW-02-0612	MW-3-0308	MW-03-0608	MW-03-0908	MW-03-1208	MW-03-121108	MW-03-0511	MW-4R-0308	MW-04R-0608
			Sample Date	9/22/2010	12/1/2010	2/22/2011	5/16/2011	8/9/2011	6/28/2012	3/11/2008	6/4/2008	9/10/2008	12/9/2008	12/11/2008	5/17/2011	3/11/2008	6/4/2008
			Sample Quarter	3Q	4Q	1Q	2Q	3Q	2Q	1Q	2Q	3Q	4Q	4Q	2Q	1Q	2Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total/Disso	Unit	creening/Action Leve														
Metals																	
Arsenic	D	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	NA	NA	< 0.05	0.024	< 0.05	< 0.05	NA	NA	< 0.05	**0.002**
Arsenic	T	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	NA	NA	< 0.05	0.023	< 0.05	NA	< 0.05	NA	< 0.05	< 0.001
Chromium	D	mg/L	1.1	NA	NA	NA	NA	NA	NA	< 0.005	< 0.005	< 0.005	< 0.005	NA	NA	< 0.005	< 0.005
Chromium	T	mg/L	1.1	NA	NA	NA	NA	NA	NA	**0.006**	< 0.005	**0.012**	NA	**0.013**	NA	**0.006**	< 0.005
Copper	D	mg/L	0.0048	NA	NA	NA	NA	NA	NA	< 0.002	< 0.002	< 0.002	< 0.002	NA	NA	**0.003**	< 0.002
Copper	T	mg/L	0.0048	NA	NA	NA	NA	NA	NA	0.01	< 0.002	0.024	NA	0.014	NA	**0.004**	< 0.002
Nickel	D	mg/L	4.6	NA	NA	NA	NA	NA	NA	< 0.01	< 0.01 J	< 0.01	< 0.01	NA	NA	< 0.01	< 0.01 J
Nickel	T	mg/L	4.6	NA	NA	NA	NA	NA	NA	< 0.01	< 0.01	< 0.01	NA	< 0.01	NA	< 0.01	< 0.01 J
Silver	D	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	0.004	< 0.003
Silver	T	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	NA	NA	< 0.003	< 0.003 J	< 0.003	NA	< 0.003 J	NA	0.003	< 0.003
Thallium	D	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	T	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	D	mg/L	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	T	mg/L	26	NA	NA	NA	NA	NA	NA	**0.01**	< 0.01	**0.02**	NA	**0.03**	NA	< 0.01	< 0.01
NWTPH																	
Diesel Range Hydrocarbons	T	mg/L	See Total	**1.2** YJ	**0.570** YJ	**0.680** Y,J	**0.680** H,J	**1.2** Y	**1.10** J	**4.2**	**3**	**4**	NA	**11**	**8.10** H,J	< 0.25	< 0.25
Residual Range Organics (RRO)	T	mg/L	See Total	**0.450** J	**0.300** OJ	**0.420** O,J	**0.620** O,J	**0.450** O	**0.520** J	**3.3**	**0.85**	**1.2**	NA	3.9	**11** O,J	NA	NA
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	1.65	0.87	1.1	1.3	1.65	1.62	7.5	3.85	5.2	NA	14.9	19.10	< 0.25	< 0.25
Gasoline Range Organics-NWTPH	T	mg/L	1	**0.015**	**0.015** J	**0.017** J	**0.015** J	**0.015** J	**0.014** J	NA	NA	NA	NA	NA	**0.059** J	NA	NA
PCB																	
Aroclor 1254	T	ug/L	0.03 [2]	< 0.005	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0049	< 0.011	< 0.01	< 0.01	NA	< **0.59** Y	NA	< 0.01	< 0.01
Aroclor 1260	T	ug/L	0.03 [2]	**0.0051** J	< 0.0050	< 0.0050	< 0.0050	**0.0043** J	< 0.0049	**2**	< 0.01 J	**0.52** AJ	NA	**1.2** AJ	NA	< 0.01	< 0.01 J
Total PCBs		ug/L	0.01 (RvAL) [2]	**0.0051** J	< 0.0050	< 0.0050	< 0.0050	**0.0043** J	< 0.0049	2	< 0.01 J	0.52 AJ	NA	1.2 AJ	NA	< 0.01	< 0.01 J
VOCs																	
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	T	ug/L	470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	T	ug/L	NV	NA	NA	NA	NA	NA	NA	**0.7**	< 0.4	< 0.4	< 0.4	NA	NA	< 1	< 1
Tetrachloroethene	T	ug/L	3.3	NA	NA	NA	NA	NA	NA	< 0.2	< 0.2	< 0.2	< 0.2	NA	NA	< 0.2	< 0.2
Toluene	T	ug/L	15000	NA	NA	NA	NA	NA	NA	NA	NA	< 0.2	< 0.2	NA	NA	NA	NA
Trichloroethene	T	ug/L	30	NA	NA	NA	NA	NA	NA	< 0.2	< 0.2	< 0.2	< 0.2	NA	NA	< 0.2	< 0.2
1,2,4-Trimethylbenzene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH																	
Benzo(a)pyrene	T	ug/L	See Total	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	T	ug/L	See Total	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	T	ug/L	See Total	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	T	ug/L	See Total	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	T	ug/L	See Total	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	T	ug/L	See Total	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAH TEQ	T	ug/L	0.15	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.015	NA	NA	NA	NA	NA	NA	NA	NA
SVOC																	
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	< 1.0	< 0.96	< 0.98	**0.26** J	< 0.99	< 0.97	NA	NA	NA	NA	NA	NA	NA	NA
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	**0.19**	**0.47** J	NA	NA	NA	NA	< 0.1	< 0.1
Conventionals																	
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	**13**	**96**	**92**	**59**	**83.5**	**11.5**	**82.5**	**1,460** J	**3,140**	NA	NA	NA	**2.1**	< 1.1
Dioxin/Furans (only detected congeners shown)																	
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

Chemical Name	Total/Disso	Unit	Screening/Action Level	MW-04R	MW-04R	MW-04R	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R
			Sample ID	MW-04R-0908	MW-04R-1208	MW-04R-0309	MW-5-0308	MW-05R-0608	MW-05R-0908	MW-05R-1208	MW-05R-0309	MW-05R-0509	MW-05R-0809	MW-05R-1109	MW-05R-0310	MW-05R-0610	MW-15R-0610	MW-05R-0910
			Sample Date	9/11/2008	12/9/2008	3/30/2009	3/11/2008	6/3/2008	9/10/2008	12/9/2008	3/31/2009	5/26/2009	8/17/2009	11/4/2009	3/30/2010	6/22/2010	6/22/2010	9/23/2010
			Sample Quarter	3Q	4Q	1Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	2Q	3Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
Metals																		
Arsenic	D	mg/L	0.005 (RvAL) [1]	< 0.2	< 0.1	< 0.005	< 0.05	0.004	< 0.05	< 0.05	0.002	< 0.05	< 0.0008	0.002	0.001	0.0034	0.0035	0.00150
Arsenic	T	mg/L	0.005 (RvAL) [1]	< 0.2	< 0.1	< 0.005	< 0.05	0.005	< 0.05	< 0.05	0.002	< 0.05	< 0.002	0.0022	0.00121	0.0035	0.0036	0.00145
Chromium	D	mg/L	1.1	< 0.02	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005 J	< 0.005	< 0.005	< 0.005	< 0.002 J	< 0.002	< 0.002	0.0013 J
Chromium	T	mg/L	1.1	< 0.02	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.002 J	< 0.002	< 0.002	0.0013 J
Copper	D	mg/L	0.0048	< 0.01	0.005	< 0.004	< 0.002	< 0.002	0.004	< 0.002	< 0.002	< 0.002	0.002	0.006	< 0.002	< 0.002	< 0.002	0.0008 J
Copper	T	mg/L	0.0048	< 0.01	0.004	< 0.004	< 0.002	< 0.002	0.004	0.002	< 0.002	< 0.002	0.002	0.007	< 0.002	< 0.002	< 0.002	< 0.002
Nickel	D	mg/L	4.6	< 0.05	< 0.02	< 0.02	< 0.01	< 0.01 J	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.002	< 0.002	< 0.002	< 0.002
Nickel	T	mg/L	4.6	< 0.05	< 0.02	< 0.02	< 0.01	< 0.01 J	< 0.01	< 0.01	< 0.01 J	< 0.01	< 0.01	0.02	< 0.002	< 0.002	< 0.002	< 0.002
Silver	D	mg/L	0.0019 (RvAL)*	0.02	0.007	< 0.006	< 0.003	< 0.003	0.004	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	0.000016 J
Silver	T	mg/L	0.0019 (RvAL)*	0.03	< 0.006	< 0.006	< 0.003	< 0.003	0.005	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	0.000015 J
Thallium	D	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05	< 0.01	< 0.01	< 0.01	0.000021 J
Thallium	T	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05	< 0.01	< 0.01	< 0.01	0.000020 J
Zinc	D	mg/L	26	NA	NA	NA	NA	NA	NA	NA	NA	< 0.01	0.01	< 0.01	0.0026	< 0.002	< 0.002	0.0017 J
Zinc	T	mg/L	26	< 0.05	< 0.02	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.0028	< 0.002	< 0.002	0.0019 J
NWTPH																		
Diesel Range Hydrocarbons	T	mg/L	See Total	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.11	NA	0.017 J
Residual Range Organics (RRO)	T	mg/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.11	NA	< 0.110
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.5	< 0.11	NA	0.017 J
Gasoline Range Organics-NWTPH	T	mg/L	1	NA	NA	NA	NA	NA	NA	NA	NA	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	NA	< 0.250
PCB																		
Aroclor 1254	T	ug/L	0.03 [2]	< 0.01	< 0.01	< 0.01 J	< 0.01	0.017 J	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049	< 0.005	NA	< 0.0050
Aroclor 1260	T	ug/L	0.03 [2]	< 0.01	< 0.01	< 0.01 J	0.057	0.039 J	0.014 AJ	0.01 AJ	< 0.01	0.028 AJ	< 0.01	0.011 AJ	0.006	0.045	NA	0.0037 J
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.01	< 0.01	< 0.01 J	0.057	0.039 J	0.014 AJ	0.01 AJ	< 0.01	0.028 AJ	< 0.01	0.011 AJ	0.006	0.045	NA	0.0037 J
VOCs																		
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	T	ug/L	470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	T	ug/L	NV	< 0.4	< 0.4	< 1	< 0.4	< 0.4	< 1	< 0.4	< 1	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	T	ug/L	3.3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NA	NA	NA	NA	NA	NA	NA
Toluene	T	ug/L	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	T	ug/L	30	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH																		
Benzo(a)pyrene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.021	NA	< 0.02
Benzo(a)anthracene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.021	NA	< 0.02
Benzo(b)fluoranthene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.021	NA	< 0.02
Benzo(k)fluoranthene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.021	NA	< 0.02
Chrysene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.021	NA	< 0.02
Dibenzo(a,h)anthracene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.021	NA	< 0.02
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.021	NA	< 0.02
Total cPAH TEQ	T	ug/L	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.032	NA	< 0.030
SVOC																		
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	< 1	< 0.95	< 1	NA	< 3.8
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conventionals																		
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	2.9	1.8	1.3	72.6	7.1	3.3	3.3	< 1	14.5	< 2.2	< 1	NA	5	NA	15
Dioxin/Furans (only detected congeners shown)																		
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	2.7E-06	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

Chemical Name	Total/Disso	Unit	Screening/Action Level	MW-05R	MW-05R	MW-05R	MW-05R	MW-05R	MW-06	MW-06	MW-06	MW-06	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07
			Sample ID	MW-05R-1210	MW-05R-0211	MW-05R-0511	MW-05R-0811	MW-05R-0612	MW-6-0308	MW-06-0608	MW-06-0908	MW-06-040809	MW-7-0308	MW-7-041808	MW-07-0608	MW-07-0908	MW-07-1208	MW-07-0309
			Sample Date	12/2/2010	2/23/2011	5/13/2011	8/9/2011	6/28/2012	3/13/2008	6/5/2008	9/11/2008	4/8/2009[1]	3/12/2008	4/18/2008	6/4/2008	9/10/2008	12/11/2008	3/30/2009
			Sample Quarter	4Q	1Q	2Q	3Q	2Q	1Q	2Q	3Q	1Q	1Q	2Q	2Q	3Q	4Q	1Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Metals																		
Arsenic	D	mg/L	0.005 (RvAL) [1]	0.00142 J	0.00178	0.00445	0.00104	0.0026	< 0.05	< 0.001 J+	< 0.05	0.002	< 0.05	NA	< 0.001	< 0.05	< 0.05	< 0.001
Arsenic	T	mg/L	0.005 (RvAL) [1]	0.00154 J	0.00191	0.00431	0.00122	0.0025	< 0.05	< 0.001 J+	< 0.05	0.002	< 0.05	NA	< 0.001	< 0.05	< 0.05	< 0.001
Chromium	D	mg/L	1.1	0.0012 J	0.0008 J	< 0.002 UJ	0.0007 J	0.0009 J	< 0.005	< 0.005	< 0.005	< 0.005 J	< 0.005	NA	< 0.005	< 0.005	< 0.005	< 0.005 J
Chromium	T	mg/L	1.1	0.0025	0.0008 J	< 0.002 UJ	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005 J	< 0.005	NA	< 0.005	< 0.005	< 0.005	< 0.005
Copper	D	mg/L	0.0048	< 0.002 UJ	< 0.002	< 0.002	< 0.002	0.0011 J	0.006	0.005	0.005	0.009	< 0.002	NA	< 0.002	0.002	< 0.002	< 0.002
Copper	T	mg/L	0.0048	< 0.002 UJ	< 0.002	< 0.002	< 0.002	0.0017 J	0.007	0.008	0.01	0.01	< 0.002	NA	< 0.002	0.002	< 0.002	< 0.002
Nickel	D	mg/L	4.6	< 0.002	< 0.002	< 0.002	0.0015 J	0.0024 J	< 0.01	< 0.01 J	< 0.01	< 0.01 J	< 0.01	NA	< 0.01 J	< 0.01	< 0.01	< 0.01
Nickel	T	mg/L	4.6	0.0013 J	< 0.002	< 0.002	0.0011 J	0.002 J	< 0.01	< 0.01 J	< 0.01	< 0.01 J	< 0.01	NA	< 0.01 J	< 0.01	< 0.01	< 0.01 J
Silver	D	mg/L	0.0019 (RvAL)*	0.000005 J	0.000006 J	< 0.00002	< 0.00002	< 0.00002	< 0.003	< 0.003	0.003	< 0.003	< 0.003	NA	< 0.003	< 0.003	< 0.003 J	< 0.003
Silver	T	mg/L	0.0019 (RvAL)*	0.000005 J	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.003	< 0.003	0.005	< 0.003	< 0.003	NA	< 0.003	< 0.003	< 0.003 J	< 0.003
Thallium	D	mg/L	0.00047	< 0.00003	< 0.00003	< 0.00002	0.000015 J	< 0.00002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	T	mg/L	0.00047	< 0.00003	< 0.00003	< 0.00002	0.000016 J	< 0.00002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	D	mg/L	26	0.0018 J	< 0.002 UJ	0.0394	0.0028	0.0007 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	T	mg/L	26	0.0014 J	< 0.002 UJ	0.0042	0.0025	0.001 J	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01
NWTPH																		
Diesel Range Hydrocarbons	T	mg/L	See Total	< 0.110	0.012 J	< 0.110	0.014 J	0.016 J	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	NA	< 0.25	< 0.25	< 0.25	< 0.25
Residual Range Organics (RRO)	T	mg/L	See Total	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	< 0.110	0.012 J	< 0.110	0.014 J	0.016	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	NA	< 0.25	< 0.25	< 0.25	< 0.25
Gasoline Range Organics-NWTPH	T	mg/L	1	< 0.050	< 0.250	< 0.250	< 0.250	< 0.250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB																		
Aroclor 1254	T	ug/L	0.03 [2]	< 0.0049	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.01	< 0.01	< 0.01	< 0.025 Y	< 0.01	< 0.010	< 0.01	< 0.01	< 0.01	< 0.01
Aroclor 1260	T	ug/L	0.03 [2]	0.0056	0.0086	0.0071	0.0058	0.0034 NJ	0.082	0.76 AJ	0.026 AJ	0.068	0.036	< 0.010	< 0.01 J	< 0.01	< 0.01	< 0.01
Total PCBs		ug/L	0.01 (RvAL) [2]	0.0056	0.0086	0.0071	0.0058	0.0034	0.082	0.76 AJ	0.026 AJ	0.068	0.036	< 0.010	< 0.01 J	< 0.01	< 0.01	< 0.01
VOCs																		
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	T	ug/L	470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	T	ug/L	NV	NA	NA	NA	NA	NA	< 0.4	< 1	< 0.4	< 0.4	< 0.4	NA	< 1	< 1	< 0.4	< 1
Tetrachloroethene	T	ug/L	3.3	NA	NA	NA	NA	NA	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NA	< 0.2	< 0.2	< 0.2	< 0.2
Toluene	T	ug/L	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	T	ug/L	30	NA	NA	NA	NA	NA	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NA	< 0.2	< 0.2	< 0.2	< 0.2
1,2,4-Trimethylbenzene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH																		
Benzo(a)pyrene	T	ug/L	See Total	< 0.02	0.014 J	< 0.02	< 0.021	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	T	ug/L	See Total	< 0.02	0.022	< 0.02	< 0.021	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	T	ug/L	See Total	< 0.02	0.016 J	< 0.02	< 0.021	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	T	ug/L	See Total	< 0.02	0.0077 J	< 0.02	< 0.021	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	T	ug/L	See Total	< 0.02	0.022	< 0.02	< 0.021	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	T	ug/L	See Total	< 0.02	< 0.020	< 0.02	< 0.021	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	< 0.02	0.0067 J	< 0.02	< 0.021	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAH TEQ	T	ug/L	0.15	< 0.030	0.021	< 0.030	< 0.032	< 0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOC																		
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	< 1.0	< 1.1	< 1.0	< 0.97	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	< 0.1	NA	< 0.1	NA	NA	NA
Conventionals																		
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	7.7	4.1	9.5	NA	< 1.1	< 2.2	< 1.1	< 1.1	< 1	< 1
Dioxin/Furans (only detected congeners shown)																		
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-07	MW-08R	MW-08R	MW-08R	MW-08R
			Sample ID	MW-07-0509	MW-07-00817	MW-07-1109	MW-07-0310	MW-07-0610	MW-07-0910	MW-07-1210	MW-07-0211	MW-07-0511	MW-07-0811	MW-07-0612	MW-8-0308	MW-08R-0608	MW-08R-0908	MW-08R-1208
			Sample Date	5/26/2009	8/17/2009	11/3/2009	3/30/2010	6/22/2010	9/23/2010	12/1/2010	2/23/2011	5/16/2011	8/9/2011	6/28/2012	3/12/2008	6/4/2008	9/10/2008	12/9/2008
			Sample Quarter	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	2Q	1Q	2Q	3Q	4Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	Total/Disso	Unit	creening/Action Leve															
Metals																		
Arsenic	D	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05	**0.002**	< 0.2	< 0.1
Arsenic	T	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05	**0.002**	< 0.2	< 0.05
Chromium	D	mg/L	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.005	< 0.005	< 0.02	< 0.01
Chromium	T	mg/L	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.005	< 0.005	< 0.02	< 0.005
Copper	D	mg/L	0.0048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.002**	< 0.002	< 0.01	< 0.004
Copper	T	mg/L	0.0048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.004**	< 0.002	< 0.01	**0.003**
Nickel	D	mg/L	4.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.01	< 0.01 J	< 0.05	< 0.02
Nickel	T	mg/L	4.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.01	< 0.01 J	< 0.05	< 0.01
Silver	D	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.003**	< 0.003	**0.03**	< 0.006
Silver	T	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.005**	< 0.003	**0.02**	**0.004**
Thallium	D	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05	< 0.01
Thallium	T	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	D	mg/L	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	T	mg/L	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.01	< 0.01	< 0.05	< 0.01
NWTPH																		
Diesel Range Hydrocarbons	T	mg/L	See Total	< 0.25	< 0.25	< 0.25	< 0.25	< 0.11	**0.028** J	**0.024** J	**0.024** J	< 0.110	**0.018** J	**0.029** J	< 0.25	< 0.25	< 0.25	< 0.25
Residual Range Organics (RRO)	T	mg/L	See Total	NA	NA	NA	**< 0.5**	< 0.11	< 0.110	< 0.110	< 0.120	< 0.140	< 0.120	< 0.120	NA	NA	NA	NA
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	< 0.25	< 0.25	< 0.25	< 0.5	< 0.11	**0.028** J	**0.024** J	**0.024** J	< 0.140	**0.018** J	**0.029**	< 0.25	< 0.25	< 0.25	< 0.25
Gasoline Range Organics-NWTPH	T	mg/L	1	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.250	< 0.050	< 0.250	< 0.250	< 0.250	< 0.250	NA	NA	NA	NA
PCB																		
Aroclor 1254	T	ug/L	0.03 [2]	< 0.01	< 0.01	**0.015** AJ	< 0.0049	**0.0055**	< 0.0050	< 0.0049	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.01	**0.029**	< 0.01	< 0.01
Aroclor 1260	T	ug/L	0.03 [2]	**0.016** AJ	< 0.01	**0.017** AJ	**0.021**	**0.0056**	**0.0071**	**0.0061**	**0.0060**	**0.0042**	**0.0032** J	**0.0090**	< 0.01	**0.049** J	< 0.01	< 0.01
Total PCBs		ug/L	0.01 (RvAL) [2]	**0.016** AJ	< 0.01	**0.032** AJ	**0.021**	**0.0111** J	**0.0071**	**0.0061**	**0.0060**	**0.0042**	**0.0032** J	**0.0090**	< 0.01	**0.078**	< 0.01	< 0.01
VOCs																		
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	T	ug/L	470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	< 0.4	< 1	< 0.4	< 0.4
Tetrachloroethene	T	ug/L	3.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.2	< 0.2	< 0.2	< 0.2
Toluene	T	ug/L	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	T	ug/L	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.2	< 0.2	NA	NA
1,2,4-Trimethylbenzene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.2	< 0.2
cPAH																		
Benzo(a)pyrene	T	ug/L	See Total	NA	NA	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA
Benzo(a)anthracene	T	ug/L	See Total	NA	NA	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA
Benzo(b)fluoranthene	T	ug/L	See Total	NA	NA	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA
Benzo(k)fluoranthene	T	ug/L	See Total	NA	NA	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA
Chrysene	T	ug/L	See Total	NA	NA	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA
Dibenzo(a,h)anthracene	T	ug/L	See Total	NA	NA	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	NA	NA	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	NA	NA	NA	NA
Total cPAH TEQ	T	ug/L	0.15	NA	NA	NA	NA	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.015	NA	NA	NA	NA
SVOC																		
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	**1.2**	< 1	< 1	< 0.96	< 0.97	< 0.98	< 0.96	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA
Conventionals																		
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	4.4	< 1.1	**4.2**	NA	< 5	**11**	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**5.5**	**100**	**2.2**	< 1.1
Dioxin/Furans (only detected congeners shown)																		
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-06

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

Chemical Name	Total/Disso	Unit	Location ID / Sample ID / Sample Date / Sample Quarter / Sample Matrix / Sample Type / creening/Action Leve	MW-08R MW-08R-0309 3/31/2009 1Q WG N	MW-08R MW-08R-0509 5/26/2009 2Q WG N	MW-08R MW-08R-0809 8/17/2009 3Q WG FD	MW-08R MW-08R-0809 8/17/2009 3Q WG N	MW-08R DUP-2-1109 11/3/2009 4Q WG FD	MW-08R MW-8R-1109 11/3/2009 4Q WG N	MW-08R MW-080R-0310 3/30/2010 1Q WG FD	MW-08R MW-08R-0310 3/30/2010 1Q WG N	MW-08R MW-08R-0610 6/23/2010 2Q WG N	MW-08R MW-08R-0910 9/22/2010 3Q WG N	MW-08R MW-18R-0910 9/22/2010 3Q WG FD	MW-08R MW-08R-1210 12/2/2010 4Q WG N	MW-08R MW-08R-0211 2/22/2011 1Q WG N	MW-08R MW-08R-0511 5/16/2011 2Q WG N	MW-08R MW-08R-0811 8/9/2011 3Q WG N
Metals																		
Arsenic	D	mg/L	0.005 (RvAL) [1]	< 0.002	< 0.05	< 0.004	< 0.004	**0.0026**	**0.002**	**0.00070**	**0.00069**	**0.00109**	**0.00079**	**0.00079**	**0.00077** J	**0.00072**	**0.00102**	**0.00062**
Arsenic	T	mg/L	0.005 (RvAL) [1]	< 0.002	< 0.05	**0.003**	< 0.004	**0.0020**	**0.002**	**0.00075**	**0.00065**	**0.00094**	**0.00083**	**0.00081**	**0.00078** J	**0.00070**	**0.00101**	**0.00058**
Chromium	D	mg/L	1.1	< 0.005	< 0.005	< 0.01	< 0.01	< 0.005	< 0.005	< 0.002 J	< 0.002 J	< 0.002	**0.0015** J	**0.0013** J	**0.0014** J	**0.0010** J	< 0.002 UJ	**0.0009** J
Chromium	T	mg/L	1.1	< 0.005	< 0.005	< 0.01	< 0.01	< 0.005	< 0.005	< 0.002 J	< 0.002 J	< 0.002	**0.0016** J	**0.0015** J	**0.0021**	**0.0010** J	< 0.002 UJ	**0.0007** J
Copper	D	mg/L	0.0048	< 0.002	< 0.002	**0.007**	**0.005**	**0.007**	**0.007**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002 UJ	**0.0011** J	< 0.002	< 0.002
Copper	T	mg/L	0.0048	< 0.002	**0.003**	**0.006**	**0.005**	**0.008**	**0.008**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002 UJ	< 0.002	< 0.002	< 0.002
Nickel	D	mg/L	4.6	< 0.01	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	**0.0011** J
Nickel	T	mg/L	4.6	< 0.01 J	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	**0.0008** J	< 0.002	**0.0013** J
Silver	D	mg/L	0.0019 (RvAL)*	< 0.003	< 0.003	< 0.006	< 0.006	**0.008** J	< 0.003 J	< 0.002	< 0.002	< 0.002	**0.000017** J	**0.000017** J	**0.00001** J	**0.000005** J	< 0.00002	< 0.000062
Silver	T	mg/L	0.0019 (RvAL)*	< 0.003	< 0.003	< 0.006	< 0.006	< 0.003	< 0.003	< 0.002	< 0.002	< 0.002	**0.000020**	**0.000020** J	**0.00001** J	**0.000009** J	< 0.00002	< 0.000065
Thallium	D	mg/L	0.00047	< 0.01	NA	NA	NA	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	**0.000006** J	**0.000006** J	< 0.00003	< 0.00003	< 0.00002	**0.000009** J
Thallium	T	mg/L	0.00047	NA	NA	NA	NA	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	**0.000010** J	**0.000007** J	< 0.00003	< 0.00003	< 0.00002	**0.000013** J
Zinc	D	mg/L	26	NA	NA	NA	NA	< 0.01	< 0.01	**0.0039**	**0.0042**	< 0.002	**0.0035**	**0.0034**	**0.0031** J	**0.0023** J	**0.0016** J	**0.007**
Zinc	T	mg/L	26	< 0.01	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	**0.0042**	**0.0039**	< 0.002	**0.0035**	**0.0034**	**0.0038**	**0.0017** J	**0.0008** J	**0.0062**
NWTPH																		
Diesel Range Hydrocarbons	T	mg/L	See Total	< 0.25	< 0.25	NA	< 0.25	NA	< 0.25	NA	< 0.25	< 0.11	**0.012** J	NA	< 0.110	**0.014** J	< 0.110	**0.014** J
Residual Range Organics (RRO)	T	mg/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	< 0.11	< 0.110	NA	< 0.110	< 0.110	< 0.110	< 0.110
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	< 0.25	< 0.25	NA	< 0.25	NA	< 0.25	NA	< 0.25	< 0.11	**0.012** J	NA	< 0.110	**0.014** J	< 0.110	**0.014** J
Gasoline Range Organics-NWTPH	T	mg/L	1	NA	< 0.25	NA	< 0.25	NA	< 0.25	NA	< 0.25	< 0.25	< 0.250	NA	< 0.050	< 0.250	< 0.250	< 0.250
PCB																		
Aroclor 1254	T	ug/L	0.03 [2]	< 0.01	< 0.01	NA	< 0.01	NA	< 0.01	NA	< 0.0049	< 0.005	< 0.0051	NA	< 0.0049	< 0.0050	< 0.0050	< 0.0050
Aroclor 1260	T	ug/L	0.03 [2]	< 0.01	**0.03** AJ	NA	< 0.01	NA	< 0.01	NA	< 0.0049	**0.0064**	< 0.0051	NA	< 0.0049	< 0.0050	< 0.0050	< 0.0050
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.01	**0.03** AJ	NA	< 0.01	NA	< 0.01	NA	< 0.0049	**0.0064**	< 0.0051	NA	< 0.0049	< 0.0050	< 0.0050	< 0.0050
VOCs																		
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	T	ug/L	470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	T	ug/L	NV	< 0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	T	ug/L	3.3	< 0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	T	ug/L	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	T	ug/L	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	T	ug/L	NV	< 0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH																		
Benzo(a)pyrene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02
Benzo(a)anthracene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02
Benzo(b)fluoranthene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02
Benzo(k)fluoranthene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02
Chrysene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02
Dibenzo(a,h)anthracene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02
Total cPAH TEQ	T	ug/L	0.15	NA	NA	NA	NA	NA	NA	NA	NA	< 0.030	< 0.030	NA	< 0.030	< 0.030	< 0.030	< 0.030
SVOC																		
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	NA	**30**	NA	< 1	NA	NA	NA	< 0.96	< 1.0	< 1.0	NA	< 0.98	< 1.0	< 1.0	< 0.99
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conventionals																		
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	< 5	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	< 1	NA	NA	NA	NA	< 1.1	NA	NA	**9**	**15**	NA	< 5.0	< 5.0	< 5.0	< 5.0
Dioxin/Furans (only detected congeners shown)																		
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-08R	MW-09	MW-09	MW-09	MW-09	MW-10	MW-10	MW-10	MW-10	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11
			Sample ID	MW-08R-0612	MW-9-0308	DUP-1-0308	MW-09-0309	DUP-1-0309	MW-10-0308	MW-10-0608	MW-10-1208	MW-10-0309	MW-11-0908	MW-11-1208	MW-11-0309	MW-11-0509	MW-11-0817	MW-11-1109	MW-11-0310
			Sample Date	6/28/2012	3/12/2008	3/11/2008	3/30/2009	3/30/2009	3/11/2008	6/3/2008	12/10/2008	3/31/2009	9/11/2008	12/11/2008	3/31/2009	5/27/2009	8/17/2009	11/2/2009	3/30/2010
			Sample Quarter	2Q	1Q	1Q	1Q	1Q	1Q	2Q	4Q	1Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	FD	N	FD	N	N	N	N	N	N	N	N	N	N	N
Chemical Name	**Total/Disso**	**Unit**	**creening/Action Leve**																
Metals																			
Arsenic	D	mg/L	0.005 (RvAL) [1]	**0.00068**	< 0.05	< 0.05	< 0.001	< 0.001	< 0.05	< 0.001	< 0.05	< 0.001	< 0.05	< 0.05	< 0.001	NA	NA	NA	NA
Arsenic	T	mg/L	0.005 (RvAL) [1]	**0.00068**	< 0.05	< 0.05	< 0.001	< 0.001	< 0.05	**0.002**	< 0.05	< 0.001	< 0.05	< 0.05	< 0.001	NA	NA	NA	NA
Chromium	D	mg/L	1.1	< 0.002	< 0.005	< 0.005	< 0.005 J	< 0.005 J	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NA	NA	NA	NA
Chromium	T	mg/L	1.1	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005 J	< 0.005	< 0.005	< 0.005	NA	NA	NA	NA
Copper	D	mg/L	0.0048	< 0.002	**0.003**	< 0.002	**0.003**	**0.003**	**0.004**	**0.009**	**0.003**	**0.003**	**0.002**	< 0.002	< 0.002	NA	NA	NA	NA
Copper	T	mg/L	0.0048	**0.0014** J	**0.003**	**0.003**	**0.003**	**0.003**	**0.005**	**0.01**	**0.005**	**0.007**	**0.004**	< 0.002	< 0.002	NA	NA	NA	NA
Nickel	D	mg/L	4.6	**0.0022**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01 J	< 0.01	< 0.01	**0.01**	< 0.01	< 0.01	NA	NA	NA	NA
Nickel	T	mg/L	4.6	**0.0022**	< 0.01	< 0.01	< 0.01 J	< 0.01 J	< 0.01	< 0.01	< 0.01	< 0.01	**0.01**	**0.01**	**0.01** J-	NA	NA	NA	NA
Silver	D	mg/L	0.0019 (RvAL)*	**0.000004** J	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003 J	< 0.003	NA	NA	NA	NA
Silver	T	mg/L	0.0019 (RvAL)*	**0.000005** J	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003 J	< 0.003	< 0.003	< 0.003	< 0.003 J	< 0.003	NA	NA	NA	NA
Thallium	D	mg/L	0.00047	< 0.00002	NA	NA	< 0.01	< 0.01	NA	NA	< 0.01	< 0.01	NA	NA	NA	NA	NA	NA	NA
Thallium	T	mg/L	0.00047	< 0.00002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	D	mg/L	26	**0.0018** J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	T	mg/L	26	**0.0018** J	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA	NA	NA
NWTPH																			
Diesel Range Hydrocarbons	T	mg/L	See Total	**0.017** J	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	**0.53**	< 0.25	< 0.25	< 0.25	**0.27**	< 0.25	< 0.25	**0.27**	**0.28**	< 0.25
Residual Range Organics (RRO)	T	mg/L	See Total	< 0.110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	**0.017**	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	**0.53**	< 0.25	< 0.25	< 0.25	**0.27**	< 0.25	< 0.25	**0.27**	**0.28**	< 0.5
Gasoline Range Organics-NWTPH	T	mg/L	1	< 0.250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.25	< 0.25	< 0.25	< 0.25
PCB																			
Aroclor 1254	T	ug/L	0.03 [2]	< 0.0049	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049
Aroclor 1260	T	ug/L	0.03 [2]	< 0.0049	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01 J	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.0049	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01 J	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049
VOCs																			
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	T	ug/L	470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylenes	T	ug/L	NV	NA	< 1	< 1	< 1	< 0.4	< 0.4	< 1	< 1	< 0.4	< 0.4	< 1	< 1	NA	NA	NA	NA
Tetrachloroethene	T	ug/L	3.3	NA	**1**	**0.9**	**1.3**	**1.3**	**2**	**1.4**	**1.3**	**1**	< 0.2	< 0.2	**1.4**	NA	NA	NA	NA
Toluene	T	ug/L	15000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	T	ug/L	30	NA	< 0.2	< 0.2	< 0.2	< 0.2	**0.5**	**0.2**	< 0.2	< 0.2	< 0.2	**0.2**	**0.6**	NA	NA	NA	NA
1,2,4-Trimethylbenzene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cPAH																			
Benzo(a)pyrene	T	ug/L	See Total	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	T	ug/L	See Total	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	T	ug/L	See Total	**0.0083** J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	T	ug/L	See Total	**0.0091** J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	T	ug/L	See Total	**0.0082** J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	T	ug/L	See Total	**0.0094** J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	**0.0086** J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total cPAH TEQ	T	ug/L	0.15	**0.015**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOC																			
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	< 0.96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5**	< 1	NA	< 0.95
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	< 0.1	< 0.1	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conventionals																			
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5
Total Suspended Solids	T	mg/L	NV	< 5.0	< 1.1	< 2.1	< 1	< 1	< 1	**3.2**	< 1.1	**2.8**	**2.1**	< 1	< 1	< 1	< 1.1	< 1	NA
Dioxin/Furans (only detected congeners shown)																			
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	2.5E-06	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12
			Sample ID	MW-11-0610	MW-11-0910	MW-11-1210	MW-11-0211	MW-11-0511	MW-11-0811	MW-11-0612	GW-12-052609	MW-12-0809	DUP-1-1109	MW-12-1109	MW-120-0310	MW-12-0310	MW-12-0610	MW-12-0910	MW-22-0910	MW-12-1210
			Sample Date	6/22/2010	9/22/2010	12/2/2010	2/22/2011	5/16/2011	8/9/2011	6/28/2012	5/26/2009	8/17/2009	11/3/2009	11/3/2009	3/30/2010	3/30/2010	6/22/2010	9/22/2010	9/22/2010	12/2/2010
			Sample Quarter	2Q	3Q	4Q	1Q	2Q	3Q	2Q	2Q	3Q	4Q	4Q	1Q	1Q	2Q	3Q	3Q	4Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	FD	N
Chemical Name	Total/Disso	Unit	creening/Action Leve																	
Metals																				
Arsenic	D	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	NA	NA	NA	0.0177	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	T	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	NA	NA	NA	0.0178	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	D	mg/L	1.1	NA	NA	NA	NA	NA	NA	NA	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	T	mg/L	1.1	NA	NA	NA	NA	NA	NA	NA	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	D	mg/L	0.0048	NA	NA	NA	NA	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	T	mg/L	0.0048	NA	NA	NA	NA	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	D	mg/L	4.6	NA	NA	NA	NA	NA	NA	NA	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	T	mg/L	4.6	NA	NA	NA	NA	NA	NA	NA	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	D	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	NA	NA	NA	< 0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	T	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	NA	NA	NA	< 0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	D	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	T	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	D	mg/L	26	NA	NA	NA	NA	NA	NA	NA	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	T	mg/L	26	NA	NA	NA	NA	NA	NA	NA	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
NWTPH																				
Diesel Range Hydrocarbons	T	mg/L	See Total	0.16 J	0.270 J	0.240 YJ	0.170 YJ	0.170 HJ	0.130 YJ	0.100 J	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.11	0.017 J	NA	< 0.110
Residual Range Organics (RRO)	T	mg/L	See Total	< 0.11	0.180 J	0.170 OJ	< 0.130	< 0.200	< 0.110	0.120 J	NA	NA	NA	NA	< 0.5	< 0.5	< 0.11	< 0.11	NA	< 0.110
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	0.16 J	0.450 J	0.410 YJ	0.300 YJ	0.370	0.130 YJ	0.220	< 0.25	< 0.25	< 0.25	< 0.25	< 0.5	< 0.5	< 0.11	0.017 J	NA	< 0.110
Gasoline Range Organics-NWTPH	T	mg/L	1	< 0.25	< 0.250	< 0.050	< 0.250	< 0.250	< 0.250	< 0.250	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	NA	< 0.050
PCB																				
Aroclor 1254	T	ug/L	0.03 [2]	< 0.005	< 0.0050	< 0.0049	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049	< 0.0049	< 0.0051	< 0.0053	NA	< 0.0049
Aroclor 1260	T	ug/L	0.03 [2]	< 0.005	< 0.0050	< 0.0049	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049	< 0.0049	< 0.0051	< 0.0053	NA	< 0.0049
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.005	< 0.0050	< 0.0049	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049	< 0.0049	< 0.0051	< 0.0053	NA	< 0.0049
VOCs																				
Carbon Disulfide	T	ug/L	NV	NA	NA	NA	NA	< 0.50	< 0.50	0.12 J	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	0.13 J	< 0.50
Chloroform	T	ug/L	470	NA	NA	NA	NA	< 0.50	< 0.50	< 0.50	NA	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50
Chloromethane	T	ug/L	NV	NA	NA	NA	NA	< 0.50	< 0.50	< 0.50	< 0.2	< 1	< 1 J	< 1 J	< 0.5	< 0.5	< 0.5	0.11 J	< 0.5	< 0.50
Dichloromethane	T	ug/L	590	NA	NA	NA	NA	< 0.50	< 2	< 2	NA	NA	< 2	< 2	NA	NA	< 2	< 2	< 2	< 2.0
Ethylbenzene	T	ug/L	2100	NA	NA	NA	NA	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	NA	NA	< 0.5	0.05 J	0.05 J	< 0.50
m,p-Xylenes	T	ug/L	NV	NA	NA	NA	NA	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	0.21 J	< 0.50
Tetrachloroethene	T	ug/L	3.3	NA	NA	NA	NA	1.5	1.5	1.4	< 0.2	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50
Toluene	T	ug/L	15000	NA	NA	NA	NA	0.13 J	0.07 J	0.19	< 0.2	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	0.25 J	0.27 J	< 0.50
Trichloroethene	T	ug/L	30	NA	NA	NA	NA	0.47 J	0.57 J	0.53	NA	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50
1,2,4-Trimethylbenzene	T	ug/L	NV	NA	NA	NA	NA	< 1.0	< 1.0	< 2	NA	NA	NA	NA	NA	NA	< 1.0	0.08 J	< 0.08 J	< 1.0
cPAH																				
Benzo(a)pyrene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	< 0.021	< 0.02	NA	< 0.02
Benzo(a)anthracene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	< 0.021	< 0.02	NA	< 0.02
Benzo(b)fluoranthene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	< 0.021	< 0.02	NA	< 0.02
Benzo(k)fluoranthene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	< 0.021	< 0.02	NA	< 0.02
Chrysene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	< 0.021	< 0.02	NA	< 0.02
Dibenzo(a,h)anthracene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	< 0.021	< 0.02	NA	< 0.02
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	< 0.021	< 0.02	NA	< 0.02
Total cPAH TEQ	T	ug/L	0.15	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.015	NA	NA	NA	NA	NA	NA	< 0.032	< 0.030	NA	< 0.030
SVOC																				
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	< 0.99	< 1.1	< 0.96	< 1.0	< 0.99	< 0.99	< 0.99	< 1.0	< 1.0	< 1	< 1	< 0.95	< 0.96	< 1.1	< 1.0	NA	< 0.97
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conventionals																				
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	6	11.5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	< 1.1	< 1	NA	NA	< 5	9.5	NA	< 5.0
Dioxin/Furans (only detected congeners shown)																				
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-12	MW-12	MW-12	MW-12	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13
			Sample ID	MW-12-0211	MW-12-0511	MW-12-0811	MW-12-0612	GW-13-052609	Dup-2-0909	MW-13-0909	MW-13-1109	MW-13-0310	MW-13-0610	MW-23-0610	MW-13-0910	MW-13-1210	MW-13-0211	MW-13-0511
			Sample Date	2/24/2011	5/16/2011	8/10/2011	6/28/2012	5/26/2009	9/9/2009	9/9/2009	11/3/2009	3/30/2010	6/23/2010	6/23/2010	9/23/2010	12/2/2010	2/24/2011	5/16/2011
			Sample Quarter	1Q	2Q	3Q	2Q	2Q	3Q	3Q	4Q	1Q	2Q	2Q	3Q	4Q	1Q	2Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	N	N	FD	N	N	N	N	FD	N	N	N	N
Chemical Name	Total/Disso	Unit	creening/Action Leve															
Metals																		
Arsenic	D	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	0.0094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	T	mg/L	0.005 (RvAL) [1]	NA	NA	NA	NA	0.0107	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	D	mg/L	1.1	NA	NA	NA	NA	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	T	mg/L	1.1	NA	NA	NA	NA	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	D	mg/L	0.0048	NA	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	T	mg/L	0.0048	NA	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	D	mg/L	4.6	NA	NA	NA	NA	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	T	mg/L	4.6	NA	NA	NA	NA	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	D	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	< **0.003**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	T	mg/L	0.0019 (RvAL)*	NA	NA	NA	NA	< **0.003**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	D	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	T	mg/L	0.00047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	D	mg/L	26	NA	NA	NA	NA	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	T	mg/L	26	NA	NA	NA	NA	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NWTPH																		
Diesel Range Hydrocarbons	T	mg/L	See Total	< 0.120	< 0.110	< 0.110	< 0.110	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.11	< 0.11	**0.023** J	< 0.110	**0.030** J	< 0.110
Residual Range Organics (RRO)	T	mg/L	See Total	< 0.120	< 0.110	< 0.110	< 0.110	NA	NA	NA	NA	< **0.5**	**0.13** J	< 0.11	< 0.110	< 0.110	< 0.110	< 0.110
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	< 0.120	< 0.110	< 0.110	< 0.110	< 0.25	< 0.25	< 0.25	< 0.25	< **0.5**	**0.13** J	< 0.11	**0.023** J	< 0.110	**0.030** J	< 0.110
Gasoline Range Organics-NWTPH	T	mg/L	1	< 0.250	< 0.250	< 0.250	< 0.250	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.250	< 0.050	< 0.250	< 0.250
PCB																		
Aroclor 1254	T	ug/L	0.03 [2]	< 0.0050	< 0.0050	< 0.0050	< 0.0049	< 0.01	< 0.01	**0.016** AJ	< 0.01	< 0.0049	< 0.005	< 0.005	< 0.0050	< 0.0049	< 0.0050	< 0.0050
Aroclor 1260	T	ug/L	0.03 [2]	< 0.0050	< 0.0050	< 0.0050	< 0.0049	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0049	< 0.005	< 0.005	< 0.0050	< 0.0049	< 0.0050	< 0.0050
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.0050	< 0.0050	< 0.0050	< 0.0049	< 0.01	< 0.01	**0.016** AJ	< 0.01	< 0.0049	< 0.005	< 0.005	< 0.0050	< 0.0049	< 0.0050	< 0.0050
VOCs																		
Carbon Disulfide	T	ug/L	NV	< 0.50	**0.06** J	**0.10** J	**0.10** J	NA	NA	NA	NA	NA	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50
Chloroform	T	ug/L	470	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50
Chloromethane	T	ug/L	NV	< 0.50	< 0.50	< 0.50	< 0.50	< 0.2	< 1	< 1	< 1 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50
Dichloromethane	T	ug/L	590	< 2.0	< 0.50	< 2.0	< 0.50	NA	NA	NA	**5**	< 2	< 2	< 2	< 2	< 2.0	< 2.0	< 0.50
Ethylbenzene	T	ug/L	2100	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	NA	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50
m,p-Xylenes	T	ug/L	NV	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	NA	< 0.5	< 0.5	**0.11** J	< 0.50	< 0.50	< 0.50
Tetrachloroethene	T	ug/L	3.3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.2	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50
Toluene	T	ug/L	15000	< 0.50	< 0.50	**0.06** J	**0.12**	NA	NA	NA	< 1	< 0.5	< 0.5	< 0.5	**0.17** J	< 0.50	**0.06** J	**0.15** J
Trichloroethene	T	ug/L	30	< 0.50	< 0.50	< 0.50	< 0.50	< 0.2	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.50	< 0.50	< 0.50
1,2,4-Trimethylbenzene	T	ug/L	NV	< 1.0	< 1.0	< 1.0	< 2	NA	NA	NA	NA	NA	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0
cPAH																		
Benzo(a)pyrene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.022	NA	< 0.02	< 0.02	**0.014** J	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.009** J	< 0.02
Benzo(a)anthracene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.022	NA	< 0.02	< 0.02	**0.022**	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.0077** J	< 0.02
Benzo(b)fluoranthene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.022	NA	< 0.02	< 0.02	**0.016** J	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.013** J	< 0.02
Benzo(k)fluoranthene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.022	NA	< 0.02	< 0.02	**0.0077** J	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.010** J	< 0.02
Chrysene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.022	NA	< 0.02	< 0.02	**0.022**	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.0086** J	< 0.02
Dibenzo(a,h)anthracene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.022	NA	< 0.02	< 0.02	< 0.020	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.013** J	< 0.02
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	< 0.02	< 0.02	< 0.02	< 0.022	NA	< 0.02	< 0.02	**0.0067** J	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.012** J	< 0.02
Total cPAH TEQ	T	ug/L	0.15	< 0.030	< 0.02	< 0.02	< 0.017	NA	< 0.02	< 0.02	**0.021**	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	**0.015**	< 0.030
SVOC																		
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	< 0.98	< 1.0	< 0.99	< 0.99	< 1	< 1	< 1	NA	< 0.98	**1.3**	< 0.98	< 1.0	< 0.97	< 1.0	**0.28** J
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	T	ug/L	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	T	ug/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conventionals																		
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	< 5	NA	NA	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	< 5.0	< 5.0	< 5.0	< 5.0	1.2	< 1	< 2.4	< 1	NA	< 5	< 5	**11**	< 5.0	< 5.0	< 5.0
Dioxin/Furans (only detected congeners shown)																		
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-13	MW-13	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-14	MW-15	MW-15	MW-15	MW-15	MW-15
			Sample ID	MW-13-0811	MW-13-0612	MW-14-0910	MW-24-0910	MW-14-1210	MW-14-0211	MW-24-0211	MW-24-0511	MW-14-0811	MW-24-0811	MW-14-0612	MW-15-0910	MW-15-1210	MW-25-1210	MW-15-0211	MW-15-0511
			Sample Date	8/10/2011	6/28/2012	9/23/2010	9/23/2010	12/1/2010	2/22/2011	2/22/2011	5/13/2011	8/10/2011	8/10/2011	6/28/2012	9/23/2010	12/1/2010	12/1/2010	2/23/2011	5/17/2011
			Sample Quarter	3Q	2Q	3Q	3Q	4Q	1Q	1Q	2Q	3Q	3Q	2Q	3Q	4Q	4Q	1Q	2Q
			Sample Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			Sample Type	N	N	N	FD	N	N	FD	N	N	FD	N	N	N	FD	N	N
Chemical Name	Total/Disso	Unit	creening/Action Leve																
Metals																			
Arsenic	D	mg/L	0.005 (RvAL) [1]	NA	NA	0.00021 J	NA	0.00058	0.00050	0.00050 J	0.00060	0.00058	0.00057	0.00050 J	0.00022 J	0.00060	0.00053	0.00040 J	0.00052
Arsenic	T	mg/L	0.005 (RvAL) [1]	NA	NA	0.00021 J	NA	0.00051	0.00050 J	0.00050 J	0.00063	0.00055 J	0.00060	0.0004 J	0.00018 J	0.00060	0.00059	0.00040 J	0.00057
Chromium	D	mg/L	1.1	NA	NA	< 0.002	NA	< 0.002	< 0.002	< 0.002	< 0.002 UJ	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002 UJ
Chromium	T	mg/L	1.1	NA	NA	< 0.002	NA	< 0.002	0.0008 J	< 0.002	< 0.002 UJ	< 0.002	< 0.002	< 0.0025	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002 UJ
Copper	D	mg/L	0.0048	NA	NA	0.0039	NA	0.0021 J	0.0030	0.0029	< 0.0043	0.0033	0.0034	0.0037	0.0081	0.0053	0.0057	0.0060	0.0069
Copper	T	mg/L	0.0048	NA	NA	0.0032	NA	0.0026 J	0.0032	0.0036	< 0.0040	0.0034	0.0031	0.0034 J	0.0072	0.0055	0.0062	0.0059	0.0072
Nickel	D	mg/L	4.6	NA	NA	< 0.002	NA	< 0.002	0.0018 J	0.0018 J	0.0027	0.001 J	0.0008 J	0.0084	0.0007 J	0.0014 J	0.0015 J	0.0022	0.0027
Nickel	T	mg/L	4.6	NA	NA	< 0.002	NA	< 0.002	0.0022	0.0021	0.0028	0.0012 J	0.001 J	0.0087	0.0007 J	0.0014 J	0.0015 J	0.0019 J	0.0028
Silver	D	mg/L	0.0019 (RvAL)*	NA	NA	0.000008 J	NA	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Silver	T	mg/L	0.0019 (RvAL)*	NA	NA	0.000008 J	NA	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Thallium	D	mg/L	0.00047	NA	NA	0.000014 J	NA	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000045	0.000054	0.000054	< 0.00002	0.00004
Thallium	T	mg/L	0.00047	NA	NA	0.000014 J	NA	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000045	0.000056	0.000055	0.000046	0.00004
Zinc	D	mg/L	26	NA	NA	0.0035	NA	0.0031	0.0037 J	0.0030 J	0.003	0.0034	0.0036	0.004	0.0046	0.0052	0.0066	0.0028 J	0.0053
Zinc	T	mg/L	26	NA	NA	0.0038	NA	0.0029	0.0044	0.0029 J	0.0032	0.0037	0.0037	0.0042	0.0045	0.0054	0.0051	0.0029 J	0.0056
NWTPH																			
Diesel Range Hydrocarbons	T	mg/L	See Total	0.015 J	0.026 J	< 0.110	NA	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	0.012 J	0.015 J	0.040 J	< 0.110	< 0.110	0.019 J	< 0.110
Residual Range Organics (RRO)	T	mg/L	See Total	< 0.110	< 0.110	< 0.110	NA	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	0.015 J	0.026	< 0.110	NA	< 0.110	< 0.110	< 0.110	< 0.110	< 0.110	0.012 J	0.015	0.040 J	< 0.110	< 0.110	0.019 J	< 0.110
Gasoline Range Organics-NWTPH	T	mg/L	1	< 0.250	< 0.250	< 0.250	NA	< 0.050	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.050	< 0.050	< 0.250	< 0.250
PCB																			
Aroclor 1254	T	ug/L	0.03 [2]	< 0.0050	< 0.0500	< 0.0049	NA	< 0.0049	< 0.0049	< 0.0050	< 0.0050	< 0.0049	< 0.0050	< 0.0500	< 0.0050	< 0.0050	< 0.0049	< 0.0050	< 0.0050
Aroclor 1260	T	ug/L	0.03 [2]	< 0.0050	< 0.0500	0.0019 J	NA	< 0.0049	< 0.0049	< 0.0050	0.0032	0.0021 J	< 0.0050	< 0.0500	< 0.0050	< 0.0050	< 0.0049	< 0.0050	< 0.0050
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.0050	< 0.0500	0.0019 J	NA	< 0.0049	< 0.0049	< 0.0050	0.0032	0.0021 J	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0049	< 0.0050	< 0.0050
VOCs																			
Carbon Disulfide	T	ug/L	NV	< 0.50	< 0.50	< 0.50	NA	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	T	ug/L	470	< 0.50	< 0.50	0.14 J	NA	0.20 J	0.11 J	0.10 J	< 0.50	< 0.50	0.08 J	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	T	ug/L	NV	< 0.50	< 0.50	< 0.50	NA	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.08 J	< 0.50	< 0.50	< 0.50	< 0.50
Dichloromethane	T	ug/L	590	< 2.0	< 2.0	< 2.00	NA	< 0.50	< 2.0	< 2.0	< 0.50	< 2.0	< 2.0	< 0.50	< 2.0	< 2.0	< 2.0	< 2.0	< 0.50
Ethylbenzene	T	ug/L	2100	< 0.50	< 0.50	< 0.50	NA	< 2.0	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylenes	T	ug/L	NV	< 0.50	< 0.50	< 0.50	NA	< 0.50	< 0.50	< 0.50	0.14 J	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	T	ug/L	3.3	< 0.50	< 0.50	< 0.50	NA	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2	1.7	1.7	1.5	1.8
Toluene	T	ug/L	15000	< 0.50	0.1 J	0.12 J	NA	< 0.50	0.09 J	< 0.50	0.14 J	0.10 J	0.06 J	0.10	0.15 J	< 0.50	< 0.50	0.06 J	0.07 J
Trichloroethene	T	ug/L	30	< 0.50	< 0.50	< 0.50	NA	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.13 J	0.13 J	0.13 J	0.10 J	0.11 J
1,2,4-Trimethylbenzene	T	ug/L	NV	< 1.0	< 2.0	< 1.00	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cPAH																			
Benzo(a)pyrene	T	ug/L	See Total	< 0.02	< 0.021	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020
Benzo(a)anthracene	T	ug/L	See Total	< 0.02	< 0.021	< 0.02	< 0.02	0.0043 J	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020
Benzo(b)fluoranthene	T	ug/L	See Total	< 0.02	< 0.021	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020
Benzo(k)fluoranthene	T	ug/L	See Total	< 0.02	< 0.021	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020
Chrysene	T	ug/L	See Total	< 0.02	< 0.021	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020
Dibenzo(a,h)anthracene	T	ug/L	See Total	< 0.02	< 0.021	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	< 0.02	< 0.021	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020	< 0.02	< 0.02	< 0.02	< 0.02	< 0.020
Total cPAH TEQ	T	ug/L	0.15	< 0.030	< 0.016	< 0.030	< 0.030	0.029	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.015	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030
SVOC																			
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	0.15 J	< 0.99	< 1.0	< 1.0	< 0.96	< 0.97	< 0.99	< 0.99	< 0.99	< 0.99	< 0.96	< 1.0	< 0.98	< 0.96	< 1.0	< 0.98
Butyl Benzyl Phthalate	T	ug/L	1900	NA	NA	0.044 J	0.045 J	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Di-n-butyl Phthalate	T	ug/L	4500	NA	NA	0.039 J	0.035 J	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.033 J	< 0.2	< 0.2	< 0.2	< 0.2
Phenol	T	ug/L	10000	NA	NA	< 0.50	< 0.50	< 0.48	< 0.49	< 0.50	< 0.50	< 0.50	< 0.50	< 0.48	< 0.50	< 0.49	< 0.48	< 0.50	< 0.50
Naphthalene	T	ug/L	NV	NA	NA	0.068 J	0.052 J	0.037	0.034	0.016	0.024	0.042	0.037	0.15	0.035 J	0.012 J	0.043 J	0.045	0.035
Conventionals																			
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	< 5.0	< 5.0	13	NA	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	10.5	< 5.0	< 5.0	< 5.0	< 5.0
Dioxin/Furans (only detected congeners shown)																			
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	52.2 BJ	< 33.3 UJ	NA	NA	NA	NA	NA	NA	NA	57.1 BJ	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	< 25.0	3.39 J	NA	NA	NA	NA	NA	NA	NA	< 24.5	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	< 25.0	< 25.3	NA	NA	NA	NA	NA	NA	NA	2.22 J	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	6.80E-07	5.20E-07	NA	NA	NA	NA	NA	NA	NA	5.50E-07	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

			Location ID	MW-15	MW-15	MW-15	MW-15 Dup
			Sample ID	MW-25-0511	MW-15-0211	MW-15-0612	MW-25-0612
			Sample Date	5/17/2011	8/10/2011	6/28/2012	6/28/2012
			Sample Quarter	2Q	3Q	2Q	2Q
			Sample Matrix	WG	WG	WG	WG
			Sample Type	FD	N	N	FD
Chemical Name	**Total/Disso**	**Unit**	**creening/Action Leve**				
Metals							
Arsenic	D	mg/L	0.005 (RvAL) [1]	**0.00051**	< 0.00050	**0.0003** J	**0.0003** J
Arsenic	T	mg/L	0.005 (RvAL) [1]	**0.00052**	**0.00047** J	**0.0003** J	**0.0003** J
Chromium	D	mg/L	1.1	< 0.002 UJ	< 0.002	< 0.0007	< 0.002
Chromium	T	mg/L	1.1	< 0.002 UJ	< 0.002	**0.0007** J	< 0.002
Copper	D	mg/L	0.0048	**0.0070**	**0.0058**	**0.0055**	**0.0052**
Copper	T	mg/L	0.0048	**0.0067**	**0.0058**	**0.0061**	**0.0058**
Nickel	D	mg/L	4.6	**0.0036**	**0.0011**	**0.0073**	**0.0067**
Nickel	T	mg/L	4.6	**0.0031**	**0.0011** J	**0.0067**	**0.0067**
Silver	D	mg/L	0.0019 (RvAL)*	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Silver	T	mg/L	0.0019 (RvAL)*	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Thallium	D	mg/L	0.00047	**0.000036**	< 0.000034	**0.000049**	**0.000043**
Thallium	T	mg/L	0.00047	**0.000038**	< 0.000039	**0.000048**	**0.000045**
Zinc	D	mg/L	26	**0.0053**	**0.0031**	**0.0042**	**0.004**
Zinc	T	mg/L	26	**0.0042**	**0.0031**	**0.0046**	**0.0046**
NWTPH							
Diesel Range Hydrocarbons	T	mg/L	See Total	< 0.110	**0.017** J	**0.018** J	**0.022** J
Residual Range Organics (RRO)	T	mg/L	See Total	< 0.110	< 0.120	< 0.110	< 0.110
Total Diesel + Residual Range	T	mg/L	0.5 (RvAL)	< 0.110	**0.017** J	**0.018**	**0.022**
Gasoline Range Organics-NWTPH	T	mg/L	1	< 0.250	< 0.250	< 0.250	< 0.250
PCB							
Aroclor 1254	T	ug/L	0.03 [2]	< 0.0050	< 0.0050	< 0.0500	< 0.0500
Aroclor 1260	T	ug/L	0.03 [2]	< 0.0050	< 0.0050	< 0.0500	< 0.0500
Total PCBs		ug/L	0.01 (RvAL) [2]	< 0.0050	< 0.0050	< 0.500	< 0.0500
VOCs							
Carbon Disulfide	T	ug/L	NV	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	T	ug/L	470	< 0.50	< 0.50	**0.15 J**	**0.16 J**
Chloromethane	T	ug/L	NV	< 0.50	< 0.50	< 0.50	< 0.50
Dichloromethane	T	ug/L	590	< 0.50	< 2.0	< 2.0	< 2.0
Ethylbenzene	T	ug/L	2100	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylenes	T	ug/L	NV	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	T	ug/L	3.3	**1.8**	**1.6**	< **1.4**	**1.4**
Toluene	T	ug/L	15000	**0.27** J	< 0.50	< **0.12 J**	**0.13 J**
Trichloroethene	T	ug/L	30	**0.11** J	< 0.50	< 0.50	< 0.50
1,2,4-Trimethylbenzene	T	ug/L	NV	< 1.0	< 1.0	< 2.0	< 2.0
cPAH							
Benzo(a)pyrene	T	ug/L	See Total	< 0.02	< 0.020	< 0.019	< 0.021
Benzo(a)anthracene	T	ug/L	See Total	< 0.02	**0.006** J	< 0.019	< 0.021
Benzo(b)fluoranthene	T	ug/L	See Total	< 0.02	**0.0047** J	< 0.019	< 0.021
Benzo(k)fluoranthene	T	ug/L	See Total	< 0.02	**0.0041** J	< 0.019	< 0.021
Chrysene	T	ug/L	See Total	< 0.02	**0.005** J	< 0.019	< 0.021
Dibenzo(a,h)anthracene	T	ug/L	See Total	< 0.02	**0.0052** J	< 0.019	< 0.021
Indeno(1,2,3-cd)pyrene	T	ug/L	See Total	< 0.02	**0.0059** J	< 0.019	< 0.021
Total cPAH TEQ	T	ug/L	0.15	< 0.030	**0.023**	< 0.014	< 0.016
SVOC							
bis(2-Ethylhexyl)phthalate	T	ug/L	1.7 (RvAL) [3]	< 0.98	< 1.0	< 0.98	< 1.0
Butyl Benzyl Phthalate	T	ug/L	1900	< 0.2	< 0.2	< 0.2	< 0.2
Di-n-butyl Phthalate	T	ug/L	4500	< 0.2	< 0.2	< 0.2	< 0.2
Phenol	T	ug/L	10000	< 0.49	< 0.50	< 0.49	< 0.50
Naphthalene	T	ug/L	NV	**0.02**	**0.031**	**0.16** J	**0.11** J
Conventionals							
Solids, Volatile Suspended	T	mg/L	NV	NA	NA	NA	NA
Total Suspended Solids	T	mg/L	NV	< 5.0	< 5.0	< 5.0	< 5.0
Dioxin/Furans (only detected congeners shown)							
OCTACHLORODIBENZO-P-DIOXIN	T	pg/L	NV	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZO-P-DIOXINS	T	pg/L	NV	NA	NA	NA	NA
TOTAL HEPTACHLORODIBENZOFURANS	T	pg/L	NV	NA	NA	NA	NA
Total TEQ Dioxin/Furans	T	ug/L	5.8E-06 [6]	NA	NA	NA	NA

Table 5 T-117 Groundwater Detections First Quarter 2008 to Second Quarter 2012

Notes:

Red	Detected value that exceeds screening level
Bold	Detected result
Blue	Non-detected value that exceeds the screening level
<	Non-detect at the reporting limit shown
A	Reported result is likely a combination of Aroclor 1254/1260; accurate identification of Aroclor 1254 cannot
B	The analyte was found in the associated method blank as well as the sample
FD	Field Duplicate
J	Estimated concentration
J-	Estimated concentration, biased low
Y	Eluting in approximately the correct range, but elution pattern does not match the calibration standard
O	Resembles a petroleum product eluting in approximately the correct range, but does not match the calibration standard
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
NA	Not Analyzed
NV	No established value
ND	No individual constituent detected above the reporting limit
mg/L	milligram per liter
ug/L	microgram per liter
RvAL	Removal action level for groundwater as listed in the Terminal 117 Early Action Area Revised EE/CA applied to samples obtained after June 2010. Refer to footnotes below for changes in screening/action levels.

Screening levels are proposed levels only, for delineation of the groundwater monitoring well network

TPH/NWTPH screening levels obtained from the MTCA Method A Cleanup Level for groundwater

PCB screening levels are obtained from the Surface Water ARAR - Aquatic Life - Marine/Chronic - National Toxics Rule, 40 CFR 131

Cadmium, chromium, copper, lead, and silver screening levels obtained from the WAC Chapter 173-201A- Aquatic Life - Marine/Acute Water Quality Standards for Surface Waters of the State of Washington

All other groundwater screening levels were obtained from the Surface Water ARAR - Human Health – Marine – Clean Water Act §304

* Indicates RvAL is the same as the screening level previously applied prior to publication of EE/CA

[1] Prior to establishment of the RvAL in June 2010, the detected concentrations of arsenic were compared to a screening level of 0.00014 mg/L

[2] Prior to establishment of the RvAL in June 2010 for total PCBs, the detected concentrations of individual arochlors were compared to a screening level of 0.03 ug/L

[3] Prior to establishment of the RvAL in June 2010, the detected concentrations of bis (2-Ethylhexyl)phthalate were compared to a screening level of 2.2 ug/L

[4] Prior to establishment of the RvAL in June 2010, the detected concentrations of cPAHs were compared to a screening level of 0.018 ug/L for individual cPAHs

[5] RvAL for cPAHs based on total cPAHs TEQ

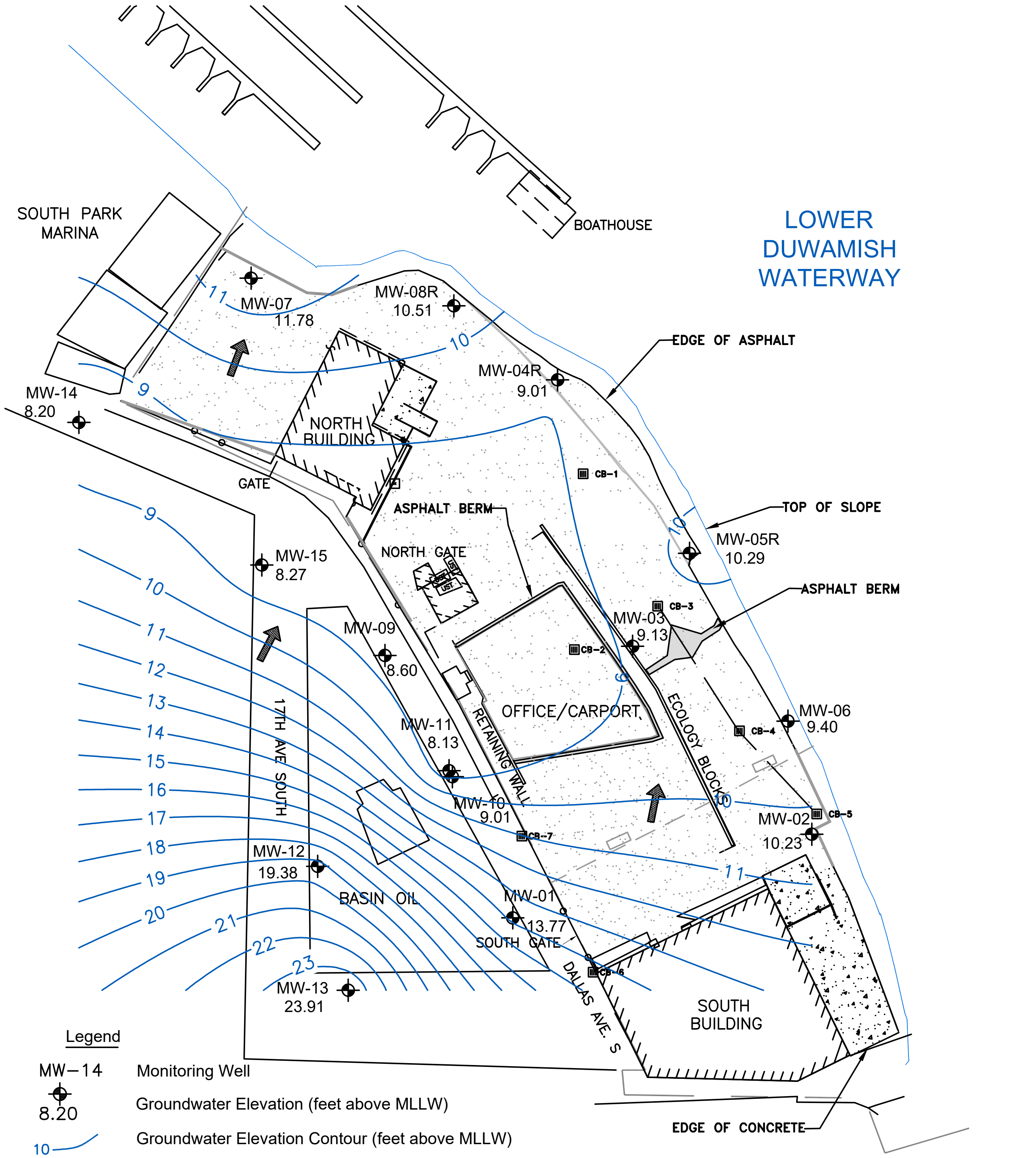
[6] Dioxin and furan results were compared to the Safe Drinking Water Act published maximum contaminant level (MCL) for 2,3,7,8-TCDD of 3e-05 µg/L, adjusted to a value of 5.8e-06 µg/L in compliance with MTCA equation 720-2. For the TEF calculation, one-half of the estimated detection limit (EDL) is used for non-detected congeners

Table 7 Mann-Kendall Regression Test Outputs from ProUCL 4.1

	Analyte							
Well	**Total PCBs**	**TPH**	**Dissolved Arsenic**	**Total Arsenic**	**Dissolved Silver**	**Total Silver**	**Dissolved Copper**	**Total Copper**
MW-02	decreasing with full dataset; decreasing using 5 detected values (of 16)	decreasing with full dataset; all samples detected	IE; 5 samples	IE; no detections	IE; for all wells using full datasets and using detected data only, low detection frequencies and varrying reporting limits.	IE; for all wells using full datasets and using detected data only, low detection frequencies and varrying reporting limits.	IE; no detections	IE; no detections
MW-03	IE; 4 samples	IE; 4 samples	IE; 3 samples	IE; no detections			IE; no detections	IE; no detections
MW-04	IE; 5 samples	IE; 5 samples	IE; 5 samples	IE; 5 samples			IE; 5 samples	IE; 5 samples
MW-05	decreasing; 13 of 15 detected	decreasing; but only 4 of 15 detected, IE for detected data	apparent decreasing trend due to older undetected data with high DLs (up to 50 ug/L); IE using detected data only	apparent decreasing trend but only 3 of 15 samples detected			decreasing; but only 4 of 15 detected, IE for detected data	decreasing; but only 3 of 15 detected, IE for detected data
MW-06	IE; 4 samples	IE; 4 samples	IE; 4 samples	IE; 4 samples			IE; 4 samples	IE; 4 samples
MW-07	decreasing; 11 of 17 detected	decreasing; but only 4 of 16 detected, IE for detected data	IE; 5 samples	IE; no detections			IE; no detections	IE; no detections
MW-08	apparent decreasing, but only 3 of 16 detected, IE for detected data	decreasing; but only 5 of 16 detected, IE for detected data	decreasing trend using detected data only (10 of 17 samples)	decreasing trend using detected data only (7 of 17 samples)			decreasing with full dataset; decreasing using 7 detected values (of 17)	decreasing with full dataset; decreasing using 7 detected values (of 17)
Upland Summary	decreasing; however only 45 of 93 values detected	decreasing; however only 40 of 93 values detected	old data have high DLs; 29 of 59 samples detected	decreasing trend in MW-08 only			decreasing trend in MW-08 others IE	decreasing trend in MW-08 other IE
MW-01	decreasing with full dataset; decreasing using 5 detected values (of 16)	decreasing with full dataset; decreasing using 7 detected values (of 17)	IE; 5 samples	IE; no detections	IE; for all wells using full datasets and using detected	IE; for all wells using full datasets and using detected	IE; no detections	IE; no detections
MW-09	IE; 2 samples	IE; 2 samples	IE; 2 samples					
MW-10	IE; 4 samples	IE; 4 samples	IE; 4 samples					
MW-11	IE; 14 samples	decreasing; however older data above higher RL (0.5 ug/L) cause apparent trend; removing three ND samples yields an output of IE	IE; 3 samples					
MW-12	IE; 11 samples	apparent decreasing trend is function of decreasing reporting limit; only 1 of 11 samples detected	IE; 1 sample					
MW-13	IE; 11 samples	apparent decreasing trend is function of older data being ND at higher RLs	IE; 1 sample					
MW-14	IE; 6 samples	IE; 6 samples	IE; 6 samples					
MW-15	IE; 6 samples	IE; 6 samples	IE; 6 samples					
StreetsROW Summary	n/a; only 4 of 54 samples detected	n/a; only 23 of 54 samples detected	too few samples					

Notes:

IE = Insufficient evidence to identify a significant trend at specified level of significance. dataset too small or values are stable.



Legend

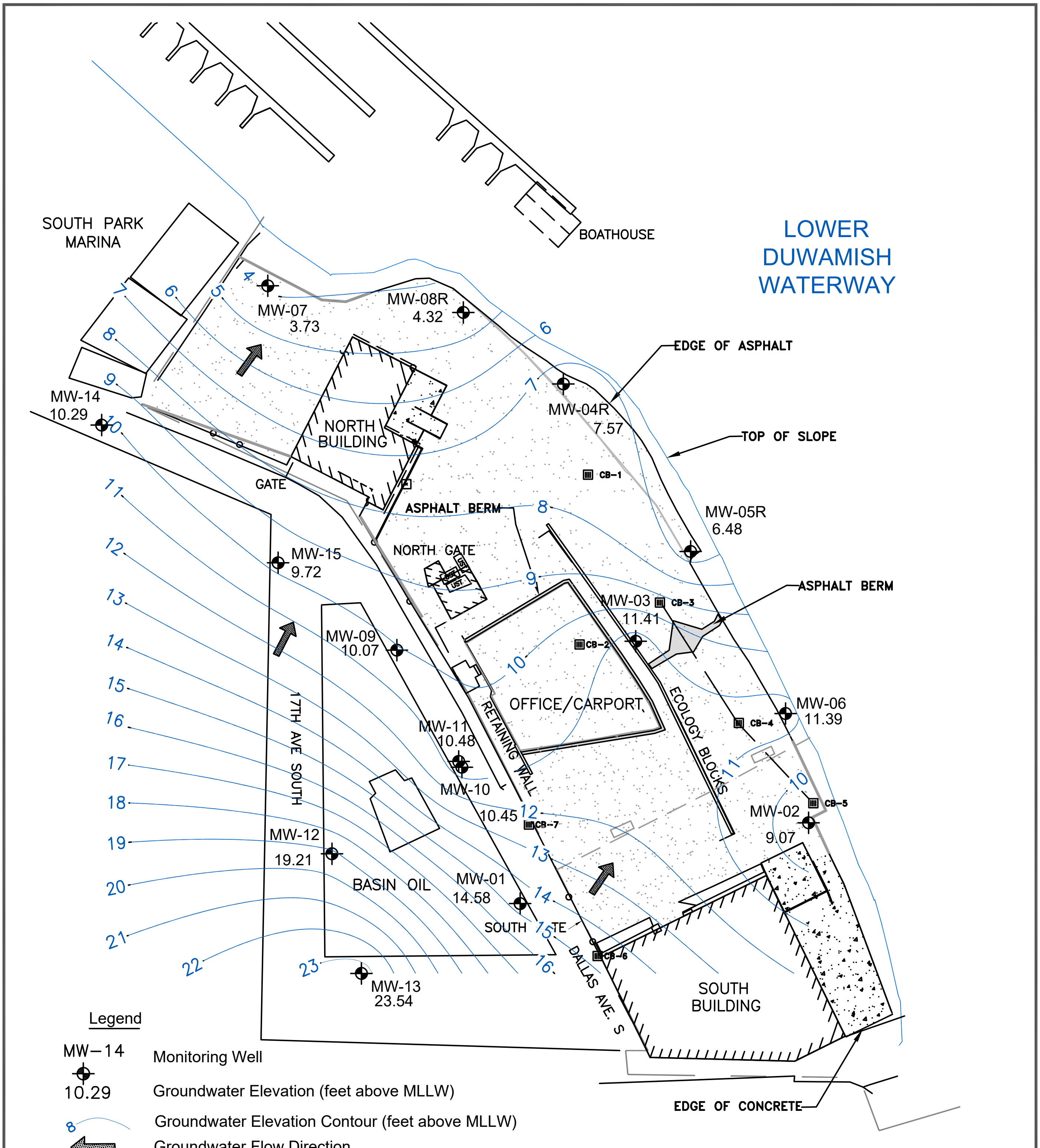
MW–14	Monitoring Well
8.20	Groundwater Elevation (feet above MLLW)
10	Groundwater Elevation Contour (feet above MLLW)
	Groundwater Flow Direction
MLLW =	Mean Lower Low Water
CB–5	Collection Basin

Notes:

Measurements performed on December 1, 2010 between 1113 and 1141 hours. Low tide on December 1, 2010: 4.8 ft. at 0623 hours. High tide on December 1, 2010: 11.8 ft. at 1236.

SEALASKA	Figure 3-1 Groundwater Surface Elevation Map Rising Tide Fourth Quarter 2010	Port of Seattle Terminal T-117 Annual GW Report

EALASKA\POS\GW ANNUAL 2011\FIG 3-1
/ 24, 2012 REV June 28, 2012



Legend

MW–14	Monitoring Well
10.29	Groundwater Elevation (feet above MLLW)
8	Groundwater Elevation Contour (feet above MLLW)
	Groundwater Flow Direction
MLLW =	Mean Lower Low Water
CB–5	Collection Basin

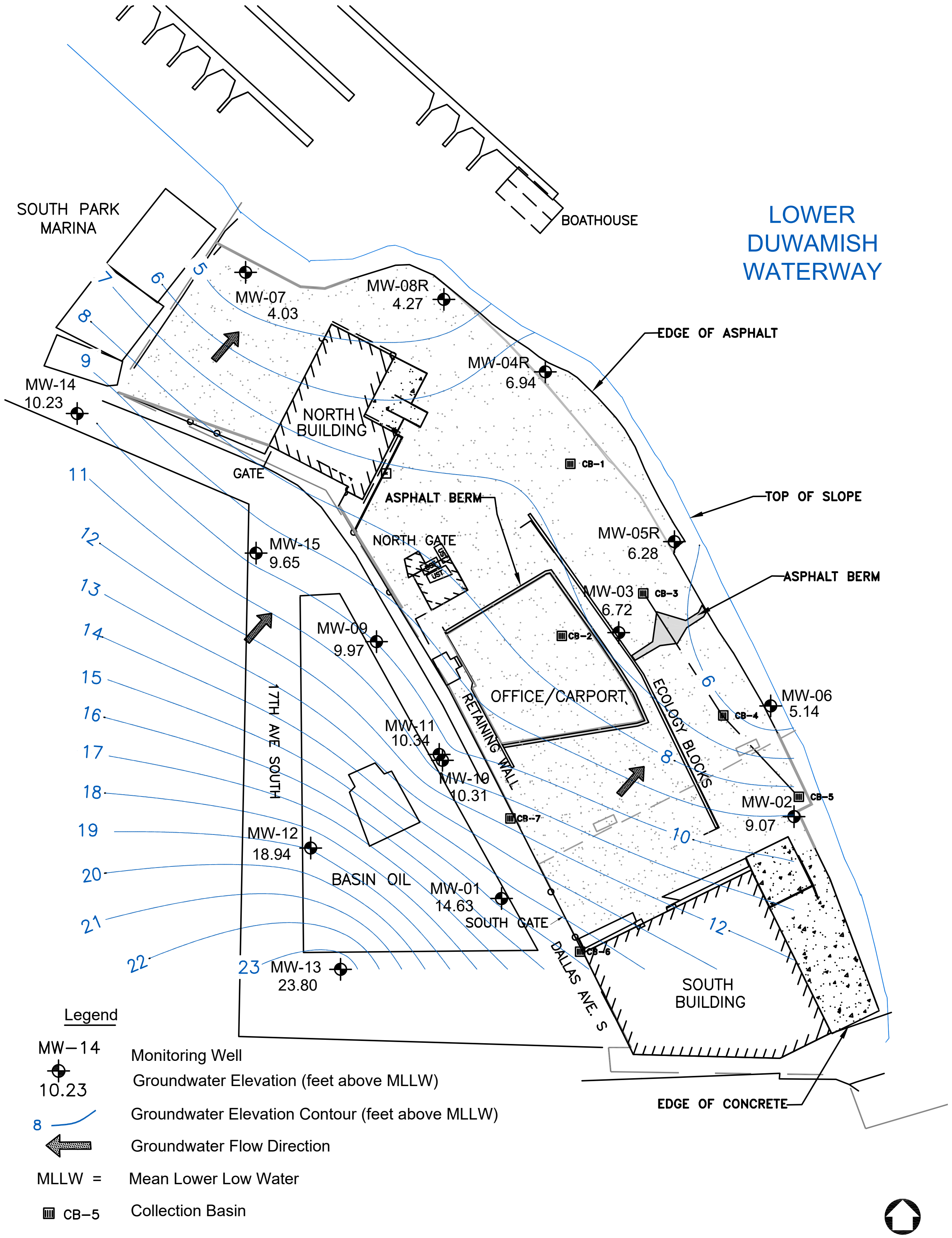
Notes:
Measurements performed on February 22, 2011 between 1412 and 1512 hours. Low tide on February 22, 2011: 0.3 ft. at 1412 hours

P:SEALASKA\POS\GW ANNUAL 2011\FIG 3-2
MAY 24, 2012 REV JUNE 28, 2012

SEALASKA

Figure 3-2
Groundwater Surface Elevation Map
Low Tide First Quarter 2011

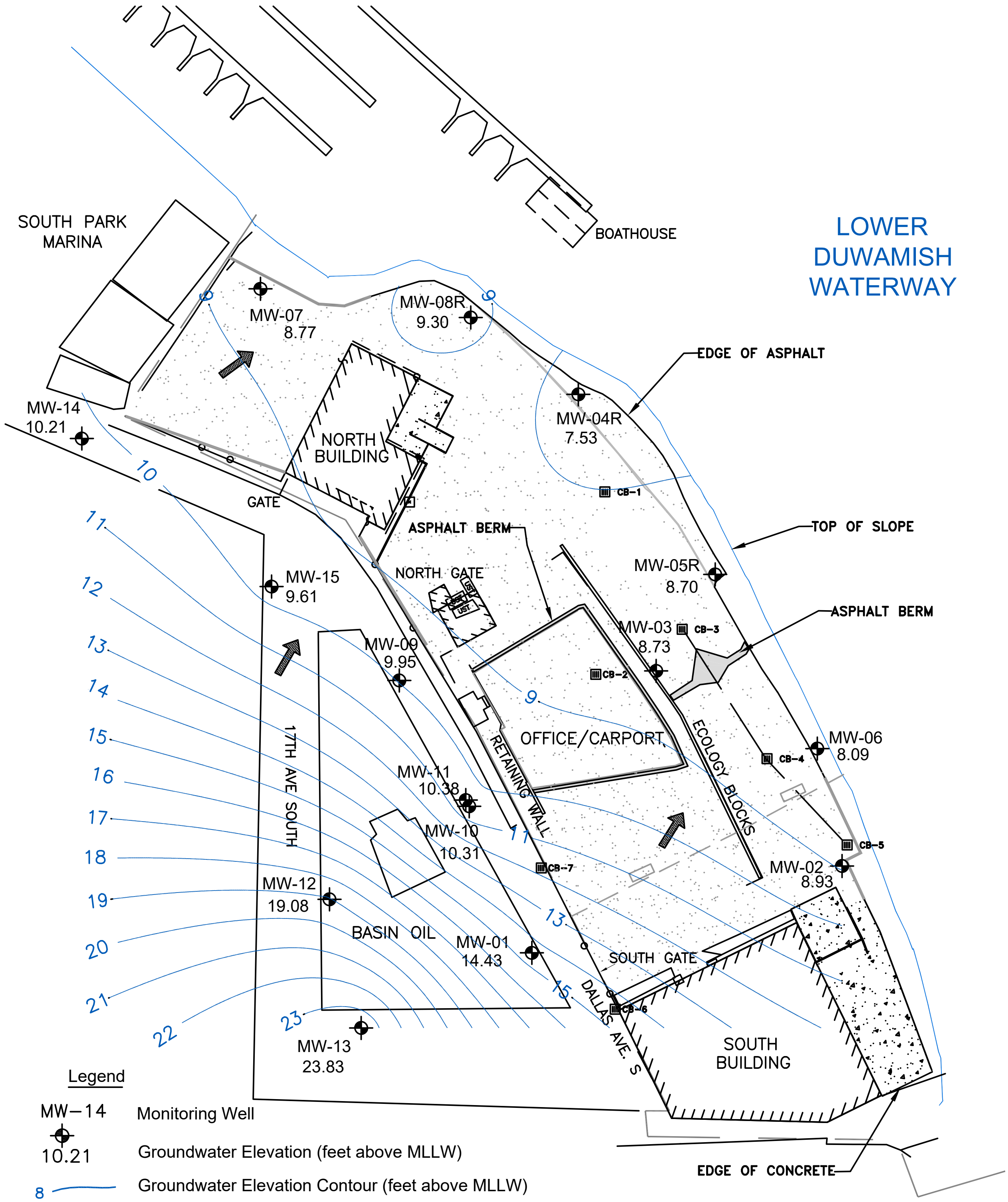
Port of Seattle
Terminal T-117
Annual GW Report



Notes:
Measurements performed on May 13, 2011 between 0838 and 0902 hours. Low tide on May 13, 2011: 1.7 ft. at 0838 hours

P:SEALASKA\POS\GW ANNUAL 2011\FIG 3-3
MAY 24, 2012 REV JUNE 28, 2012

SEALASKA	Figure 3-3 Groundwater Surface Elevation Map Low Tide Second Quarter 2011	Port of Seattle Terminal T-117 Annual GW Report



Legend

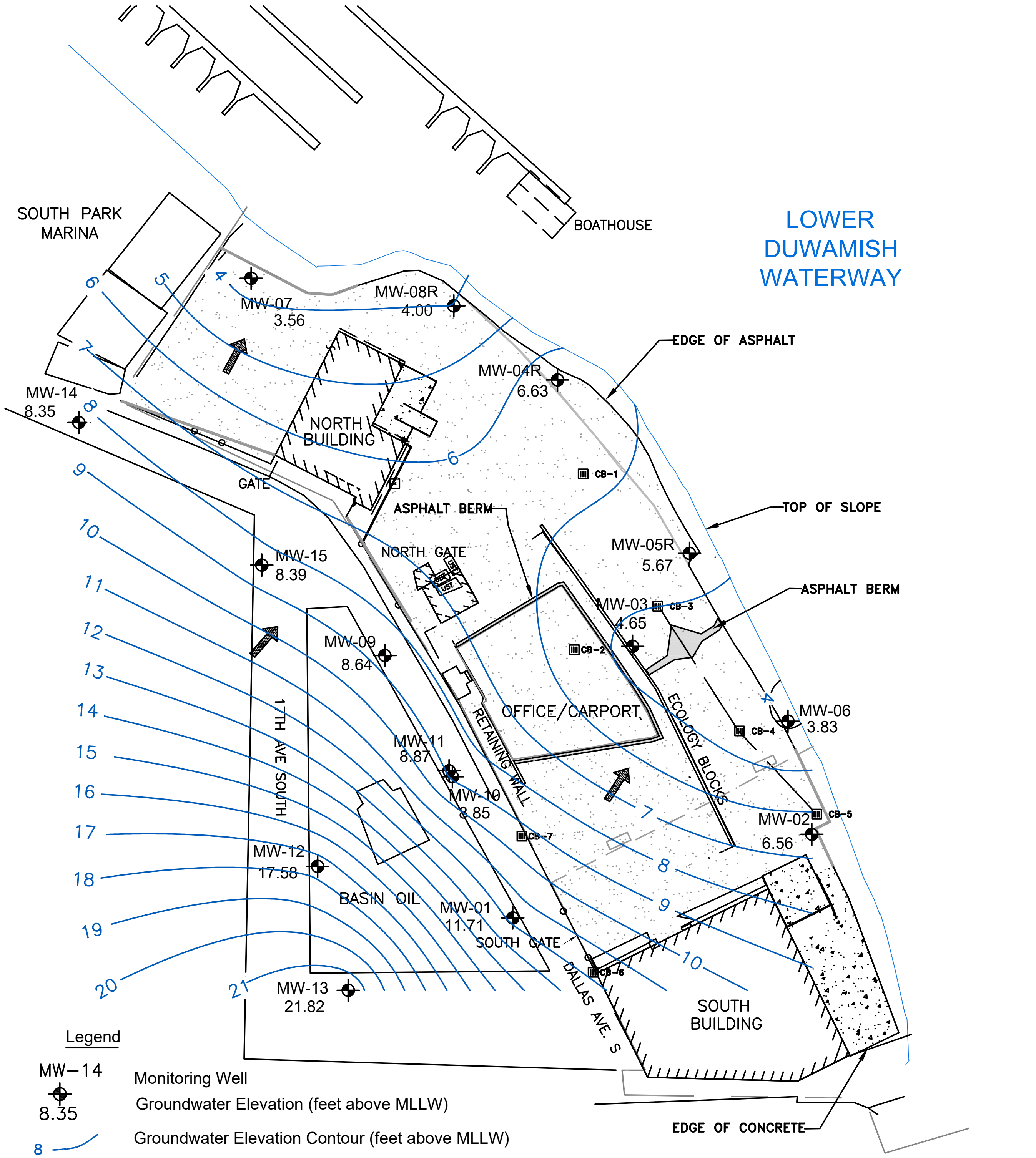
MW–14	Monitoring Well
10.21	Groundwater Elevation (feet above MLLW)
8	Groundwater Elevation Contour (feet above MLLW)
	Groundwater Flow Direction
MLLW =	Mean Lower Low Water
CB–5	Collection Basin

0 100 200
Scale in Feet

Notes:
Measurements performed on May 13, 2011 between 1448 and 1538 hours; MW-14 (not tide dependent) measured at 1240 (pre-purge) due to it being purged/sampled at time of high tide.
High tide on May 13, 2011: 8.5 ft. at 1445 hours

P:SEALASKA\POS\GW ANNUAL 2011\FIG 3-4
MAY 24, 2012 REV JUNE 28, 2012

SEALASKA	Figure 3-4 Groundwater Elevation T-117 High Tide Second Quarter 2011	Port of Seattle Terminal T-117 Annual GW Report



Legend

MW–14 8.35 Monitoring Well
Groundwater Elevation (feet above MLLW)

8 Groundwater Elevation Contour (feet above MLLW)

Groundwater Flow Direction

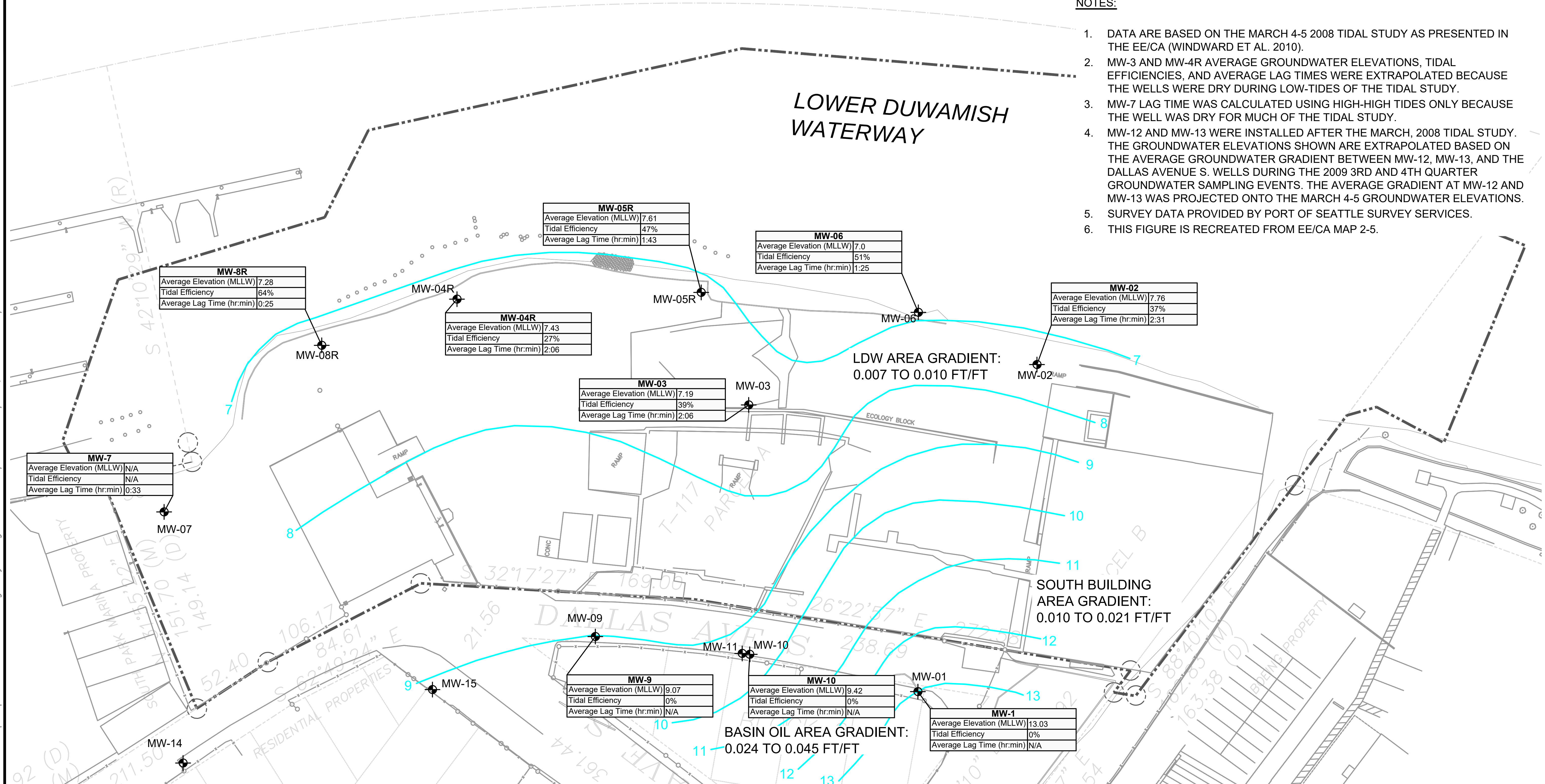
MLLW = Mean Lower Low Water

CB–5 Collection Basin

Notes:
Measurements performed on August 9, 2011 between 0748 and 0823 hours. Low tide on August 9, 2011: -0.9 feet at 0816 hours

P:SEALASKA\POS\3rd qtr 2011 GW report\FIG 3-5
OCTOBER 7, 2011 REV JUNE 28, 2012

SEALASKA	Figure 3-5 Groundwater Surface Elevation Map Low Tide Third Quarter 2011	Port of Seattle Terminal T-117 Annual GW Report



NOTES:

1. DATA ARE BASED ON THE MARCH 4-5 2008 TIDAL STUDY AS PRESENTED IN THE EE/CA (WINDWARD ET AL. 2010).
2. MW-3 AND MW-4R AVERAGE GROUNDWATER ELEVATIONS, TIDAL EFFICIENCIES, AND AVERAGE LAG TIMES WERE EXTRAPOLATED BECAUSE THE WELLS WERE DRY DURING LOW-TIDES OF THE TIDAL STUDY.
3. MW-7 LAG TIME WAS CALCULATED USING HIGH-HIGH TIDES ONLY BECAUSE THE WELL WAS DRY FOR MUCH OF THE TIDAL STUDY.
4. MW-12 AND MW-13 WERE INSTALLED AFTER THE MARCH, 2008 TIDAL STUDY. THE GROUNDWATER ELEVATIONS SHOWN ARE EXTRAPOLATED BASED ON THE AVERAGE GROUNDWATER GRADIENT BETWEEN MW-12, MW-13, AND THE DALLAS AVENUE S. WELLS DURING THE 2009 3RD AND 4TH QUARTER GROUNDWATER SAMPLING EVENTS. THE AVERAGE GRADIENT AT MW-12 AND MW-13 WAS PROJECTED ONTO THE MARCH 4-5 GROUNDWATER ELEVATIONS.
5. SURVEY DATA PROVIDED BY PORT OF SEATTLE SURVEY SERVICES.
6. THIS FIGURE IS RECREATED FROM EE/CA MAP 2-5.

LEGEND

MW-07 MONITORING WELL LOCATION AND ID

T-117 STUDY AREA

8 GROUNDWATER CONTOUR

MW-7	
Average Elevation (MLLW)	N/A
Tidal Efficiency	N/A
Average Lag Time (hr:min)	0:33

THE AVERAGE GROUNDWATER ELEVATION FOR THE WELL OVER A FULL TIDAL CYCLE

THE TIDAL CHANGE IN THE WELL DIVIDED BY THE TIDAL CHANGE IN THE WATERWAY. 100% REPRESENTS THE HIGHEST POSSIBLE TIDAL INFLUENCE AND 0% REPRESENTS NO TIDAL INFLUENCE.

THE DELAY IN THE TIDAL CYCLE IN THE WELL COMPARED TO THE WATERWAY (I.E. THE TIME BETWEEN HIGH TIDE IN THE WATERWAY AND HIGH TIDE IN THE WELL).

30' 0' 30' 60'

CRETE CONSULTING, INC.

INTRERIM GROUNDWATER REPORT
T-117 EARLY ACTION AREA

2008 TIDAL STUDY

DATE: 4/24/2012 DRWN: BTS

FIGURE 3-6

File: K:\Project\clients\Crete\T117\Report - Feb2012\cad\T117_2012-02_027.dwg Layout: figure User: swp Plotted: Apr 24, 2012 - 5:04pm Xref's:

Appendix A Groundwater Water-Level Measurements

GROUNDWATER LEVEL MEASUREMENTS - 4th Qtr 2010 Rising Tide

Port of Seattle T-117
Project No. 15044.001

Date: 12/1/2010
Duwamish Tide Level: Rising Tide
Recorded By: M.Tillotson / M. Brooks

Well No.	TOC Elevation (Feet, MLLW)	Time	Depth to Water (Feet)	Water Elevation (Feet, MLLW)	Comments
MW-01	21.87	1141	8.1	13.77	
MW-02	15.48	1113	5.25	10.23	
MW-03	16.45	1121	7.32	9.13*	PT = 0.01 ft
MW-04R	18.86	1120	9.85	9.01	
MW-05R	17.33	1123	7.04	10.29	
MW-06	16.32	1127	6.92	9.40	
MW-07	19.85	1114	8.07	11.78	
MW-08R	19.40	1119	8.89	10.51	
MW-09	23.40	1138	14.80	8.60	
MW-10	22.83	1140	13.82	9.01	
MW-11	23.07	1139	14.94	8.13	
MW-12	24.20	1134	4.82	19.38	
MW-13	27.76	1135	3.85	23.91	
MW-14	22.26	1130	14.06	8.20	
MW-15	22.58	1132	14.31	8.27	

Notes: Low Tide @ 0623 (4.8 ft) High Tide @ 1236 (11.8 ft)

* Thick black floating petroleum product present in well.

GROUNDWATER LEVEL MEASUREMENTS - 1st Qtr 2011 Low Tide

Port of Seattle T-117
Project No. 15044.001

Date: 2/22/2011
Duwamish Tide Level: Low Tide
Recorded By: A. Lewis/S. James

Well No.	TOC Elevation (Feet, MLLW)	Time	Depth to Water (Feet)	Water Elevation (Feet, MLLW)	Comments
MW-01	21.87	1448	7.29	14.58	
MW-02	15.48	1433	6.41	9.07	
MW-03	16.45	1428	5.04	11.41*	DTP = 5.01; PT = 0.03 ft
MW-04R	18.86	1419	11.29	7.57	
MW-05R	17.33	1422	10.85	6.48	
MW-06	16.32	1427	4.93	11.39	
MW-07	19.85	1412	16.12	3.73	
MW-08R	19.40	1417	15.08	4.32	
MW-09	23.40	1439	13.33	10.07	
MW-10	22.83	1445	12.38	10.45	
MW-11	23.07	1442	12.59	10.48	
MW-12	24.20	1504	4.99	19.21	
MW-13	27.76	1512	4.22	23.54	
MW-14	22.26	1456	11.97	10.29	
MW-15	22.58	1453	12.86	9.72	

Notes: Low Tide @ 1412 (0.3 ft); High Tide @ 0731 (12.3 ft)

* Thick black petroleum product present in well.

GROUNDWATER LEVEL MEASUREMENTS - 2nd Qtr 2011 Low Tide

Port of Seattle T-117
Project No. 15044.001

Date: 5/13/2011
Duwamish Tide Level: Low Tide
Recorded By: A. Lewis/S. James

Well No.	TOC Elevation (Feet, MLLW)	Time	Depth to Water (Feet)	Water Elevation (Feet, MLLW)	Comments
MW-01	21.87	0845	9.51	12.36	
MW-02	15.48	0854	6.41	9.07	
MW-03	16.45	0902	9.73	6.72*	DTP = 9.62; PT = 0.11 ft
MW-04R	18.86	0847	11.92	6.94	
MW-05R	17.33	0849	11.05	6.28	
MW-06	16.32	0852	11.18	5.14	
MW-07	19.85	0843	15.82	4.03	
MW-08R	19.40	0845	15.13	4.27	
MW-09	23.40	0838	13.43	9.97	
MW-10	22.83	0843	12.52	10.31	
MW-11	23.07	0840	12.73	10.34	
MW-12	24.20	0848	5.26	18.94	
MW-13	27.76	0851	3.96	23.80	
MW-14	22.26	0857	12.03	10.23	
MW-15	22.58	0854	12.93	9.65	

Notes: Low Tide @ 0838 (1.7 ft); High Tide @ 1445 (8.5 ft)

* Thick black floating petroleum product present in well.

GROUNDWATER LEVEL MEASUREMENTS - 2nd Qtr 2011 High Tide

Port of Seattle T-117
Project No. 15044.001

Date: 5/13/2011
Duwamish Tide Level: High Tide
Recorded By: A. Lewis/S. James

Well No.	TOC Elevation (Feet, MLLW)	Time	Depth to Water (Feet)	Water Elevation (Feet, MLLW)	Comments
MW-01	21.87	1526	7.44	14.43	
MW-02	15.48	1501	6.55	8.93*	DTP = 6.54; PT = 0.01 ft
MW-03	16.45	1510	7.72	8.73*	DTP = 9.62; PT = 0.10 ft
MW-04R	18.86	1451	11.33	7.53	
MW-05R	17.33	1454	8.63	8.70	
MW-06	16.32	1457	8.23	8.09	
MW-07	19.85	1445	11.08	8.77	
MW-08R	19.40	1448	10.1	9.30	
MW-09	23.40	1517	13.45	9.95	
MW-10	22.83	1523	12.52	10.31	
MW-11	23.07	1520	12.69	10.38	
MW-12	24.20	1530	5.12	19.08	
MW-13	27.76	1533	3.93	23.83	
MW-14	22.26	1240	12.05	10.21**	DTW = pre-purge
MW-15	22.58	1538	12.97	9.61	

Notes: Low Tide @ 0838 (1.7 ft); High Tide @ 1445 (8.5 ft)

* Thick black floating petroleum product present in well.
** Sampling well during high tide and DTW measurments; water-level measurement shown is pre-purge DTW.

GROUNDWATER LEVEL MEASUREMENTS - 3rd Qtr 2011 Low Tide

Port of Seattle T-117
Project No. 15044.002

Date: 8/9/2011
Duwamish Tide Level: Low Tide
Recorded By: J. Ruef/B. Boyd

Well No.	TOC Elevation (Feet, MLLW)	Time	Depth to Water (Feet)	Water Elevation (Feet, MLLW)	Comments
MW-01	21.87	0804	10.16	11.71	
MW-02	15.48	0818	8.92	6.56	
MW-03	16.45	0823	11.80	4.65*	DTP = 11.69; PT = 0.11 ft
MW-04R	18.86	0814	12.23	6.63	
MW-05R	17.33	0812	11.66	5.67	
MW-06	16.32	0816	12.49	3.83	
MW-07	19.85	0807	16.29	3.56	
MW-08R	19.40	0809	15.40	4.00	
MW-09	23.40	0755	14.76	8.64	
MW-10	22.83	0758	13.98	8.85	
MW-11	23.07	0757	14.20	8.87	
MW-12	24.20	0752	6.62	17.58	
MW-13	27.76	0800	5.94	21.82	
MW-14	22.26	0748	13.91	8.35	
MW-15	22.58	0750	14.19	8.39	

Notes: Low Tide @ 0816 (-0.9 ft) and High Tide @ 1619 (10.2 ft)

* Thick black floating petroleum product present in well.

APPENDIX A.8

Chemical and Equipment Inventory for South Park Marina

Chemical and Equipment Inventory for the South Park Marina

TIG environmental™
INVESTIGATIONS ▾ FORENSICS ▾ REMEDIATION

Chemical and Equipment Inventory for the South Park Marina

1. Introduction

The Intelligence Group, LLC (TIG) conducted inventories of the chemicals, potential hazardous materials, transformers, and storm and wash water treatment systems at the South Park Marina. This inventory included inspection of the South Park Marina operational spaces and shops and the retail tenant facilities, including South Park Tire Factory and Rick's Master Marine. Residential tenant buildings were excluded. Vessels and boats moored at the South Park Marina docks or being stored on the upland lot were not inspected.

TIG inspected seven buildings in total, all of which were in active use. This inspection noted chemicals and potential hazardous materials stored at the site. The buildings inspected included:

- SPM main administrative offices
- SPM main workshop
- SPM harbormaster shop
- Private tenant woodworking shop
- Tenant shower and laundry facilities
- Retail tenant: Rick's Master Marine
- Retail tenant: South Park Tire Factory

TIG also inventoried electrical transformers and air compressors located at the South Park Marina at the time of the visit.

2. Chemical Inventory

TIG inventoried over 900 individual chemical containers at the South Park Marina during field visits on September 20, 21, and 22 and October 18, 2016 (TIG 2016b; TIG 2016c). The majority of these were 1 quart or smaller in size, and included approximately 700 unique chemicals. Of the chemicals inventoried, most were located in the SPM main shop, South Park Tire Factory, Rick's Master Marine and a tenant woodworking shop (TIG 2016b; TIG 2016c). TIG reviewed chemical safety data sheets for these chemicals to identify constituents of concern (COCs) associated with the Lower Duwamish Waterway (LDW) that were present. Table 1 provides a complete list of chemicals inventoried. A brief overview of the findings in each area is provided below.

South Park Tire Factory

The South Park Tire Factory facility is the largest building at the South Park Marina site, at approximately 8,400 sq ft. The majority of this space is used for storage of new and used wheels and tires. A minority portion of the area is used as automotive service bays for wheel and tire servicing, brake servicing, and fluid changes. The remainder of the space is used as office and retail storefront space. The largest chemical quantity found at the site was approximately 140 gallons of bulk retail automotive engine oil. There were also many small quantities of 1 quart or less of retail automotive products in this shop. A large (approximately 140-gallon) waste oil collection container was located in the building. The container is emptied weekly. Two 55-gallon barrels for spent antifreeze were also present.

Rick's Master Marine

Rick's Master Marine is comprised of a retail storefront and two service bays totaling approximately 4,200 sq ft. The largest chemical quantities discovered were stored in 55-gallon drums resting atop spill collection basins. These included two barrels of a 50/50 antifreeze mixture and three barrels containing engine gear oil. Two collection barrels for waste oil and a third for mixed solvents were also located in the shop. There was and one barrel each for waste solvent-bearing materials and oil filters. Other chemicals found onsite included retail engine and boat maintenance and cleaning products in the storefront area, as well as a range of similar chemicals in the service areas.

Main Shop

The South Park Marina main shop is a two-story building of approximately 1,800 sq ft. This building is used for supply storage and as a workspace for maintenance work performed onsite. Equipment present included welding materials, plumbing materials, lighting fixtures and electrical supplies, an assortment of tools, and marine chemicals in small volume containers. The majority of these were petroleum-based lubricants, assorted adhesives, degreasers, and paints. A steel cabinet containing flammables was located outside the entrance to the main shop, secured with a padlock. A 200-gallon, waste oil storage tank and two, 20-gallon, spent antifreeze barrels were located in a Conex box (which also houses the boat wash water treatment system) adjacent to the main shop.

Harbormaster Shop

The harbormaster shop, adjacent to the main shop, contained few chemicals, as its primary use appeared to be as a tool storage area for South Park Marina employees. Two electric-powered carts used to transport lightweight items throughout the marina were stored here. An assortment of tools and other equipment, similar those found in the main shop, were discovered in the harbormaster shop.

Woodworking Shop

A tenant carpentry and woodworking shop of approximately 2,500 sq ft was identified on the east end of the South Park Marina. This shop is primarily used for the crafting and repair of wooden boats and vessels. At the time of inventory, two wooden vessels were stored inside this three-bayed building. The most common chemicals found were paints and enamels.

Shower and Laundry Facility

The SPM tenant showers and laundry facility was investigated and found to contain small amounts of retail cleaning products.

Administrative Office

The SPM administrative office is an approximately 800 sq ft building used by South Park Marina staff as a break room, restroom, office, and storage area. This building contained small quantities of household cleaners and solvents, as well as 1-quart to 1-gallon containers of retail pesticides.

Chemical and Equipment Inventory for the South Park Marina

Liveaboard Tenants

Sewage waste generated by the South Park Marina's live-aboard tenants is collected and disposed offsite through the Clean Vessel Act Grant Program, which provides grant funds to states for the construction, renovation, operation, and maintenance of waste reception facilities and pumpout stations for recreational boaters (TIG 2016f; U.S. Fish & Wildlife Service 2016).

3. Transformer Inventory

During site visits on September 20 and October 18, 2016, TIG identified and inspected a total of four pole-mounted transformers at the South Park Marina (TIG 2016a; TIG 2016d). Three transformers were located on a single utility pole located next to the shower and laundry facility. The fourth transformer was located on a separate utility pole located next to the westernmost residential structure. One transformer, located on the pole next to the shower and laundry facility, bears a label confirming it contains less than 1 part per million (ppm) of polychlorinated biphenyls (PCBs). The others do not have labels indicating PCB content (TIG 2016d). Transformer external dimensions were also estimated from the ground. Three of the four transformers were estimated to be 3 ft in height and 1.6 ft in diameter. One of these three bears the less than 1 ppm PCB label. The fourth transformer was estimated to be 4 ft in height and 1.9 ft in diameter (TIG 2016a; TIG 2016d).

4. Compressor Inventory

During site visits on September 20, and October 18, 2016, TIG identified and inspected six air compressors at the South Park Marina, including one at the SPM main shop, one located in the harbormaster shop, one at the South Park Tire Factory facility, and three at Rick's Master Marine shop (TIG 2016b; TIG 2016e). Three of these, one at each location, were connected to permanent air supply piping for daily tool use, and also supplied air for inflation and related shop purposes. The compressor located in the harbormaster office, has been plumbed for usage. The two compressors at the Rick's Master Marine shop included one that was decommissioned and is stored in the workshop, and one that is attached to the dry fire suppression system for the building.

At the Rick's Master Marine shop, the shop-use compressor is serviced annually by the shop owner, while the fire suppression compressor is serviced annually by Froula Alarm Systems, Inc., which is also responsible for all fire extinguishers at the South Park Marina. The compressor at the South Park Tire Factory facility is serviced annually by South Park Tire Factory mechanics. The compressor itself was stated to be less than five years old, with an older tank. The compressor at the main shop is new and expected to be serviced annually. The compressor in the harbormaster office, although plumbed for usage, is not regularly used (TIG 2016e) .

5. Former Fueling Station

During the site visit, South Park Marina staff provided information on a former onsite fueling station and underground storage tank (UST). In the 1980s, a fueling station was located on the north end of the central gangway, supplied by a UST in front of the main office and parking area of the marina. In 1991, the station and associated fueling line were decommissioned and the UST was removed (Burlington Environmental 1991).

6. Summary

TIG conducted a thorough inspection of all public areas within the South Park Marina facility, with a focus on identifying stored chemicals or equipment that could potentially have contributed to current or past LDW contamination. Residential areas were not investigated, though are expected to contain typical household chemicals (e.g., cleaners and possibly retail pesticides). Most identified chemicals are related directly to automotive and marine maintenance, and nearly all of these were present in small retail containers of 1 gallon or less in volume. All chemicals, including oil and antifreeze present in larger volume containers, were stored properly in locations that did not show signs of past spills or mishandling. COCs pertaining to the LDW Superfund Site were determined by reviewing material safety data for inventoried chemicals. Table 1 provides a complete inventory list.

7. References

Burlington Environmental, Inc. 1991. *Documentation of Underground Storage Tank Removal.*

TIG (TIG Environmental). 2016a. *South Park Marina Site Visit for Transformer Inventory, September 20, 2016.*

TIG (TIG Environmental). 2016b. *South Park Marina Site Visit for Chemical Inventory, September 20, 21, and 22, 2016*

TIG (TIG Environmental). 2016c. *South Park Marina Site Visit for Chemical Inventory, October 18. 2016.*

TIG (TIG Environmental). 2016d. *South Park Marina Site Visit for Visual Inspection of Electrical Poles and Pole-mount Transformers, October 18, 2016.*

TIG (TIG Environmental). 2016e. *South Park Marina Site Visit for Visual Inspection of Air Compressors, October 18, 2016.*

TIG (TIG Environmental), Personal Communication with Guy Crow, South Park Marina Manager. November 23, 2016, 2016f.

U.S. Fish & Wildlife Service. 2016. "Clean Vessel Act Grant Program - Overview." December 12, 2016. https://wsfrprograms.fws.gov/Subpages/GrantPrograms/CVA/CVA.htm.

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
South Park Marina: Wash Water Treatment Container			
3M Super Duty Rubbing Compound	Unknown	1	Gal
Aquazyme	Solvent	2	Lb
BioGuard Anti-Foam	Cleaner	1	Qt
Bon Ami Cleanser	Cleaner	28	Oz
CH2o Inc. Poly Floc 30	Cleaner	55	Gal
Cleaner/degreaser	Solvent	2	Qt
Eagle One NanoWax As-U-Wash	Cleaner	2	Qt
Joy liquid detergent	Cleaner	1	Gal
Henkel Technologies Alodine 1201	Coating	32	Oz
Motor oil (assorted)	Lubricant	1	Qt
Muratic acid	Solvent	2	Gal
Purple Power Prime Shine Car Wash	Cleaner	1	Gal
Spent antifreeze coolant	Other	60	Gal
Spent motor oil	Lubricant	275	Gal
Suck It Up oil absorber	Cleaner	32	Lb
Super Brite Instant Black Streak Remover	Cleaner	22	Oz
South Park Marina: Harbormaster Shop			
3-In-One Motor Oil	Compound	3	Oz
Aqua-Chem Tank Deodorant	Cleaner	4	Qt
Butchers Bowling Alley Wax	Cleaner	1	Lb
CRC Cutting Oil	Lubricant	12	Oz
Crown HD Adhesive	Adhesive	22	Oz
Crown Paint Thinner	Solvent	1	Gal
Durabond D-815 Carpet Adhesive	Adhesive	1	Qt
Evinrude Lubricant	Lubricant	12	Oz
Kerosene	Fuel	1	Gal

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Loctite Silver Grade Anti-Seize	Lubricant	4	Oz
Mercury Fuel Treatment	Solvent	24	Oz
Rapid Tap Cutting Fluid	Lubricant	4	Oz
RectorSeal pipe thread sealant	Adhesive	6	Oz
SeaFoam Motor Treatment	Solvent	1	Pt
Simple Green Cleaner	Cleaner	1	Gal
StaPut Plumber's Putty	Coating	14	Oz
SuperClean Degreaser	Solvent	1	Gal
USC Fiberglass Filler	Coating	1	Lb
South Park Marina: Main Shop (Air Station)			
Airgas compressed acetylene	Gas	1	N/A
Airgas compressed O2	Gas	1	N/A
South Park Marina: Main Shop (Antifreeze Bench)			
Antifreeze 50/50 prediluted, ready-to-use	Other	15	Gal
Liquid propane gas	Fuel	98.7	Oz
Loctite 598 Black High Performance RTV Silicone Gasket Maker	Adhesive	2.36	Oz
Marking chalk	Coating	4	Oz
Permatex Ultra Copper High Temp RTV Silicone	Adhesive	3	Oz
Victor Muffler Mender and Exhaust System Sealant	Coating	6	Oz
Window washer fluid	Other	2	Gal
South Park Marina: Main Shop (Drill Press Corner)			
ABC Dry Chemical Fire Extinguisher	Fire suppressant	29	N/A
LA's Totally Awesome Oxygen Orange Degreaser	Solvent	32	Oz
Liquid Wrench Solvent	Solvent	32	Oz
Oxy-acetylene torch	Hardware	1	N/A
Ramuc Epoxy Pool Paint	Adhesive	2	Gal

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Ridgid Thread Cutting Oil	Lubricant	1	Gal
Water fire extinguisher	Fire suppressant	5	N/A
West Marine Bottom Shield Paint	Coating	1	Gal
West Marine PCA Gold Premium Ablative Antifouling Paint	Coating	1	Gal
South Park Marina: Main Shop (Electrical Area)			
3M Scotchkote Electrical Coating, part no. 054007 14853	Coating	15	Oz
BasaLite Concrete Mix	Concrete	300	Lb
DeWalt Li-Ion 14.4V cordless tool battery	Battery	N/A	N/A
GB Ox-Gard OX-400	Lubricant	4	Oz
Great Stuff Polyurethane Foam Sealant	Adhesive	12	Oz
Klein Tools Premium Synthetic Clear Wire Lubricant	Lubricant	1	Qt
Makita Li-Ion 18V cordless tool battery	Battery	5	N/A
Mitee Pipe Joint Compound	Adhesive	2	Oz
Philips fluorescent bulbs (T8 32W, 48 in)	Lighting	25	N/A
Whitlam Select Unyte Thread Sealing Compound	Adhesive	2	Oz
South Park Marina: Main Shop (Entry)			
Benjamin Moore Acrylic House Paint	Coating	1	Qt
Corroseal (concentrated)	Solvent	1	Qt
Gunk Big Puncture Seal	Coating	24.5	Oz
Interlux Fiberglass Bottom Koat	Coating	1	Gal
Paslode Pneumatic Tool Lubricating Oil	Lubricant	32	Oz
PCA Gold Ablative Antifouling Paint	Coating	2	Gal
Sakrete High Strength Concrete Mix	Concrete	60	Lb
Seal-Krete Waterproofing Sealer	Coating	1	Gal
Slime Tube Sealant	Coating	32	Oz
Welding rods	Welding	3	N/A

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
	Consumables		
South Park Marina: Main Shop (Hardware Area)			
Mercury High Performance Gear Lube SAE90	Lubricant	32	Oz
Performix Plasti Dip Rubber Coating	Coating	14.5	Oz
West Marine Antifouling Paint Bottomshield	Coating	2	Gal
South Park Marina: Main Shop (Main Floor Center)			
Weldworld Contact Cement	Adhesive	32	Oz
South Park Marina: Main Shop (Oil Corner)			
Automatic transmission fluid	Lubricant	35	Qt
Bilge Pro Bilge Cleaner	Cleaner	32	Oz
Brake cleaner	Solvent	3	Lb
Brake fluid	Lubricant	24	Oz
Browning Ultra-Fine Gun Oil	Solvent	4	Oz
Carburetor cleaner	Solvent	3	Qt
Copper Marine Anti-Seize	Lubricant	1	Lb
Cutting oil (mineral oil)	Lubricant	1	Qt
Davis Fiberglass Stain Remover	Solvent	16	Oz
Engine oil (assorted weights)	Lubricant	16	Qt
Form-A-Gasket Sealant	Adhesive	4	Oz
Gear oil/lube	Lubricant	5	Gal
G-n Metal Assembly Paste	Adhesive	17.6	Oz
Gunk Liquid Wrench with Teflon	Lubricant	11	Oz
H&W Copper Coat Gasket Compound	Adhesive	9	Oz
Hydraulic oil	Lubricant	5	Gal
Insta Trim Boat Leveler Co. Biodegradable Trim Tab Oil	Lubricant	16	Oz
Interlux Yacht Enamel Paint	Coating	1	Qt

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Lock-Ease Graphited Lock Fluid	Lubricant	3	Oz
Marine Grade Anti-Seize	Lubricant	8	Oz
Motor treatment fuel additive	Solvent	48	Oz
Multi-Purpose grease	Lubricant	8	Lb
Penetrating Lubricant	Lubricant	36	Oz
Permatex Gasket Remover	Solvent	12	Oz
Power steering fluid	Lubricant	24	Oz
Relton A-9 Aluminum Cutting Fluid	Lubricant	16	Oz
Silver Grade Anti-Seize	Lubricant	1	Lb
Starting fluid	Solvent	22	Oz
Super Clean Tough Task Cleaner Degreaser	Solvent	32	Oz
TruTest Silicone Lubricant	Lubricant	16	Oz
WD-40	Lubricant	1	Gal
White Lithium Grease	Lubricant	10	Oz
Zero Rust Direct-to-Metal Stops Rust Now	Coating	12	Oz
Zinc Rich Coating	Coating	1.5	Lb
South Park Marina: Main Shop (Outdoor Flammables Cabinet)			
2-Cycle Oil	Other	1	Gal
AlumiPrep 33	Coating	1	Qt
Denatured alcohol	Cleaner	1	Qt
Diesel	Fuel	5	Gal
FarWest Synthetic Thinner	Solvent	1	Gal
Gasoline	Fuel	40	Gal
InterLux 2316	Coating	1	Qt
InterLux 2333N	Coating	1	Qt
InterLux 299E	Coating	1	Qt
InterLux 333	Coating	2	Qt

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Kerosene	Fuel	5	Gal
Klean Strip Paint Thinner	Solvent	2	Gal
O-186 Go-75W Multipurpose Oil	Lubricant	5	Gal
SABER 100x1 Premix	Lubricant	1	Qt
South Park Marina: Main Shop (Plumbing Shop)			
20-10 Windshield Cleaner concentrate	Compound	32	Oz
ABS Cement	Unknown	8	Oz
Ace Royal Shield Acrylic Latex Enamel	Unknown	1	Qt
Acetone	Unknown	1	Gal
Aluma Brite concentrated aluminum cleaner brightener	Cleaner	1	Gal
Ammonia cleaner	Cleaner	128	Oz
Armor All	Cleaner	10	Oz
Atco Wet Surface Roof Patch 1823	Coating	1	Gal
Baking soda	Cleaner	13.5	Lb
BASF Master Seal Self Leveling High Performance Polyurethane Sealing	Adhesive	27.8	Oz
Behr Paint & Primer One Exterior Enamel	Coating	10	Gal
Behr Waterproofing Sealer	Coating	1	Gal
Behr White Enamel Paint	Coating	5	Gal
Clorox Bleach	Cleaner	24	Oz
Color Putty Co. Color Putty	Coating	7.36	Oz
Corothane I-Aliphatic Moisture Cure Urethane	Coating	2	Gal
Corothane MIO	Coating	2	Qt
Corroseal	Solvent	1	Gal
Corothane I-Aliphatic Moisture Cure Urethane	Coating	2	Gal
Custom Silk CaAl based patch and finish compound	Coating	10	Lb
Cutter Bug Free Backyard Outdoor Fogger	Pesticide	16	Oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Dap 100% Waterproof Windoor Door & Trim Sealant	Adhesive	1500	Ml
Dap Polyurethane Construction Adhesive Sealant ProGrade	Adhesive	10.1	Oz
Dap Weldwood Contact Cement	Adhesive	16	Oz
Dietzgen Ammonium Hydroxide	Cleaner	1	Gal
Drive-Maxx 700 Black Jack Driveway Sealer	Coating	15	Gal
Enforcer 10min Hair Clog Remover	Solvent	64	Oz
Evercoat HomeFix Universal Repair Filler 100-769	Coating	2	Lb
Exterior house paint (assorted)	Coating	6	Gal
Firm Foot Epoxy Spray with Grit	Adhesive	12	Oz
Formby's Tung Oil Finish	Solvent	16	Oz
Power House Glass cleaner	Cleaner	22	Oz
Gojo Foam Antibacterial hand cleaner	Cleaner	3750	Ml
Great Stuff Gaps & Cracks Insulating Foam Sealant	Adhesive	24	Oz
Green Diamond Slag Products	Abrasive	100	Lb
Henry 107 Asphalt Emulsion	Coating	0.9	Gal
Henry 201 Asphalt Roof Coating	Coating	2	Gal
Henry 304 Asphalt Driveway Patching Mix	Coating	11	Lb
Henry Rubberized Wet Patch 208R	Coating	0.9	Gal
HomeLife Wasp & Hornet Killer	Pesticide	14	Oz
Huber Ground Limestone Hubercarb S-200	Coating	50	Lb
Ideal Aqua-Gel Cable Pulling Lubricator	Lubricant	1	Qt
Interlux 353 Vinyl-Lux Prime Wash Base	Coating	1	Qt
Interlux Micron CSC Extra Antifouling Marine Paint	Coating	1	Gal
Interlux Solvent 216 Special Thinner	Solvent	1	Qt
Interlux Trilux 33 Marine Spray Paint	Coating	11	Oz
Jasco Metal Etch	Solvent	2	Qt

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Jasco Prep & Primer For Rusted and New Metal	Coating	1	Gal
Jasco Termin-8H2O Wood Preservative	Solvent	1	Gal
LA's Totally Awesome All Purpose Concentrated Cleaner Degreaser Spot Remover	Cleaner	16	Oz
LA's Totally Awesome Cleaner with Bleach	Cleaner	64	Oz
Libby Owens Ford Auto Glass & Accessory Cleaner	Cleaner	19	Oz
Lilly Miller Casoron Granules	Pesticide	1.25	Lb
Ilsco De-Ox Aluminum and Copper Terminal Oxidation Inhibitor	Adhesive	4	Oz
Magnetite Acrylic Scratch Remover	Solvent	15	Oz
MDR Liquid Electric Tape	Adhesive	4	Oz
Meguiar's Mirror Glaze	Cleaner	16	Oz
Microban Disinfectant Spray Plus	Cleaner	1	Gal
Mineral Spirits	Solvent	1	Qt
Murphy's Oil Soap	Cleaner	32	Oz
Permatex Copper Spray-a-Gasket	Adhesive	9	Oz
PermoSeal Plastic Spray	Coating	8.5	Oz
Petit Marine Paint Brushing Thinner	Solvent	1	Gal
Pettit ACP-50 Antifouling Marine Paint	Coating	1	Qt
Purple PVC primer	Coating	32	Oz
PVC cement	Adhesive	64	Oz
Raid Wasp & Hornet Killer	Pesticide	17.5	Oz
Resolve Dual Action Foam Carpet Cleaner	Cleaner	22	Oz
Rodda Master Painter Interior Latex	Coating	5	Gal
Safe Step Mag Chloride 8300 Ice Melter	Snow removal	300	Lb
Scotchgard Protector for Fabric and Upholstery	Cleaner	14	Oz
SeaLand Holding Tank Deodorant	Cleaner	16	Oz
Seapower Inflatable Boat & Fender Cleaner	Cleaner	16	Oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Preserver			
Sherwin Williams Corothane I-HS	Coating	2	Gal
Sherwin Williams Promar B29-WI Zone Marking Paint	Coating	1	Gal
Sikaflex Marine Adhesive	Adhesive	7500	Ml
Simonize II Premium Liquid Wax	Cleaner	16	Oz
Skyco Ospho	Coating	3	Gal
Spray paint (assorted)	Coating	209	Oz
StaPut Plumber's Putty	Coating	70	Oz
Starbrite Inflatable Boat and Fender Cleaner/Polish	Cleaner	32	Oz
Suck It Up Absorbant Solidifier	Cleaner	16	Lb
Tec General Use Multi Floor Adhesive	Adhesive	4	Gal
The Home Store non-Abrasive Bathroom Cleaner	Cleaner	13	Oz
Thompson's Waterseal	Coating	1	Gal
Tuff Stuff All Purpose Foam Cleaner	Cleaner	22	Oz
Turpentine	Solvent	1	Qt
Ultra-Maxx 1000 Black Jack Fast Dry Driveway Filler & Sealer	Coating	4.75	Gal
Watco Teak Oil Finish	Cleaner	1	Pt
West Marine PCA Gold Ablative Antifouling Paint	Coating	1	Gal
Zinsser Bin Primer	Coating	1	Gal
Z-Spar Marine Enamel	Coating	1	Gal
South Park Marina: Main Shop (Tool Area)			
409 Cleaner	Cleaner	1	Qt
Bar oil	Lubricant	1	Gal
Boat Bottom Seam Compound	Coating	1	Pt
Boiled Linseed Oil	Cleaner	1	Qt
Cabot Clear Solution Wood Finish	Coating	1	Gal

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Daly's Benite Penetrating Wood Conditioner Prod.# 11040	Cleaner	1	Qt
Dalys SeaFin Ship'n Shore	Coating	1	Qt
Dolfinite 2005 Natural Bedding Compound	Coating	1	Qt
Elastic Seam Compound	Adhesive	1	Pt
Fast Orange Hand Cleaner	Cleaner	15	Oz
Fast Orange Hand Cleaner	Cleaner	1	Gal
Gojo Natural Orange Hand Cleaner	Cleaner	14	Oz
Hydraulic and Jack Oil	Lubricant	32	Oz
Interlux Interprime Wood Sealer	Coating	1	Qt
Isopropyl Alcohol 70%	Cleaner	1	Qt
Krud Kutter Cleaner Degreaser	Solvent	32	Oz
Lead acid Marine Batteries	Metals	6	
Liquid Nails adhesive	Adhesive	4	Oz
Loctite 609 Pressfit Adhesive	Adhesive	50	Ml
Metallic spray paint	Coating	11	Oz
Napa Clean-R-Carb Carbourator Cleaner	Solvent	1	Lb
Office Depot Cleaning Duster	Cleaner	20	Oz
Olympic Waterguard Waterproofing Clear Wood Sealant	Coating	1.2	Gal
Shopper's Value Dishwashing Liquid	Cleaner	25	Oz
Squeeze It Oil Can	Lubricant	6	Oz
Terro Ant Killer Liquid Ant Baits	Pesticide	4.4	Oz
WD-40 Industrial Electrical Contact Cleaner	Lubricant	11	Oz
West Marine CPP Antifouling Marine Paint Blue	Coating	1	Gal
Window Glass Cleaner	Cleaner	64	Oz
South Park Marina - Main Shop (Under Stairs)			
Lead weights	Metals	400	Lb

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
South Park Marina - Main Shop (Upstairs)			
Diesel Fuel Conditioner and Anti-Gel	Solvent	12	Oz
Stardust Superabsorbent	Cleaner	25	Lb
South Park Marina - Main Shop (Welding Station)			
Energizer lead acid battery 12V 1400 CCA	Battery	1	N/A
South Park Marina - Office (Back Room)			
House paint (assorted)	Coating	3	Qt
South Park Marina: Marina Office (Bathroom)			
Enforcer BugMax	Pesticide	32	Oz
Febreeze	Cleaner	9.7	Oz
Hydrogen peroxide	Cleaner	16	Oz
Lysol Disinfectant Spray	Cleaner	19	Oz
Pro Soap Water-Activated Hand Soap	Cleaner	15	Lb
Raid Ant & Roach Killer	Pesticide	20	Oz
Scrubbing Bubbles Bathroom Cleaner	Cleaner	25	Oz
Scrubbing Bubbles Mega Shower Foamer	Cleaner	20	Oz
Soft Scrub with Bleach	Cleaner	24	Oz
Swiffer Duster Refills Recharges	Cleaner	24	sheets
Xtra-Pine floor cleaner	Cleaner	40	Oz
South Park Marina: Main Office (Kitchen)			
GermX Hand Sanitizer	Cleaner	10	Oz
Glacier Bay Hand Cleaner	Cleaner	1	Gal
GOJO Natural Orange Pumice Hand Cleaner	Cleaner	14	Oz
Goo Gone	Cleaner	8	Oz
Lime A-Way	Cleaner	28	Oz
Lysol All Purpose Cleaner	Cleaner	1	Qt
Tilex Mold & Mildew Remover with Bleach	Cleaner	1	Qt

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Trisodium phosphate	Cleaner	16	Oz
White vinegar	Cleaner	1	Gal
World Famous Colonel Brassy Surface Cleaner	Cleaner	16	Oz
Zep Streak Free Glass Cleaner	Cleaner	1	Qt
South Park Marina: Main Shop (Storeroom)			
Bar's Leaks Liquid Aluminum Radiator Stop Leak	Coating	8.5	Oz
Bio-Clean The Friendly Bacteria Waste Eliminator	Cleaner	2	Lb
BoatLife Life-Calk	Adhesive	930	Ml
Bonide Bedbug Killer	Pesticide	1	Gal
Castrol Super Clean Cleaner Degreaser	Solvent	4	Oz
Colonel Brassy Surface Cleaner	Cleaner	32	Oz
Copper Green Brown Wood Preservative	Coating	32	Oz
CorrosionX Lubricant	Lubricant	6	Oz
CRC Freeze Off Super Penetrant	Lubricant	23	Oz
d-CON Flea Kill	Pesticide	6	Oz
Deck Stain Latex	Coating	2	Gal
Enforcer Flea Fogger	Pesticide	4	Oz
Galvicon Cold Galvanizing Compound	Coating	2	Gal
Goof Off	Solvent	4.5	Oz
Grant's Kills Ants	Pesticide	12	Oz
High Temperature Spray Paint	Coating	22	Oz
Ice Melter	Snow removal	50	Lb
Kleen Warrior All Purpose Cleaner Degreaser	Solvent	10	Qt
Lilly/Miller Hose-n Go Blackberry & Brush Killer	Pesticide	1	Qt
Liquid Wrench Marine Grease	Lubricant	75	Oz
Low Odor Mineral Spirits	Solvent	32	Oz
LPS ChainMate Moly Lubricant	Lubricant	44	Oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Metal Primer	Coating	1	Gal
Miracle-Gro Shake'n Feed	Garden	4.5	Lb
Miracle-Gro Plant Food concentrated 15-30-15	Garden	24	Oz
Misty Glypho Kill	Pesticide	1	Gal
Misty WK-44 Concentrate	Pesticide	1	Gal
Narco 109-M Marine Cleaner	Cleaner	1	Gal
Nautical Glass Ultimate Marine Finish	Coating	2	Pt
Octane Boost Marine	Solvent	36	Oz
Ortho Diazinon Granules	Pesticide	1	Lb
Ortho Diazinon Insect Spray	Pesticide	1	Pt
Ortho Home Pest Insect Control	Pesticide	1	Pt
Ortho RosePride Orthorex Insect & Disease Control	Pesticide	14	Oz
Penetro 90 Penetrating Oil	Lubricant	13	Oz
Phosphoric Acid + Hydrofluoric Acid cleaning mix	Cleaner	1	Qt
Quikrete Concrete Mix	Concrete	60	Lb
Raid Yard Guard Outdoor Fogger Formula V	Pesticide	16	Oz
RainX	Solvent	7	Oz
Rooto Professional Drain Opener	Cleaner	3	Gal
RoundUp Concentrate	Pesticide	64	Oz
RoundUp Extended Control Ready-to-Use	Pesticide	1.33	Gal
RoundUp Ready-to-Use	Pesticide	1.33	Gal
SeaLand Max Control Holding Tank Deodorant	Cleaner	8	Oz
Sherwin Williams 950A Siliconized Acrylic Latex Caulk	Coating	60.6	Oz
Silicone Kitchen & Bath	Adhesive	40.4	Oz
Specs Paint Thinner	Solvent	16	Oz
Spectracide Carpenter Ant & Termite Killer	Pesticide	32	Oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Spill-X Dispersant & Eliminator	Cleaner	2	Pt
Splash Zone Epoxy Compound Part A	Adhesive	16	Oz
Splash Zone Epoxy Compound Part B	Adhesive	16	Oz
Spray paint (assorted)	Coating	110	Oz
Sunnyside Lacquer Thinner	Solvent	16	Oz
Sunnyside Odorless Paint Thinner	Solvent	32	Oz
SuperLube Dri-Film Lubricant with PTFE	Lubricant	11	Oz
SuperLube Synthetic Lubricant with PTFE	Lubricant	11	Oz
Tech America Ecto Gard Fogger	Pesticide	12	Oz
Tide Laundry Soap	Cleaner	100	Oz
TSP Spectracide Indoor Fogger	Pesticide	18	Oz
Weldwood Contact Cement	Adhesive	32	Oz
Wet or Dry PVC Cement	Adhesive	8	Oz
Zinc Rich Cold Galvanizing Compound	Coating	14.75	Oz
South Park Marina: Marina Showers			
Fabuloso Multi-Purpose Cleaner	Cleaner	22	Oz
LA's Totally Awesome Ammonia	Cleaner	1	Gal
LA's Totally Awesome Shower Cleaner	Cleaner	32	Oz
MotsenBocker's Lift Off	Cleaner	44	Oz
Windex	Cleaner	2	Qt
Woodworking Shop: Center Bay			
2-Cycle Motor Oil	Lubricant	16	Oz
3M Marine Aluminum Restorer & Polisher	Coating	18	Oz
3M Marine Compound & Finishing Material	Coating	1	Gal
Ace Hardware Lub-E	Lubricant	11	Oz
Acrylic latex tile grout	Cleaner	32	Oz
Acrylic paint	Coating	15	Oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Acrylic reinforcing mix	Coating	2.5	Gal
AcrylPro Ceramic Tile Mastic	Cleaner	1	Qt
Antique Black Stove and Iron Polish	Coating	8	Oz
Aqua Blue 100 Fast-Cut Compound	Solvent	1	Qt
Aqua Blue 200 Buffind and Polishing Compound	Coating	1	Qt
Aqua Clean Tabs Water Purifying Tablets	Cleaner	32	N/A
Black Flag Home Insect Control	Pesticide	1.33	Gal
Brasso Metal Polish	Coating	16	Oz
Captain John's Boot Brite	Cleaner	12	Oz
Carb & Choke Cleaner	Solvent	25	Oz
CB BORiD Insect Killer	Pesticide	1	Lb
Citristrip Stripping Gel	Solvent	64	Oz
CLR	Other	28	Oz
Compressed gas - unlabeled cylinder	Fuel	N/A	N/A
Compressed O2	Fuel	N/A	N/A
Crystalline Clear Museum Wax	Coating	50	G
Dexol Systematic Grannules Insect Control	Pesticide	10	Oz
Dow Stain Stick	Cleaner	4.4	Oz
Dry tile grout	Cleaner	20	Lb
Fast & Hot Ice Melter	Coating	7	Lb
FSR Big Job Fiberglass Stain Remover	Cleaner	4	L
Glass Wash Soap	Cleaner	12	Oz
Great Stuff Gaps & Cracks Filler	Coating	12	Oz
Gr-reat'N Easy Bathroom Cleaner	Cleaner	16	Oz
Gunk Purple Cleaner Degreaser	Solvent	32	Oz
Gunk Puncture Seal	Coating	18	Oz
Harvest Store Industrial Glass Polishing Powder	Coating	10	Oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Hypalon Inflatable Boat Glue	Adhesive	70	Cc
HypoyC Gear Oil	Lubricant	2	Qt
Ideal NoAlox Joint Compound	Coating	8	Oz
K-91 Tack Set Vinyl & Plank Adhesive	Adhesive	1	Gal
Kilz Primer	Coating	5	gal
Kiwi Boot Protector Silicone	Coating	12	oz
Kleen Strip Wood Bleach Solution A	Cleaner	16	oz
Kleen Strip Wood Bleach Solution B	Cleaner	16	oz
Lawnmower Motor Oil	Lubricant	16	oz
Legacy of Clean Pre Wash	Cleaner	1	qt
Lime Scale Remover	Solvent	8	oz
LIP Acrylic 400	Coating	2	qt
Master Wholesale Inc. M-Bond Bonding Agent	Coating	1	gal
MDR Instant Fender Cleaner	Cleaner	16	oz
Meguiar's Paint Cleaner	Cleaner	16	oz
Meguiar's Quick Wax	Coating	1	pt
MerMaids Super Swabby Bilge Cleaner	Cleaner	3	gal
Miracle-Gro Liquid	Other	8	oz
Mother's Mag & Aluminum Polish	Coating	20	oz
Noxon 7 Metal Polish	Coating	12	oz
NuFinish	Coating	16	oz
Oatey All Purpose Cement	Adhesive	4	oz
Old English Wood Conditioner	Coating	8	oz
Paint'n Tex Perlite Aggregate	Coating	1	lb
Parawax Household Wax	Coating	1	lb
PB Penetrating Catylist	Solvent	4	oz
Perfect-It III Rubbing Compound	Coating	1	qt

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Perfect-It Machine Polish	Coating	2	qt
PeriClean Water System Cleaner	Cleaner	400	g
Permatex All Purpose Spray Adhesive	Adhesive	10.5	oz
Pine-Sol	Cleaner	1.41	L
Pledge Revitalizing Oil	Coating	1	pt
Plexus Plastic Cleaner	Cleaner	13	oz
Pneumatic Tool Oil	Lubricant	8	oz
Power Steering Fluid	Lubricant	12	oz
Scotchgard Marine Wax	Coating	3	L
Scouring Powder (assorted)	Other	252	oz
Sears Concentrated Carpet Cleaner	Cleaner	1	gal
Shout Action Gel	Cleaner	14	oz
Silica Sand	Other	2	qt
Silicone Spray Lubricant	Lubricant	10.25	oz
Simple Green Bike Degreaser	Solvent	20	oz
Soft Scrub Cleanser	Cleaner	26	oz
Special Value Orange All Purpose Cleaner	Cleaner	1	qt
Starbrite Water Conditioner	Cleaner	4.5	oz
Starbrite Rust Stain Remover	Cleaner	22	oz
STP Son of a Gun Protectant	Coating	1	qt
Tacoma Screw Products Gasket Maker	Coating	7.25	oz
Teak Wood Deck Cleaner	Cleaner	2	gal
Thompson's Water Seal	Coating	12	oz
TSP Plus Cleaner Degreaser	Solvent	32	oz
Turtle Wax	Coating	36	oz
Turtle Wax Zip Car Wash	Cleaner	2	qt
Twinkle Copper Cleaner	Cleaner	4	oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
West Marine Stop Odor	Cleaner	16	oz
West Marine Teak Cleaner & Brightener	Cleaner	2	qt
Western Family Laundry Stain Remover spray	Cleaner	22	oz
Wheat Paste Wallpaper Adhesive	Adhesive	10	oz
White Teflon Lubricant	Lubricant	13	g
Wilson Art 500 Contact Adhesive	Adhesive	5	gal
Woodworking Shop: Flammables Cabinet			
Ammonia Strong Solution 27%	Cleaner	1	qt
Dalys Benite	Other	1	gal
Fiberglass Solvent Wash Solvent 202	Solvent	1	qt
Flood ESP	Coating	1	qt
Flood Penetrol	Coating	1	gal
Isopropyl Alcohol	Solvent	3	pt
Japan Drier	Coating	32	oz
Jasco Termin-8	Pesticide	1	qt
Klean Strip Stripper	Solvent	1	qt
Linseed Oil	Lubricant	1	qt
Methyl Ethyl Ketone (MEK)	Solvent	1	qt
Penetrating Conditioner	Solvent	1	pt
Pro-Finisher by Parks - Sanding Sealer	Coating	1	gal
Pro-Line 20 Vinyl Rtardr	Coating	1	gal
Rexco Partall Film No. 10	Coating	1	gal
Rodda Paint Prep Shield anti-corrosion	Coating	1	qt
Shipmates Rust Gone Metal Prep	Solvent	1	qt
Solvent 233N Reducing Solvent	Solvent	2	qt
Solvent 355 Viny-Lax Solvent	Solvent	1	qt
Sterling Primer Catylist A-1000C	Coating	3	gal

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Superox 46-720	Other	2	gal
Thinner (assorted)	Solvent	1	gal
Toluene	Solvent	1	qt
Zippo Lighter Fluid	Fuel	12	oz
Woodworking Shop: Paint Cabinet			
Awl-Cat #2 Topcoat Cementor for Spray Application	Coating	1	gal
BASF Natural B	Solvent	5	gal
BoatLife Git Rot Part A	Coating	32	oz
Foam & Filler	Coating	1	gal
Paint and primer (assorted)	Coating	23	qt
Titebond Premium Wood Glue	Adhesive	16	oz
Ultra Smooth Finishing Putty	Coating	5.5	lb
Woodworking Shop: Saw Room			
House paint	Coating	1	gal
Lightweight fairing powder (glass beads)	Other	360	g
Ni-Cad 18V cordless tool batteries	Battery	4	
Rot Fix System Three Part	Coating	24	oz
Rust/Corrosion Protection Spray Paint	Coating	11	oz
Smith's Epoxy Sealer Part A	Adhesive	1	gal
Smith's Epoxy Sealer Part B	Adhesive	1	gal
System 3 Wood Flour	Coating	1	lb
Top Secret Coatings 101 Thinner	Solvent	1	qt
Woodworking Shop: Wood Finish Cabinet			
Crown Spra-Tool Accelerant	Solvent	26	oz
Elmers Wood Filler	Coating	2	qt
Minwax Wood Putty	Coating	8	oz
Smith's Clear Penetrating Epoxy Sealer Part A	Adhesive	1	gal

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Smith's Clear Penetrating Epoxy Sealer Part B	Adhesive	1	gal
Thinners, Strippers, Reducers	Solvent	3	gal
Titebon Premium Wood Glue	Adhesive	16	oz
Varnish, Sealer, Finish, Preserver	Coating	36	qt
West System 206 Slow Hardener	Adhesive	27.5	oz
West System 40L Colloidal Silica Adhesive Filler	Adhesive	165	oz
Rick's Master Marine: Bathroom			
Clorox Bleach	Cleaner	64	oz
Clorox Disinfecting Wipes	Cleaner	10.75	oz
Comet with Bleach	Cleaner	28	oz
Dish soap	Cleaner	1	gal
Fast Orange Hand Cleaner	Cleaner	1	gal
Home Sense Auto Dishwasher Gel	Cleaner	150	oz
Peak Marine Antifreeze Coolant	Other	1	gal
RoundUp Concentrated Mix	Pesticide	1	gal
Simple Green Cleaner	Cleaner	1	gal
Sudbury Eco Zope Plus	Cleaner	12	oz
Windex Advanced	Cleaner	1.34	gal
Windex Advanced	Cleaner	1	qt
Rick's Master Marine: Front Office			
Clorox Disinfecting Wipes	Cleaner	559	g
Simple Green Industrial Cleaner Degreaser	Solvent	1	gal
Speed-Wall Interior 1456 Latex Paint	Coating	2	gal
Spray bottle labeled water+ammonia	Cleaner	1	qt
Staples Screen Cleaning Fluid	Cleaner	4	oz
Sudbury Eco Zope Plus	Cleaner	4	oz
XP Lab Inc XP3 Extra Power for Gasoline	Solvent	150	ml

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Rick's Master Marine: Outdoor Storage			
Used absorbent pads	Other	55	gal
Used (drained) oil filters	Other	55	gal
Rick's Master Marine: Retail Storefront			
303 Aerospace Protectant	Cleaner	8	oz
BernzOMatic Propane	Fuel	16.4	oz
Bostik Marine Marine Grade 940 FS High Performance Sealant/Adhesive	Adhesive	10	oz
Civic Premium Blend Gearcase Lube	Lubricant	1	qt
CRC 6-56 Zero VOC Multi-Purpose	Lubricant	11	oz
CRC Engine Stor Fogging Oil	Solvent	13	oz
CRC Fuel Stabilizer	Solvent	16	oz
CRC Heavy Duty Corrosion Inhibitor	Coating	10	oz
CRC Octane Boost	Solvent	12	oz
DuraPlus Power Steering & Trim Fluid	Lubricant	16	oz
Evinrude/Johnson Gearcase Lube	Lubricant	1	qt
Evinrude/Johnson Needle Bearing Assembly Grease	Lubricant	3.5	oz
Evinrude/Johnson Touch Up Paint	Coating	12	oz
Honda Marine Corrosion Inhibitor	Coating	16	oz
Honda Marine Multi-Purpose Extreme Pressure Marine Grease	Lubricant	14	oz
Honda Marine Power Trim & Tilt Fluid	Lubricant	1	qt
Honda Marine SAE 10W-30	Lubricant	1	gal
Honda Marine SAE 10W-30	Lubricant	1	qt
Honda Marine SAE 5W-30	Lubricant	1	qt
Honda Marine SAE 80W-90 Gear Case Oil	Lubricant	1	qt
Honda Marine Touch Up Paint	Coating	12	oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Marine Formula 6-56 Multi-Purpose Lubricant	Lubricant	8	oz
MaryKate Instant Black Streak Remover	Cleaner	1	qt
MaryKate On & Off Hull & Bottom Cleaner	Cleaner	1	qt
Meguiar's Metal Guard	Coating	22	oz
Meguiar's Fiberglass Restoration System	Cleaner	2	
Meguiar's Non-Skid Deck Cleaner	Cleaner	32	oz
Meguiar's Oxidation Remover	Cleaner	1	pt
Meguiar's Power Cut Compound	Cleaner	1	qt
Meguiar's Pure Wax	Cleaner	16	oz
Meguiar's Quik Wax	Cleaner	1	pt
Meguiar's Ultimate Detailer	Cleaner	24	oz
Meguiar's Vinyl & Rubber Cleaner and Protectant	Cleaner	1	pt
Mercury Extended Life Coolant Anti-Freeze	Other	1	gal
Mercury OptiMax Outboards Synthetic Blend Outboard Oil	Lubricant	1	gal
Mercury Performance Lubricants 4 Stroke Marine Engine Oil	Lubricant	1	qt
Mercury Performance Lubricants 4 Stroke Marine Engine Oil	Lubricant	1	gal
Mercury Performance Storage Seal Fogging Oil	Solvent	12	oz
Mercury Precision Care Synthetic Power Steering Fluid	Lubricant	8	oz
Mercury Precision Lubricants 2-4-C Marine Lubricant with PTFE	Lubricant	14	oz
Mercury Precision Lubricants Premium Plus 2 Stroke Marine Engine Oil	Lubricant	1	pt
Mercury Precision Lubricants Synthetic Blend Verado 4-Stroke Outboard Oil	Lubricant	1.06	gal
Mercury Precision Lubricants Synthetic Power	Lubricant	1	qt

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Steering Fluid			
Mercury Protection Care Quickare Fuel Treatment # 1	Solvent	12	oz
Mercury Protection Care Quickleen Engine & Fuel System Cleaner # 2	Solvent	12	oz
Mercury Protective Care Quickstop Fuel Stabilizer	Solvent	12	oz
Mercury Racing 4-Stroke Engine Oil	Lubricant	1	qt
Mercury Racing 4-Stroke Engine Oil	Lubricant	1	gal
Mercury Synthetic Blend 4-Stroke Engine Oil	Lubricant	1	gal
Pennzoil Dex/Merc Automatic Transmission Fluid	Lubricant	1	qt
Pennzoil Premium Wheel Bearing 707L Red Grease	Lubricant	16	oz
Perfect Seal Sealing Compound	Adhesive	16	oz
Quicksilver High Performance Extreme Grease	Lubricant	14	oz
Quicksilver High Performance Extreme Grease	Lubricant	8	oz
Quicksilver Marine Lubricants 4-Stroke Marine Engine Oil	Lubricant	1	qt
Quicksilver Marine Lubricants Full Synthetic 4 Cycle Engine Oil	Lubricant	1	qt
Quicksilver Marine Lubricants High Performance Gear Lube	Lubricant	1	qt
Quicksilver Marine Lubricants Hydraulic Helm Steering Fluid	Lubricant	1	qt
Quicksilver Marine Lubricants Performance DFI Oil Direct Fuel Injection	Lubricant	1	gal
Quicksilver Marine Lubricants Power Trim and Steering Fluid	Lubricant	1	qt
Quicksilver Marine Lubricants Premium 2 Stroke Engine Oil	Lubricant	1	pt
Quicksilver Marine Lubricants Premium Plus 2 Stroke Marine Engine Oil	Lubricant	16	oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Quicksilver Marine Lubricants Premium Plus 2 Stroke Marine Engine Oil	Lubricant	1	qt
Quicksilver Marine Parts & Accessories Enamel Spray Paint	Coating	12	oz
Quicksilver Marine Parts & Accessories Power Trim & Steering Fluid	Lubricant	8	oz
Quicksilver Marine Parts & Accessories System Antifreeze	Other	1	gal
Quicksilver Needle Bearing Assembly Lubricant	Lubricant	8	oz
Quicksilver Power Tune Internal Engine Cleaner	Solvent	12	oz
Quicksilver Valve Lubricant	Lubricant	12	oz
SeaChoice Bilge Cleaner	Cleaner	1	qt
SeaChoice Boat Wash	Cleaner	1	qt
SeaChoice Deck Cleaner	Cleaner	32	oz
SeaChoice Hull Cleaner	Cleaner	1	qt
Seapower Marine Cleaner and Wax	Cleaner	1	qt
Seapower Marine Cleaner and Wax	Cleaner	1	gal
SeaStar Hydraulic Steering Fluid	Lubricant	1	qt
Sierra Marine Bearing Grease	Lubricant	10	oz
Sierra Marine Full Synthetic Marine Engine Oil	Lubricant	5	qt
Sierra Marine Synthetic Blend Gear Lubricant	Lubricant	10	oz
Sierra Spline Grease	Lubricant	14	oz
Sierra Spray-Lith White Grease	Lubricant	12	oz
Starbrite Black Streak Remover	Cleaner	1	gal
Starbrite Black Streak Remover	Cleaner	24	oz
Starbrite EZ-To-Store EZ-To-Start Diesel Fuel Storage Additive/Stabilizer	Solvent	16	oz
Starbrite Inflatable Boat and Fender Cleaner/Polish	Cleaner	16	oz
Starbrite No Damp Moisture Absorbent Dehumidifier	Solvent	12	oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Starbrite Tower Guard Aluminum Protectant	Cleaner	22	oz
Tempo Marine outboard and stern drive motor paint	Coating	12	oz
Thetford Aqua-Kem-Green Holding Tank Deodorant	Cleaner	8	oz
Tohatsu Engine Paint	Coating	12	oz
Volvo Penta Coolant VCS Ready Mixed	Other	1	gal
Volvo Penta Full Synthetic Gasoline Engine Oil	Lubricant	1	gal
Volvo Penta Full Synthetic Gasoline Engine Oil	Lubricant	1	qt
Volvo Penta Spray Enamel	Coating	12	oz
Volvo Penta Synthetic Gear Oil	Lubricant	1	qt
Rick's Master Marine: Work Bay 1			
3M Marine Ultra Performance Paste Wax	Cleaner	9.5	oz
4-Stroke Outboard Oil	Lubricant	5	qt
54 Marine RV Gel Wash	Cleaner	16	oz
ABC Dry Chemical Fire Extinguisher	Fire suppressant	1	N/A
Automatic transmission fluid	Lubricant	1	qt
Ballotini Impact Beads Potters	Abrasive	50	lb
BioSoy All Season Hydraulic Oil	Lubricant	32	qt
Coilhose Pneumatics Air Tool Lubricant ATL016	Lubricant	16	oz
Compressed Gas 75%Ar, 25%CO2	Gas	1	N/A
CRC Marine 6-56 Zero VOC Multipurpose Lubricant	Lubricant	11	oz
Full-Synthetic Gear Lube	Lubricant	1	qt
Gasoline	Fuel	5	gal
Gasoline	Fuel	50	L
Gear lube	Lubricant	20	oz
Hydraulic Steering Fluid	Lubricant	2	qt
Loctite 518 Flange Sealant	Adhesive	0.85	oz
Loctite 7649 Primer	Coating	4.5	oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Marine Grease 2-4-C with PTFE	Lubricant	8	oz
MaryKate Cleaning Detail Deck Cleaner	Cleaner	2.5	lb
MaryKate On & Off Fibergalss Hull & Bottom Cleaner	Cleaner	32	oz
Mercury Power Tune Engine Cleaner	Cleaner	13	oz
Motor oil (assorted)	Lubricant	2	qt
Motor oil (assorted)	Lubricant	5	gal
Permatex Copper Spray-A-Gasket	Adhesive	3	oz
Power Trim & Steering Fluid	Lubricant	8	oz
QuickSilver 3 Quickstor Fuel Stabilizer	Solvent	12	oz
Rapid Tap Cutting Fluid	Lubricant	1	pt
SeaFoam Motor Treatment	Solvent	16	oz
Sierra Spray Lithium White Grease	Lubricant	12	oz
Silver Grade Anti-Seize	Lubricant	4	oz
Silver Grade Anti-Seize	Lubricant	8	oz
Spray Paint Corrosion Guard	Coating	11	oz
Tannery Vintage Leather Cleaner	Cleaner	10	oz
TR Seapower Fiberglass Boat Cleaner & Wax	Cleaner	32	oz
Ultra Black RTV Silicone Gasket Maker	Adhesive	12	oz
Waste solvent collection	Other	55	gal
White Lithium Grease	Lubricant	8	oz
Rick's Master Marine: Work Bay 2			
2-Stroke Engine Oil	Lubricant	16	oz
2-Stroke Engine Oil	Lubricant	1	gal
3M Marine Adhesive Sealant 5200	Adhesive	10	oz
4-Stroke Motor Oil	Lubricant	1	gal
4-Stroke Motor Oil	Lubricant	3	qt

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
ABC Dry Chemical Fire Extinguisher	Fire suppressant	1	N/A
Antifreeze coolant	Other	6	gal
Automatic transmission fluid	Lubricant	1	qt
Compressor oil	Lubricant	3	qt
Compressor oil	Lubricant	4	gal
Corrosion Guard Spray Paint	Coating	11	oz
CRC Heavy Duty Corrosion Inhibitor Spray Paint	Coating	10	oz
CRC Salt & Corrosion Terminator	Cleaner	22	oz
Dielectric Tune-Up Grease	Lubricant	8	oz
Duro Tub'n Sink Jelly Lime and Stain Remover	Cleaner	8	oz
Gas Mix	Fuel	12	oz
Gasoline	Fuel	5	gal
Gear case lube	Lubricant	33	oz
Gear lube	Lubricant	55	gal
Gear lube	Lubricant	1	qt
Gear oil	Lubricant	1	qt
Heavy Duty Synthetic Motor Oil	Lubricant	2	qt
Hydraulic jack oil	Lubricant	1	gal
Hydraulic steering fluid	Lubricant	1	qt
Lead acid Marine Batteries	Battery	4	N/A
Loctite Flange Sealant 5900	Adhesive	10	oz
Marine Gear Lube	Lubricant	2	qt
Mercury Quickare Fuel Treatment I	Solvent	12	oz
Motor oil (various)	Lubricant	55	gal
Motor il (assorted)	Lubricant	2	gal
Motor oil (assorted)	Lubricant	70	qt
Multi Purpose Grease	Lubricant	75	g

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Multi Purpose Grease	Lubricant	16	oz
Multi Purpose Grease	Lubricant	3	oz
Oil/lube pump buckets	Other	10	gal
Oxy-Acetylene Torch	Hardware	1	N/A
Pennzoil Multi Purpose Lubricant	Lubricant	12	oz
Perfect Seal Sealing Compound	Adhesive	16	oz
Power Trim & Steering Fluid	Lubricant	32	oz
Power Trim & Steering Fluid	Lubricant	16	oz
Power Trim & Steering Fluid	Lubricant	32	oz
Power Trim & Tilt Fluid	Lubricant	3	qt
Power Trim/Tilt and Steering Fluid	Lubricant	16	oz
Power Trim/Tilt and Steering Fluid	Lubricant	11	oz
Power Tune Engine Cleaner	Cleaner	13	oz
Rector Seal 5 Pipe Thread Sealant	Adhesive	8	oz
RTV Silicone Gasket Maker	Adhesive	18	oz
Simple Green Cleaner	Cleaner	22	oz
Spent antifreeze coolant	Other	55	gal
Spent liquid petroleum canisters	Other	30	lb
Spent motor oil	Lubricant	110	gal
Stay-Clean Flux	Solvent	4	oz
Storage Seal Fogging Oil	Solvent	120	oz
Transmission fluid	Lubricant	2	gal
Transmission fluid	Lubricant	3	gal
Used oil filters (assorted sizes)	Other	11	N/A
WD-40	Lubricant	24	oz
Weather strip cement	Adhesive	5	oz
South Park Tire Factory: Offices			

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Clear All Multi Purpose Cleaner	Cleaner	1	gal
Kleen Warrior All Purpose Cleaner Degreaser	Solvent	3	qt
Zep Cherry Bomb Hand Cleaner	Cleaner	2	gal
South Park Tire Factory: Service Bay 1			
ABC Dry Chemical Fire Extinguisher	Fire suppressant	1	N/A
Air filter oil	Lubricant	6.5	oz
Aluminum Anti-Seize	Lubricant	8	oz
Antifreeze coolant	Other	2	gal
Armor All Extreme Tire Shine	Cleaner	18	oz
Auto & Industrial Grease	Lubricant	42.3	oz
Automatic transmission fluid	Lubricant	1	gal
Automatic transmission fluid	Lubricant	1	qt
AutoZone Brake Cleaner	Cleaner	14	oz
Black Magic Bleche-Wite Tire Cleaner	Cleaner	32	oz
Black Magic Tire Wet Wax	Coating	8	oz
Blue Max Powder Truck and Car Wash 2816	Cleaner	5	gal
Blue Tire Slick Stock # 77164	Lubricant	5	gal
Brake fluid	Lubricant	1	qt
Brake fluid	Lubricant	1	gal
Castrol Limited Slip Gear Oil	Lubricant	1	qt
Comet with Bleach	Cleaner	14	oz
CRC Brakleen Brake Parts Cleaner	Cleaner	1	gal
CRC Freeze Off Super Penetrant	Solvent	11.5	oz
CRC Mass Air Flow Sensor Cleaner	Cleaner	22	oz
CRC Multipurpose Marine Grease	Lubricant	14	oz
CRC QD Electronic Cleaner	Cleaner	7.5	oz
Enamel paint	Coating	4	gal

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Engine Detailer CD-2	Cleaner	12.5	oz
Evapo-Rust Super Safe Rust Remover	Solvent	4	gal
Farwest Paint 607 Traffic Line Thinner	Solvent	1	gal
Gear oil	Lubricant	1	qt
Greased-Lightning Auto Pro Cleaner Degreaser	Cleaner	1	gal
High temperature circulating oil	Lubricant	1	gal
High temperature spray paint	Coating	33	oz
Interior spackling paste	Coating	32	oz
Lead acid car battery	Battery	5	N/A
Liquid propane gas	Fuel	4	gal
Lucas Engine Oil Stop Leak	Coating	1	qt
Lucas Heavy Duty Oil Stabilizer	Fuel	3	qt
Marvel Air Tool Oil	Lubricant	1	qt
Meguiar's Cleaner Wax	Coating	16	oz
Meguiar's Tire Shine	Cleaner	15	oz
Motor oil (assorted)	Lubricant	37	qt
Motor oil (assorted)	Lubricant	5	gal
Motor oil (assorted)	Lubricant	15	gal
Myers Tire Seal	Coating	1	gal
Napa Carb Choke and Throttle Body Cleaner	Cleaner	12	oz
No Touch Tire Care	Cleaner	42	oz
Pentosin CHF 11S Oil for Central Hydraulic System Power Steering	Lubricant	1	L
Power steering fluid	Lubricant	1	qt
Rema Tip Top 203 Cold Vulcanizing Fluid	Adhesive	1	gal
Rema Tip Top 71 Pre Buff Cleaner	Cleaner	1	pt
Rema Tip Top Bead Sealer 960	Coating	32	oz

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Rema Tip Top Special Cement BL	Adhesive	30	g
Rust-Oleum Undercoat Rubberized Paint	Coating	30	oz
Rust-Oleum Wheel Paint	Coating	11	oz
SelectSorb Automotive Oil Absorbent	Lubricant	4	lb
Shell SAE 10W-30 motor oil	Lubricant	170	gal
Shell SAE 5W-30 motor oil	Lubricant	170	gal
Spray paint (assorted)	Coating	44	oz
Starting fluid	Fuel	11	oz
STP Gas Treatment	Fuel	378	oz
Throttle Body and Air Intake Cleaner	Cleaner	24	oz
Touch Up Paint Solid Marker	Coating	4	oz
Turtle Wax Leather Cleaner and Conditioner	Coating	16	oz
Turtle Wax Zip Wax Car Wash	Cleaner	1	pt
Used lead wheel weights	Other	25	gal
Used oil filters	Lubricant	15	N/A
Waste motor oil	Lubricant	10	gal
Waste oil collector	Lubricant	4	gal
Window washing fluid	Cleaner	7	gal
Zep 2000 Heavy Duty Clear Penetrating Grease	Solvent	13	oz
Zep Flash Concrete Floor Cleaner	Cleaner	5	gal
South Park Tire Factory: Service Bay 2			
ABC Dry Chemical Fire Extinguisher	Fire suppressant	2	N/A
Acura All Wheel Drive Fluid	Lubricant	2	qt
Air compressor oil	Lubricant	2	qt
Antifreeze coolant	Other	6	gal
Automatic transmission fluid	Lubricant	2	gal
Automatic transmission fluid	Lubricant	25	qt

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
AutoZone Brake Cleaner	Cleaner	56	oz
AutoZone R134a Refrigerant	Other	12	oz
Bar 84 11%CO2 1.6%CO 600ppmC3H3 Bal.N2	Lubricant	15	lb
Bar's Leaks Cooling System Treatment	Other	500	g
BlueMagic Upholstry Stain & Spot Lifter	Cleaner	8.7	oz
CRC Brakleen Brake Parts Cleaner	Solvent	2	gal
CRC Diesel Air Brake Antifreeze and Conditioner	Other	1	gal
CRC Disc Brake Quiet	Coating	4	oz
CRC Freeze Off Super Penetrant	Solvent	11.5	oz
Eagle One Velour & Fabric Guard	Cleaner	14	oz
Eagle One Was As-U-Dry	Cleaner	16	oz
Evapo-Rust Rust Remover	Solvent	2	oz
Gasoline	Fuel	1	gal
Gasoline	Fuel	25	L
GM Auto-Trak II Transfer Case Fluid	Lubricant	1	qt
Honda Dual Pump Fluid II	Lubricant	1	qt
Honda VTM-4 Differential Fluid	Lubricant	2	gal
Lead acid car battery	Battery	2	N/A
Liquid propane gas	Fuel	15	lb
Liquid propane gas	Fuel	16.4	oz
Lucas Power Steering Stop Leak	Coating	2	qt
Mopar Transfer Case Lubricant	Lubricant	1	qt
Motor oil (assorted)	Lubricant	1	qt
Multi Purpose Grease	Lubricant	28	oz
Multi Purpose Grease	Lubricant	6	oz
Multi Purpose Grease	Lubricant	4	lb
Multi Purpose Grease	Lubricant	20	gal

Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Multi Purpose Grease	Lubricant	5	gal
Napa AW46 Hydraulic Oil	Lubricant	5	gal
OEM Premium Vacuum Pump Oil	Lubricant	296	ml
Oxy-Acetylene Torch	Fuel	1	N/A
PAG46 A/C Pro Refrigerant Oil	Lubricant	8	oz
Paint exterior latex	Coating	10	gal
Pennzoil Syndromesh Manual Transmission Fluid	Lubricant	4	qt
Permatex All Purpose Spray Adhesive	Adhesive	21	oz
Permatex Plastic Welder	Adhesive	1.68	oz
Permatex Threadlocker Red	Coating	1.22	oz
Permatex Ultra Black RTV Silicone Gasket Maker	Coating	6	oz
Power steering fluid	Lubricant	36	oz
Power steering fluid	Lubricant	2	qt
Prestone Radiator Flush & Cleaner	Cleaner	22	oz
Prestone Synthetic Brake Fluid	Lubricant	20	oz
Prestone Synthetic Brake Fluid	Lubricant	2	gal
RainX Original	Coating	16	oz
Red-n Tacky #2 All Purpose Grease with Anti-Seize	Lubricant	14	oz
Spray paint (assorted)	Coating	22	oz
Starting fluid	Fuel	11	oz
Synthetic Gear Lubricant	Lubricant	2	qt
Synthetic Gear Oil	Lubricant	2	qt
Tetrachloroethylene (TCE)	Solvent	3	gal
Waste motor oil	Lubricant	5	gal
Zone Marking Coating Paint	Coating	1	gal
South Park Tire Factory: Storefront			
ABC Dry Chemical Fire Extinguisher	Fire suppressant	1	N/A

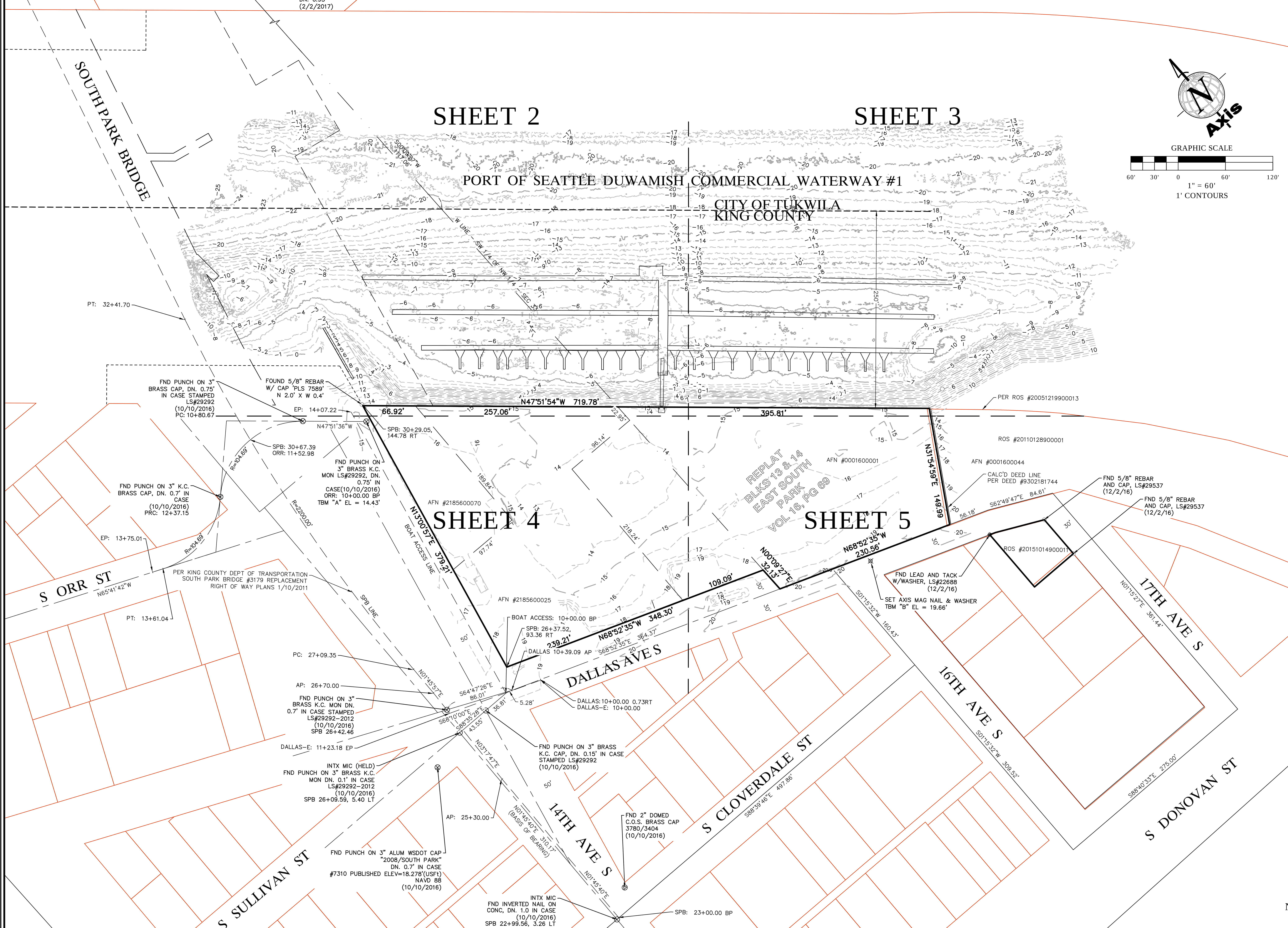
Table 1: Chemical Inventory

Chemical	Type	Quantity	Unit
Lead acid car battery (assorted sizes)	Battery	28	N/A
South Park Tire Factory: Tire Storage Area			
ABC Dry Chemical Fire Extinguisher	Fire suppressant	1	N/A
Fluorescent bulbs, 60 in	Other	4	N/A
Kool Green Antifreeze Coolant	Other	55	gal
Liquid propane gas	Fuel	15	lb
MultiMist Brake Cleaning Solution	Cleaner	30	gal
Paint (assorted, exterior acrylic, enamel, striping)	Coating	8	gal
Paint (assorted; exterior acrylic, enamel, striping)	Coating	10	gal
Spent antifreeze	Other	165	gal
Spray striping paint	Solvent	36	oz
Used oil filters	Lubricant	6	gal
Waste oil storage	Lubricant	275	gal
Zep Commercial High-Traffic Floor Polish	Coating	5	gal

APPENDIX A.9

2017 Topographical Survey As-Builts

BOUNDARY / TOPOGRAPHIC SURVEY



DATUM

HORIZONTAL DATUM:
NAD 83/11
WASHINGTON STATE PLANE ZONE: NORTH
COMBINED SCALE FACTOR 0.99999808

WSDOT MONUMENT DESIGNATION: GP17099-222
MONUMENT ID: 2988
BRASS DISK LEVEL WITH CONCRETE BRIDGE DECK SURFACE
PUBLISHED COORDINATES
NORTHING: 193093.813 (USFt)
EASTING: 1273881.002 (USFt)

VERTICAL DATUM: NAVD 88

WSDOT MONUMENT DESIGNATION: SOUTH PARK
MONUMENT ID: 7310
ALUM DISK IN WSDOT CASE AND COVER

ELEVATION: 18.278 (USFt)

TBM "A": FOUND PUNCH ON 3" BRASS K.C. MONUMENT LS#29292 IN CASE

ELEVATION: 14.43 (USFt)

TBM "B": SET AXIS MAG NAIL & WASHER

ELEVATION: 19.66 (USFt)

REFERENCES

RECORD OF SURVEY BY KPFF CONSULTING ENGINEERS, RECORDED UNDER AUDITOR'S FILE NO. 20110128900001, RECORDS OF KING COUNTY, WASHINGTON.

RECORD OF SURVEY BY DAVID EVANS AND ASSOC., RECORDED UNDER AUDITOR'S FILE NO. 20051219900013, RECORDS OF KING COUNTY, WASHINGTON.

INTERIOR PARCEL LINES ARE PER KING COUNTY'S PARCEL DATA.

HISTORICAL PROPERTY OWNERSHIP REPORT BY SECURITY FIRST TITLE RESCOURCE FOR ENVIROSITE CORPORTATION, SEPT 16, 2016

EQUIPMENT NOTES

PRIMARY CONTROL POINTS AND ACCESSIBLE MONUMENT POSITIONS WERE FIELD MEASURED UTILIZING GLOBAL POSITIONING SYSTEM (GPS) SURVEY TECHNIQUES USING LEICA SYSTEM 1200 EQUIPMENT. MONUMENT POSITIONS THAT WERE NOT DIRECTLY OBSERVED USING GPS SURVEY TECHNIQUES WERE TIED INTO THE CONTROL POINTS UTILIZING LEICA ELECTRONIC 1201 TOTAL STATIONS FOR THE MEASUREMENT OF BOTH ANGLES AND DISTANCES. THIS SURVEY MEETS OR EXCEEDS THE STANDARDS SET BY WACS 332-130-080/090.

UTILITY NOTES

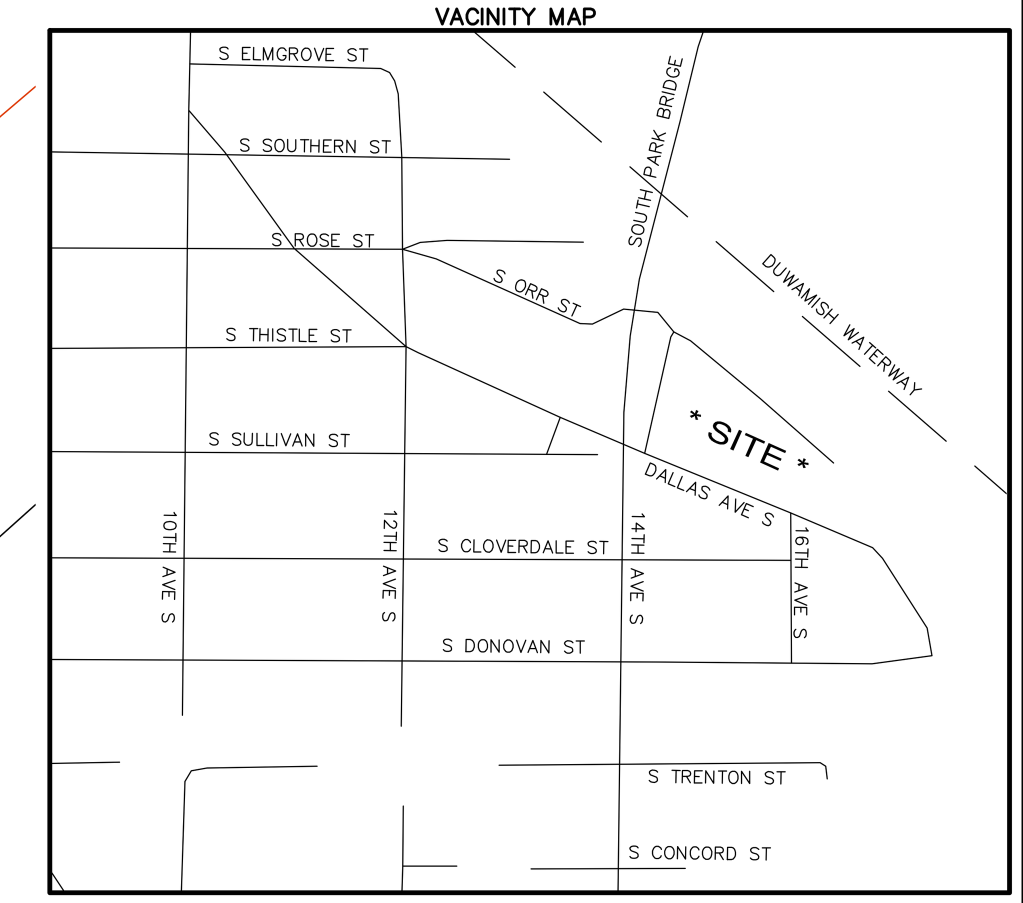
SANITARY SEWER AND STORM DRAINAGE FACILITIES HAVE BEEN ASBUILT THROUGH FIELD MEASUREMENTS OF THE LOCATION OF THE ACCESS STRUCTURES, THE TOP ELEVATION OF THE STRUCTURES, AND THE INVERT ELEVATIONS OF ANY PIPES ENTERING OR LEAVING THE STRUCTURES. IT IS STANDARD PRACTICE TO SHOW THE PIPES CONNECTING THESE STRUCTURES AS STRAIGHT LINES. THIS IS ONLY AN ASSUMPTION AND THE ACTUAL LOCATION OF THE PIPING MUST BE VERIFIED IN THE FIELD BY THE CONSTRUCTION CONTRACTOR PRIOR TO ANY CONSTRUCTION.

UTILITY LOCATIONS SHOWN HEREON ARE BASED UPON ASBUILT FIELD LOCATION OF EXISTING STRUCTURES. FIELD LOCATION OF UTILITIES BASED ON LOCATOR PAINT MARKINGS AND LOCATIONS BASED ON UTILITY MAPS FROM CITY AND UTILITY PURVEYOR'S DRAWINGS.

LEGEND

⊕ FOUND MONUMENT IN CASE
FOUND TACK IN LEAD
○ FOUND REBAR AND CAP AS NOTED
SET PK/MAG NAIL

VACINITY MAP



NE 1/4, SEC. 32, NW 1/4, SEC. 33, TWP. 24 N., RGE 4 E., W.M.
CITY OF SEATTLE, KING COUNTY, WASHINGTON

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BRUCE E. BAILEY
STATE OF WASHINGTON
38479
REGISTERED PROFESSIONAL LAND SURVEYOR

PRELIMINARY

BOUNDARY & TOPOGRAPHIC SURVEY
OF
SOUTH PARK MARINA
8604 DALLAS AVE. S., SEATTLE, WA. 98108

FOR
THE INTELLIGENCE GROUP, L.L.C.

Axis Survey & Mapping
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REDMOND, WA 98052
TEL. 425.823-5700
FAX 425.823-6700
www.axismap.com

JOB NO.	DATE
16-209	3/13/17
DRAWN BY	CHECKED BY
TJO/ARH/MWF	BEB
SCALE	SHEET
1"=60'	1 OF 5

TOPOGRAPHIC SURVEY

GRAPHIC SCALE

20' 10' 0 20' 40'

1" = 20'

1' CONTOURS

DATUM

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ALUM DISK IN WSDOT CASE AND COVER

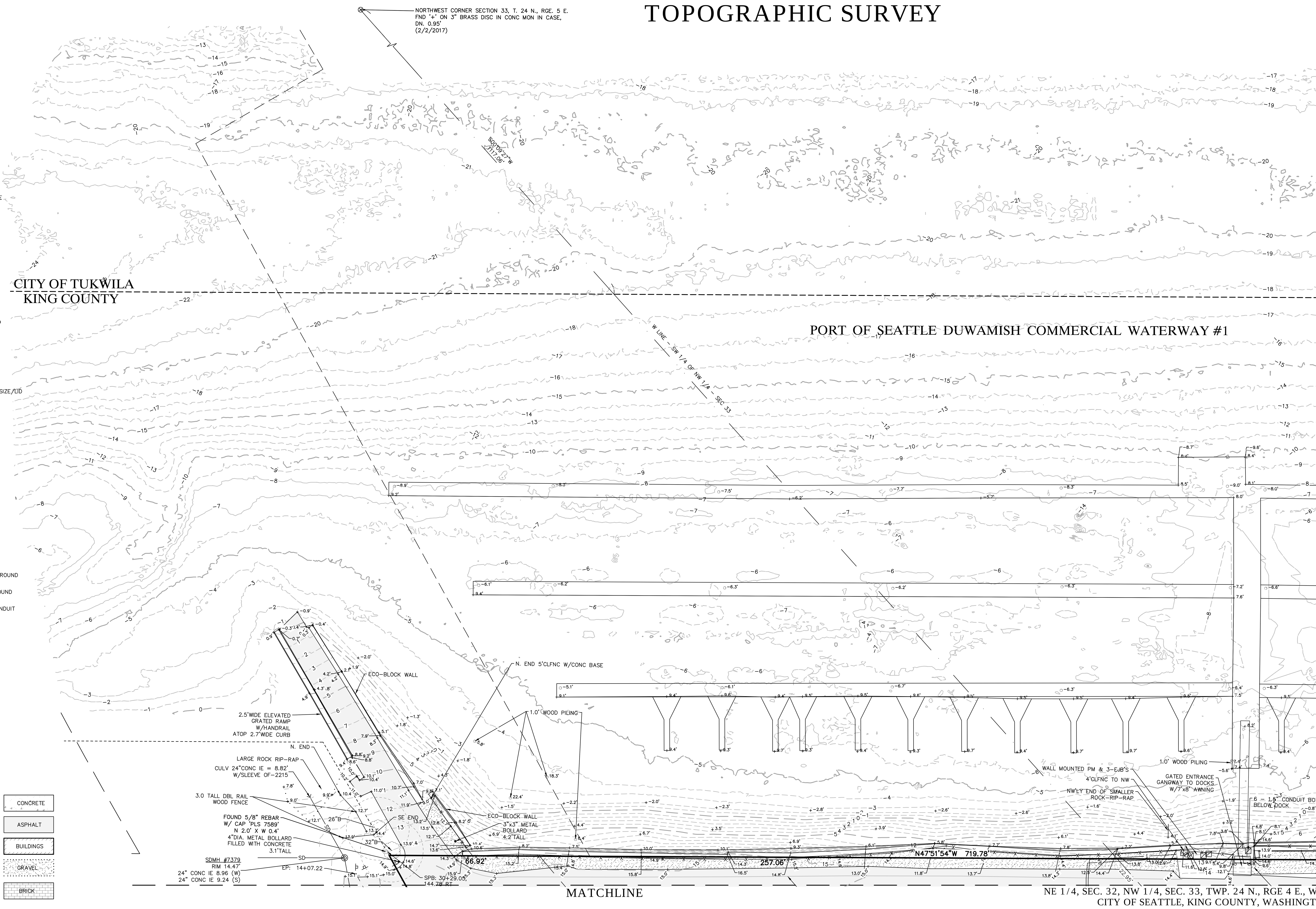
ELEVATION: 18.278 (USFt)

LEGEND

- FOUND MONUMENT IN CASE
- FOUND TACK IN LEAD
- FOUND REBAR AND CAP AS NOTED
- SET PK/MAG NAIL
- SS SANITARY SEWER CLEANOUT
- 4" SANITARY SEWER MANHOLE
- CATCH BASIN
- SD STORM DRAIN CLEANOUT
- STORM DRAIN MANHOLE
- YARD DRAIN – NON CONFORMING SIZE/LID
- CULVERT
- FIRE DEPARTMENT CONNECTOR
- FIRE HYDRANT
- HOSE BIB
- ICV IRRIGATION CONTROL VALVE
- WATER METER
- WATER VALVE
- POWER STUB
- POWER JUNCTION BOX
- POWER METER
- YARD LIGHT
- POWER TOWER
- TELECOMMUNICATIONS RISER
- CABLE TV RISER
- GUY ANCHOR
- UTILITY POLE W/ LIGHT
- UTILITY POLE W/ LIGHT & UNDERGROUND CONDUIT
- UTILITY POLE W/ LIGHT, UNDERGROUND CONDUIT & TRANSFORMER
- POWER POLE W/UNDERGROUND CONDUIT
- POWER POLE W/ TRANSFORMER & UNDERGROUND CONDUIT
- UTILITY POLE
- GAS METER
- GAS VALVE
- MAIL BOX
- SIGN
- PST POST
- BOLLARD
- 12"B BIRCH
- 12"C CEDAR
- 12"D DECIDUOUS
- HEDGE
- DRIPLINE

- SS SANITARY SEWER LINE
- SD STORM DRAIN LINE
- D DITCH LINE
- OP OVERHEAD POWER LINE
- P POWER LINE
- T TELECOMMUNICATIONS LINE
- C CABLE TV LINE
- W WATER LINE
- G GAS LINE
- X CHAIN LINK FENCE LINE
- WOOD FENCE LINE
- WIRE FENCE LINE
- EXISTING RETAINING WALL
- ROCKERY

CONCRETE
ASPHALT
BUILDINGS
GRAVEL
BRICK



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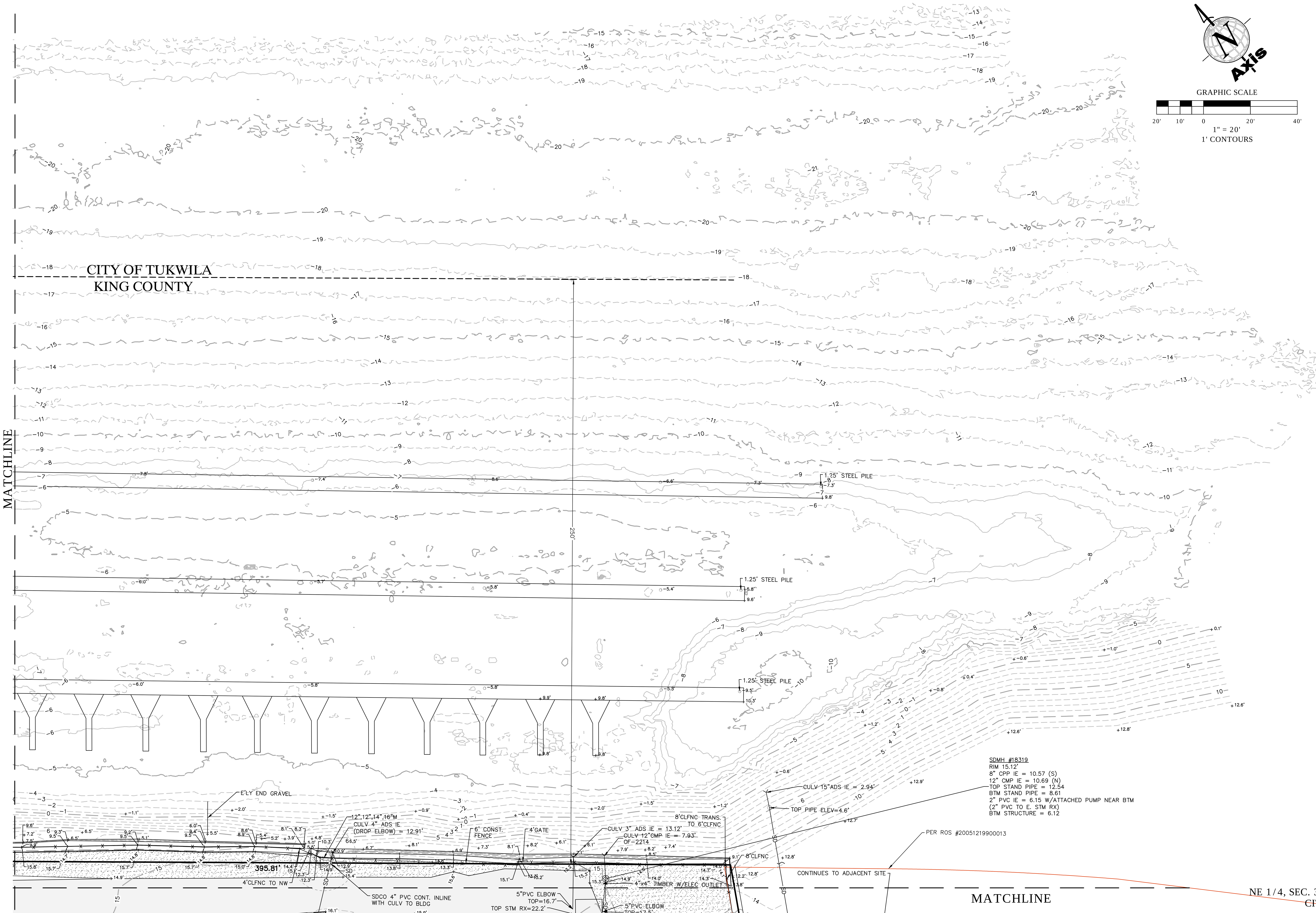
1"=20'	2 OF 5

TOPOGRAPHIC SURVEY



GRAPHIC SCALE

20' 10' 0 20' 40'

1" = 20'
1' CONTOURS

DATUM

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- 4" SANITARY SEWER MANHOLE
- CATCH BASIN
- SD STORM DRAIN CLEANOUT
- STORM DRAIN MANHOLE
- YARD DRAIN – NON CONFORMING SIZE/LID
- CULVERT
- FIRE DEPARTMENT CONNECTOR
- FIRE HYDRANT
- HOSE BIB
- ICV IRRIGATION CONTROL VALVE
- WATER METER
- WATER VALVE
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- ROCKERY
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- ASPHALT
- BUILDINGS
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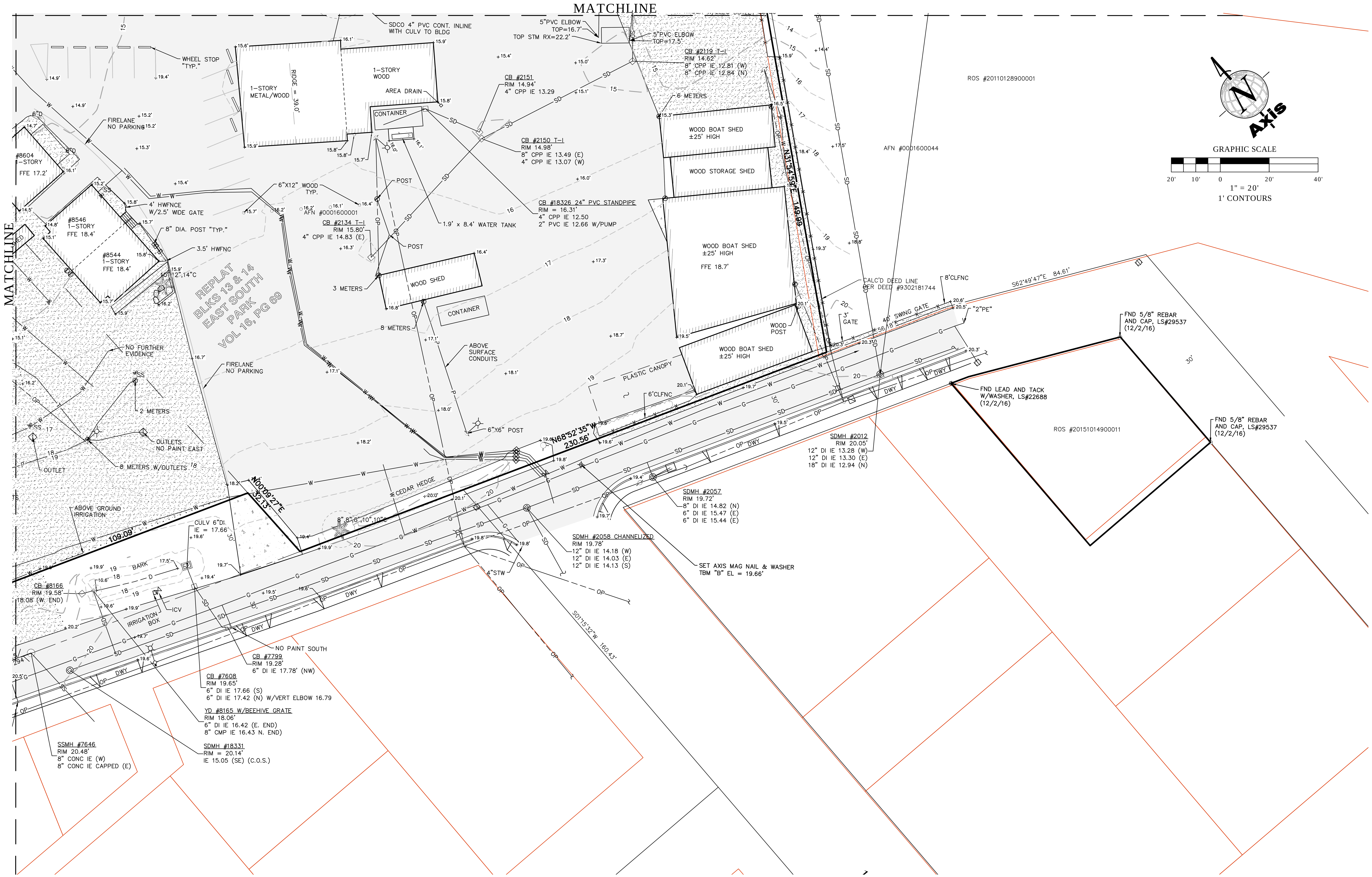

GRAPHIC SCALE

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12"B BIRCH
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PRELIMINARY

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OF
SOUTH PARK MARINA
8604 DALLAS AVE. S., SEATTLE, WA. 98108

FOR
THE INTELLIGENCE GROUP, L.L.C.

Axis
Survey & Mapping
15241 NE 90TH ST
REDMOND, WA 98052
TEL. 425.823-5700
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JOB NO.	DATE
16-209	3/13/17
DRAWN BY	CHECKED BY
TJO/ARH/MWF	BEB
SCALE	SHEET
1"=20'	5 OF 5

APPENDIX A.10

Tax Assessor Records

F-5333

3654-B

& por Vac ally adj

ADDITION East So. Park Replat Blks. 13+14
Section ___ Twp. ___ N. Range ___ Ewm. ___ Block 1 ___ Tract or Lot No. ___
Permit No. ___ LOT 3
Date ___
Address of Property 8532 Dallas Ave. (Rear)
Fee Owner ___
Condition of Exterior good ___ Interior good

USE Service Bldg for Trailer Camp	BUILDINGS	PLUMBING SH-4W-4B-1H	REFRIGERATION	GAS STATION
CONSTRUCTION Frame		No. FIXTURES 17 26 2 Tanks 2 Trays		CON.
FOUNDATION conc. 6"	FLOORS Cement	GRADE good	ELEVATORS	FLOORS
BASEMENT NO		D. S. SEWER CONN.		SERVICE BLDG.
	INTERIOR WALL FINISH Painted	HEATING 3-Movable Elec. H.W. Radiators	CONVEYORS	CON.
WALLS 2x4-24	PORCHES NO	WIRING Code	EXTRA FEATURES NO	FLOORS
				TANKS (List)
EXTERIOR Imitation Brick Comp on S/	YEAR BUILT 1942	FINISHED X UNFINISHED	REMODELED Add 1944	SPRINKLER SYSTEM NO
	EFFECTIVE AGE	FUTURE LIFE	DEP. Total 30%	No. HEADS

FACTOR	ITEM	DIMENSIONS	S.F. AREA	FACTOR	COST

Assessed Value $

INTERIOR Veneer Painted
Partitions Veneer on 2x4
ATTIC
ROOF Shingle M.S/L on 2x4-16"
FIREPLACE
TILEWORK Sq. Ft.
INTERIOR TRIM

DOCKS AND PIERS
Length of Piles
Treated Piles and Timber
Untreated
Treated Piles Only
Paved

DIMENSIONS 21 x 31
SQ. FT. AREA 651
No. Stories 1
No. Stores
No. Rooms 3

3600
1800
a.o.66
~~2500~~
8660
7100
Jo 47
~~7850~~
rh Int '63

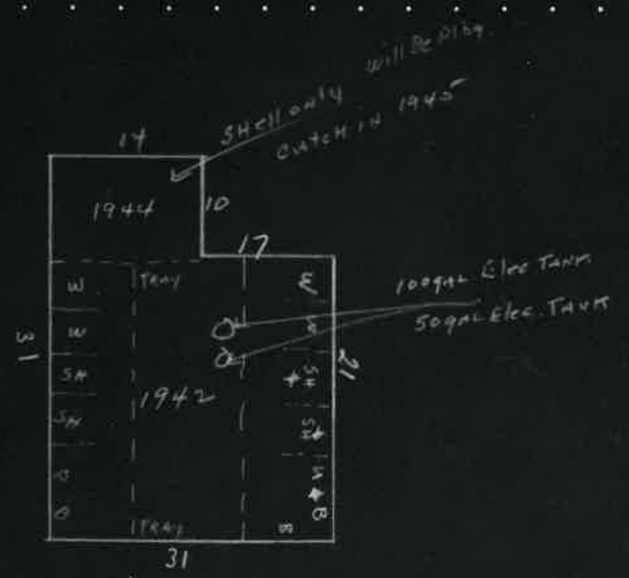
CEILING HEIGHTS

S.B.	1	10	3
B.	2		4

REMARKS

1944 Add. will contain Plbg. could not get details
1947 - 10x14 add. fr. conc. found. Dbl. const. Plywood Int. walls, Imi. brick ext. Add. 6 Toilets 1 urinal, 2 shower stalls. Average work.
1953. 20 water + drain hookups. No toilet usage in Trailers - T+T 1953

FLOOR PLAN



Appraised by Garford ___ Date 2-21-44 ___ Checked by ___ Date ___

Western Ptg.

218560-0015 ~~1540~~ ~~2550~~ ~~1040~~ 3015

LIGHT	ROAD	SCHOOL	WATER	FIRE	TOTAL ACREAGE	TIMBER	IMPROVED	UNIMPROVED
Co.	2	1						

YEAR	AC	LAND	BLDGS.	TOTAL	BY	DATE	REASON	FEE OWNER	DATE
19 ~~45~~			~~800~~		~~D.G.~~	~~6/6-44~~	~~Omitted 1944 Roll~~	Cancelled Ord# 213	2/20/50
19 ~~45~~			~~800~~		~~D.G.~~	~~6/6-44~~			
19									
19									
19									
19									
19									
19									
19									
19									
19									
19									
19									
19									
19									
19									
19									
19									

1. DISTRICT 28

LIMITS CO.

CODE NO. COUNTY

PERMIT NO.

DATE

2. ADDITION East South Park Replat BLKS 13 & 14 — 3

SECTION ___ TWP. ___ N. RANGE ___ EWM. ___ BLOCK 1 TRACT OR LOT NO. 3

DESCRIPTION

3. ADDRESS OF PROPERTY 8532-Dallas Ave. CONTRACT PURCHASER

4. FEE OWNER J P Johnson T.D. 4-22-30

5. ARCHITECT ___ CONTRACTOR

6. ORIG. BUILDING COST $ ___ OCCUPIED BY Tenant RENTAL PER MONTH $ 10.00 ESTIMATED RENTAL PER MONTH $ 15.00

7. CONDITION OF EXTERIOR Fair INTERIOR Fair FOUNDATION Good FLOOR PLAN Poor

8. BUILDING	TILE WORK	PORCHES	9. CORNER JOINTS Boxed DOWN SPOUTS SEWER CONNECTED No No
1 Fmly. Dwel.	None	3 1-Story	10. FIRST FLOOR JOIST SIZE 2 x 6 AND 20 INCH CENTERS BRIDGED No
1 Sty.		2 Roofed	11. FIRST FLOOR JOIST SUPPORT COLUMN OR POST SIZE 6 x 8
4 Rooms		1 Recessed	12. CLASS OR GRADE NO. 1 SHAPE NO.
4 1st Floor		EXTRA FEATURES	13. BUILDING FINISHED OR UNFINISHED Finished
Ard Eff63	ATTIC	1 Flue	14. DEPRECIATION: CONDITION 60-10 % OBSLSE. ___ % ECON. SUIT ___ % TOTAL 59 %
INTERIOR WALLS	None	BUILT-INS	DATE BUILT 1910 REMODELED None
4 Plaster		Usual	~~EFFECTIVE~~ AGE 2149 YEARS FUTURE LIFE 14 YEARS
		CONSTRUCTION (4)	LAND INFORMATION
	HEATING	Single-Cheap	1. SIZE ___ x ___ TOPOGRAPHY Sloping GRADE On grade FEET
FLOORS	~~H.A. Furnace~~	CEILING HEIGHT	2. STREET ROAD Graded SURFACE Gravel ALLEY No
4 Fir	~~stove~~ '56	Basement 7'	3. SIDEWALK No SEWERAGE ___ WELL ___ ELECT. PUMP
		1st Floor 9'6"	4. LANDSCAPING None COND. Poor
FIRE PLACE	BASEMENT Full		5. TREND Static VALUE OF LAND
None	Frame & Conc.		6. USE OF DISTRIC Residential VIEW None
INTERIOR TRIM	2' 5'		7. RESIDENTIAL Poor-Old ZONED
4 Fir	½ Conc. Floor		REMARKS
PLUMBING	FOUNDATION		
6 Fixtures	Concrete		
1 Tub-Leg	Pchs. P. & B.		
1 Toilet	ROOF		
1 Basin	Shingle Gable		
1 Sink			
1 H.W. Tank	EXTERIOR WALLS		
1 Ldy. Tray	Cedar Siding		
Cheap			

MAIN BUILDING

DIMENSION			SQ. FT. AREA
16	x	30	
18	x	30	1020
	x		
Pch. 6	x	9	Rec.
PCH. 6	x	14	84
PCH. 5	x	6	30

IMPROVEMENT VALUE

MAIN BUILDING $

OTHER BUILDINGS $

TOTAL $ ~~480~~ ~~800~~

ASSESSED VALUE 50% $ ~~240~~ ~~400~~ 700 Ef63

DATE 11/23/37

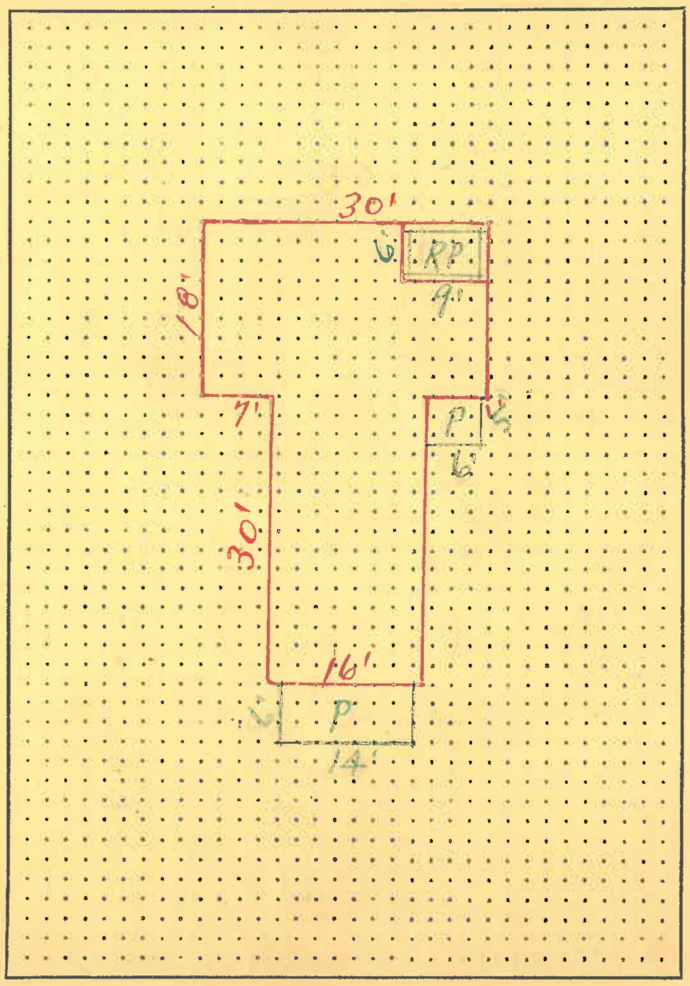
1400

OTHER BUILDINGS	CONSTRUCTION	FLOOR	ROOF	STY.	DIMENSION	AREA	VALUE
GARAGE					x		$
					x		
					x		
					x		
					x		

OWNER OR CONTRACT PURCHASER	DATE	FILE NO.	PRICE	MTGE.	STAMP

REMARKS NO BLDG CARD

FLOOR PLAN SC 20'-1"



FRONT

0015

SEWER	HSPTL.	AIRPT.	FERRY	LIB 21856

DISTRICT: ROAD	SCHOOL	WATER	FIRE
2	1		11

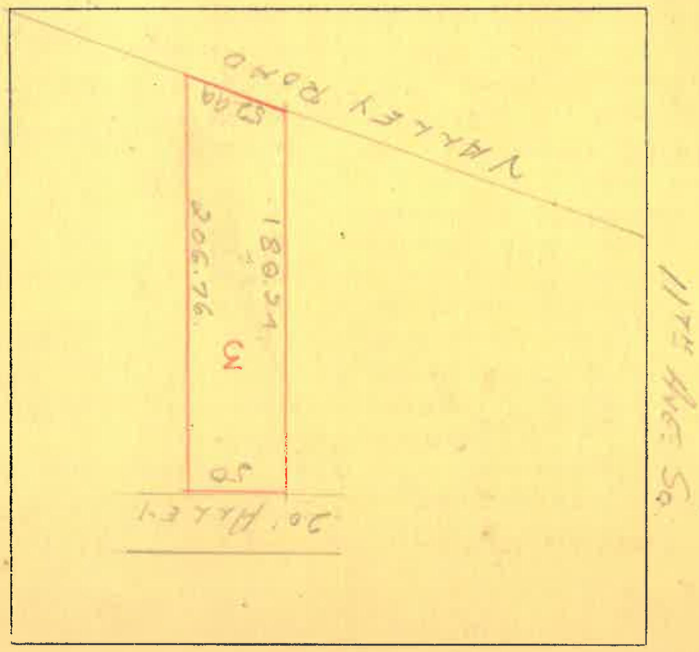
DECREASE OR INCREASE IN ASSESSED VALUATION

RECORD OF ASSESSED VALUE								LAND		BUILDING	
YEAR	AC.	LAND	BLDG'S.	TOTAL	DATE	BY	REASON	DECREASE	INCREASE	DECREASE	INCREASE
1938		90	240	330							
1944		200	240	440	2/3/43	Mc					
1945		200	1040 (2)	1240	6-6-44	DG.	Service Bldg added.				
1948		200	1340 (2)	1540	3-47	JJS	Imps. completed - plumbing added.				
1949		200	1500 (2)	1700	9-47	mac	R.V.				
1954		860	1500	2360	8-52	B.	Rev.				
1955		860	2900 (2)	3760	8-17-53	WBm.	See changes on rear Imp.				
1956		860	2250 (2)	3110	3/24/54	WBm.	Per folio.				
1958		1140	2250 (2)	3390	1/14/59	JG	Rev				
1962		1510	2250	3760	5-22-61	LL	Rv				
1965		1510	2550 (2)	4060	1-16-64	LL	Rv [illegible]				
1967		1980	2550	4530	4-16-65	BLS	Rv				
1967		1980	2500 (2)	4480	2/4/66	EL	R.V.				
71 L		3960 B	5000 T	8960*218560-0015-0	8/9		Chg legal - EHS - 5/15/70 (Ord. V 1334 4/28/69) A-3952				
1973		9100	3500	12600	4-28-72	VS	Rv				
19											
19											
19											
19											
19											
19											
19											
19											
19											
19											
19											
19											
19											

LAND CLASSIFICATION AND SEGREGATION

SCALE ONE INCH 100 FEET TO 2½ ACRES OR 330 FEET

THIS SQUARE INDICATES 2½ ACRES



PARCEL NO.

TAX LOT NO.

SECTION NE 32

TWP. 24 N

RANGE E

PLAT MAP #5333

QUARTER MAP

AERIAL PHOTO

3654-13

DISTRICT 5333

ADDITION East South Park Replat Blks 13+14

Section ___ Twp. ___ Range ___ Blk ___ Block ___

Lot 6

Blk. 1 - Lot 6 & 7
& por vac alley adj
Less Rd Road

PERMIT No.

DATE

8510 Dallas Ave.

Fee Owner A.M. Wann

Condition of Exterior Fair Interior Ben Tugged Foundation

USE Garage + Sales

	No. Stories
2	No. Stores
6	No. Rooms
	Basement
1	No. Offices
	No. Apartments
	~~1 rm.~~ ☐ 2 rm. ☐ 3 rm.
	4 rm. ☐ 5 rm. ☐ 6 rm.

ROOF CONSTRUCTION

X	Frame Lam ☐
	Mill Construction 2x8 / 2x10
	Rein. Concrete
	No. Trusses
	Wood ☐ Steel

ROOFING MATERIAL

X	Tar and Gravel

Or.

FLOOR FINISHES

X	Fir ☐ Maple
	Oak ☐ 2" x 6" T&G
	Lino. ☐ 3" x 6" T&G
X	Cement 3/4"
	Terrazzo
	Raecolith 2" T+G Bal
	Tile Fir 900'

Or.

Tile	Baths ☐ Fl. ☐ Walls
Total	Sq. Ft. ___ Floors
	Sq. Ft. ___ Walls
	Lin. Ft. ___ Dr. Bds.
Lino	Sq. Ft. ___ Floors
Total	Sq. Ft. ___ Walls
	Lin. Ft. ___ Dr. Bds.
	Kit's. ☐ Fl. ☐ Walls

PLUMBING

	No. Fixtures
1	Toilets
	Tubs, Leg or Pem.
1	Basins, Ped.
1	Sinks
	Urinals
1	Showers (~~Tub~~) (Stall)
	Laundry Trays
	H. W. Tank Fl. Drains ☐
No	Sprink. Sys. No. ___ Hds.

TYPE OF CONSTRUCTION

X	Frame
X	Single ☒ Double
	Ordinary Masonry
	Mill Construction
	Class A Rein. Con.
	Stru. Steel and Con.
	Tile ☐ Brick
	Con. ☐ Rein. Con.

Good ___ Med. ___ Cheap X

Date Built 1918 ☒ Finished ☐ Unfinished ☒ Remodeled 1941

Effective Age ___ Years ___ Future Life ___ Years

Dep. For Cond. ___ Dep. For Ob. ___ Dep. For Es. 2¼ Remodel Total ~~60%~~ 65%

REPRODUCTION COST Factor Make Up

Total ___ $

Assessed Value 50% ___ $

Sup. Building A. V. ___ $

Total ___ $

HEATING

	Stove
	Pipeless Furnace
X	Gravity H. A. for Liv ¼
X	Air Cond., Fan Gas
	Arcola Heats office + show room
	1-Pipe Steam
	2-Pipe St. or Vapor
	Hot Water
	Oil Burner
X	Coal Stoker

WIRING Code

	Knobs & Tube
	Flex Cable
	Conduit
X	Power Wiring
	Range Wiring
	No. Outlets

ELEVATORS

	Pass. ☐ Freight
	Auto. ☐ Elec.
	Man. ☐ Hyd.
	☐ Man.

4200
~~2100~~
2.0.66
~~2500~~
1800 K44

FOUNDATION

	Mud Sills
X	Post and Pier Bal-
	Brick
X	Concrete 100 Lin ft
	Pile

BASEMENT

	Full ☐ %
dug out	Sub-Basement
	Size one pk.
	Garage ☐ No. Cars
	Floors
	Plastered Plaster and Cem
	Living Rooms Bsmt
	Service Rooms

EXTERIOR WALL CONSTR.

193 Lin Ft X	Single ☒ Double
	2" x 4" Stud Walls 154 Lin ft
X	2" x 6" Stud Walls
	Brick Walls
	Brick With Pilasters
	Concrete Walls
	Con. With Pilasters
	Tile Walls
	Rein. Con. Skel.
	Filler Walls
	Laminated Walls

INTERIOR WALLS

	Stud and Plaster
	Lam. ☐ Plastered
	Ply Wood 63' Fir Part
X	Ceiled Bal. Partitions
X	Plaster Board Pl. Bd
X	Painted Cl Pan Papered
	Stain ☐ Varnish
	Kalsomine
	Whitewashed
	Unfinished

GAS STATIONS

	Frame
	Metal
	Masonry
	Plastered or Ceiled
	Floors

SERVICE BUILDING

	Frame
	Metal
	Masonry
	Plastered or Ceiled
	Floors

TANKS, ETC., LIST

2 550 Gal Tanks

Hoists: ~~Elect.~~ X Hyd.

DOCKS AND PIERS

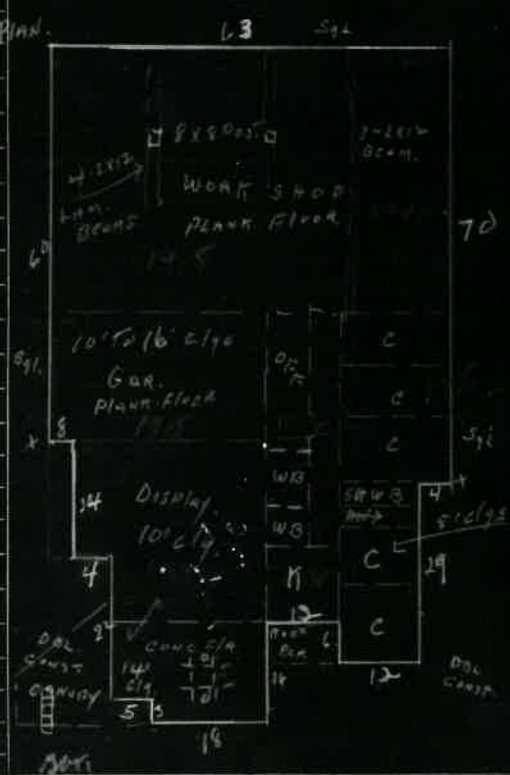
	Treated Piles and Timbers
	Untreated
	Treated Piles only
	Average Length
	Paved

C. H.

S.B., B, 1–22

GROUND FLOOR AREA

TOTAL FLOOR AREA 5892



EXTERIOR FACING

3/4"	Siding ☐ Shingles
	Shakes ☐ Stucco
1/4"	~~Brick~~ Veneer Dbl. Pan
	Kind
	Stone ☐ Cast S.
	Terra Cotta
	Struct. Glass
	Trim

INTERIOR TRIM

X	Fir
	Mah. ☐ Oak
	Metal
	Doors
	Windows
	Stained
	Varnished
X	Painted
	Unfinished

FLOOR CONSTRUCTION

Joist Con. Size 2 x 8

O. C. 12" In Bridg ☐

Mill Construction

Rein. Con.

Other Buildings	Construction	Floor	Roof	Stories	Dimensions	S. F. Area	Factor	Value	% Dep.	Deprec.	Net Value
Garage					x			$		$	$
					x			$		$	$
					x			$		$	$
					x			$		$	$

0030

218560-0030 2~~1~~10 ~~2500~~ ~~1040~~ 3015 **21856**

LIBRARY	ROAD	SCHOOL	WATER	FIRE	TOTAL ACREAGE	TIMBER	IMPROVED	UNIMPROVED
Co	2	1		11	SEWER / HSPTL. / AIRPT.	FERRY / LIB / ~~Metro~~		

YEAR	AC	LAND	BLDGS.	TOTAL	BY	DATE	REASON	FEE OWNER	DATE
1944		650	710	1360	Mc	2/3-43		J.R. Johnson	10/4-19
1945		650	1800	2450	DG	6/6-44	Remod.		
1949		780	1800	2580					
1954		1150	1800	2950	B	8-52	Rev.		
1954		1750	1800	3550	LH	6-53	Merge		
1955		1750	2500	4250	RBm	8/14/53	see changes per folio		
1958		2110	2500	4610	JB	1/14/57	Rev		
1962		2110	2500	4610	LL	5-22-61	Rv		
19 V67		1950	2500	4450	SLS	9-16-65	Rv		
1967		1950	2100	4050	El	2/4/66	R.V.	(Ord# V 1334-4/28/69)	
19	71 L	3900 B	4200 T	8100*218560-0030-0	8/9		Chg legal-F4151-5/15/70		A-3955
1973		8450	2750	11200	VS	4-28-72	Rv		
19									
19									
19									
19									
19									
19									

1 DISTRICT 8

LIMITS CO.

CODE NO. County

PERMIT NO.

2 ADDITION East South Park REPLAT BLKS 13 & 14 — NAME 6

SECTION — TWP. — N. RANGE — EWM: BLOCK 1 — TRACT OR LOT NO. 6

DESCRIPTION

3 ADDRESS --- PROPERTY 8510-Dallas Ave. — CONT. PURCHASER

4 FEE OWNER J R Johnson T.D. 4-22-30 10-4-19

5 ARCHITECT — CONTRACTOR

ORIG. COST $

6 BUILDING
Garage
1 Story
6 Rooms (Rear)

BASEMENT 50%
488 sq.'
Conc. Floor

FOUNDATION
P. & B. Conc. B.
1 Conc. Wall

ROOF
Composition

STORE FRONTS
None

EXTERIOR
Frame Single
Rustic
Plain-Cornice
Fir Trim

EXTRA FEATURES None

CONSTRUCTION Frame- Single-Cheap

MISCELLANEOUS

7 CONDITION: EXTERIOR Poor — INTERIOR Poor — FOUND. Poor

8 MAIN SUPPORT COLUMN 8 x 8 — FOOTING Conc. — SPAN — FT.

9 FIRST FLOOR JOIST 2 X 8 X 12 — INCH CENTERS BRIDGED

10 BUILDING Finished

11 GROSS INCOME $ — EXPENSE $ — NET INCOME $

12 DEPRECIATION: COND. 60 % OBSLSE. — % ECON. SUIT. — % TOTAL — %

YEAR BUILT 1918 — REMODELED 1925

EFFECTIVE AGE 18 YEARS — FUTURE LIFE 12 YEARS

DIMENSIONS See Remarks x — SQUARE FT. 4600 — AREA CUBIC FT.

INTERIOR
8 Ceiled with
Plaster Brd.
1 Partition--2X4 Rustic

FLOORS Fir

FIRE PLACE None

PLUMBING 4 Fixtures -Cheap
1 Toilet - 1 Basin
1 Sink- 1 H.W. Tank

TILE WORK None

WIRING Open Conduit

HEATING Stove

ELEVATORS

CEILING --- HEIGHT Basement 7'
1st Floor10 to15'

IMPROVEMENT VALUE

BUILDING $

MAIN BUILDING $

OTHER BUILDINGS $

TOTAL $1420

ASSESSED VALUE 50% $ 710

DATE 4/24/37

LAND INFORMATION

1. SIZE x Sloping
On grade

2. STREET --- ROAD Graded -No Alley
Surface- Gravel

3. SIDEWALK No -- Sewer -Yes

4. LANDSCAPING None
Condition Poor

5. TREND Static VALUE $
City Water

6. USE Business
View None

7. DISTRICT Poor-Old

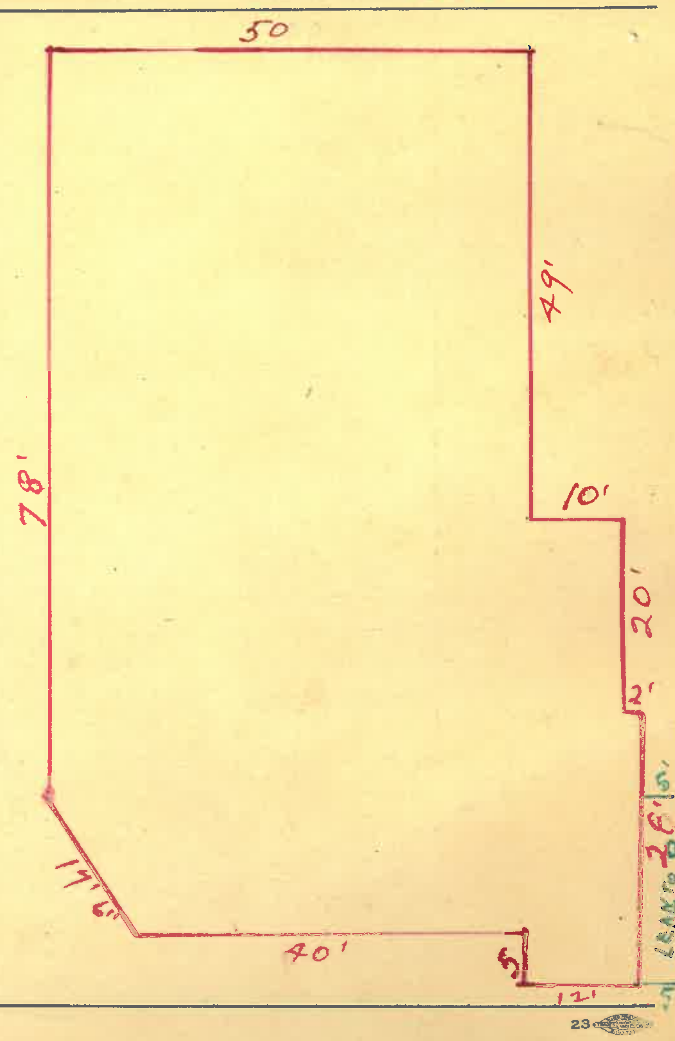
OTHER BUILDINGS	CONSTRUCTION	FLOOR	ROOF	STY.	DIMENSION	AREA	VALUE

OWNER OR CONTRACT PURCHASER	DATE	FILE NO.	PRICE	MTGE.	STAMP

REMARKS Dimensions--- 50X92 -- 4600
10X48 480
2X28 56
Less -- ½ X10X14 70
5066

Ass. Co. Rd.
Also 7 N East South Park Replat Blks 13 & 14

FLOOR PLAN SC 20'-1"

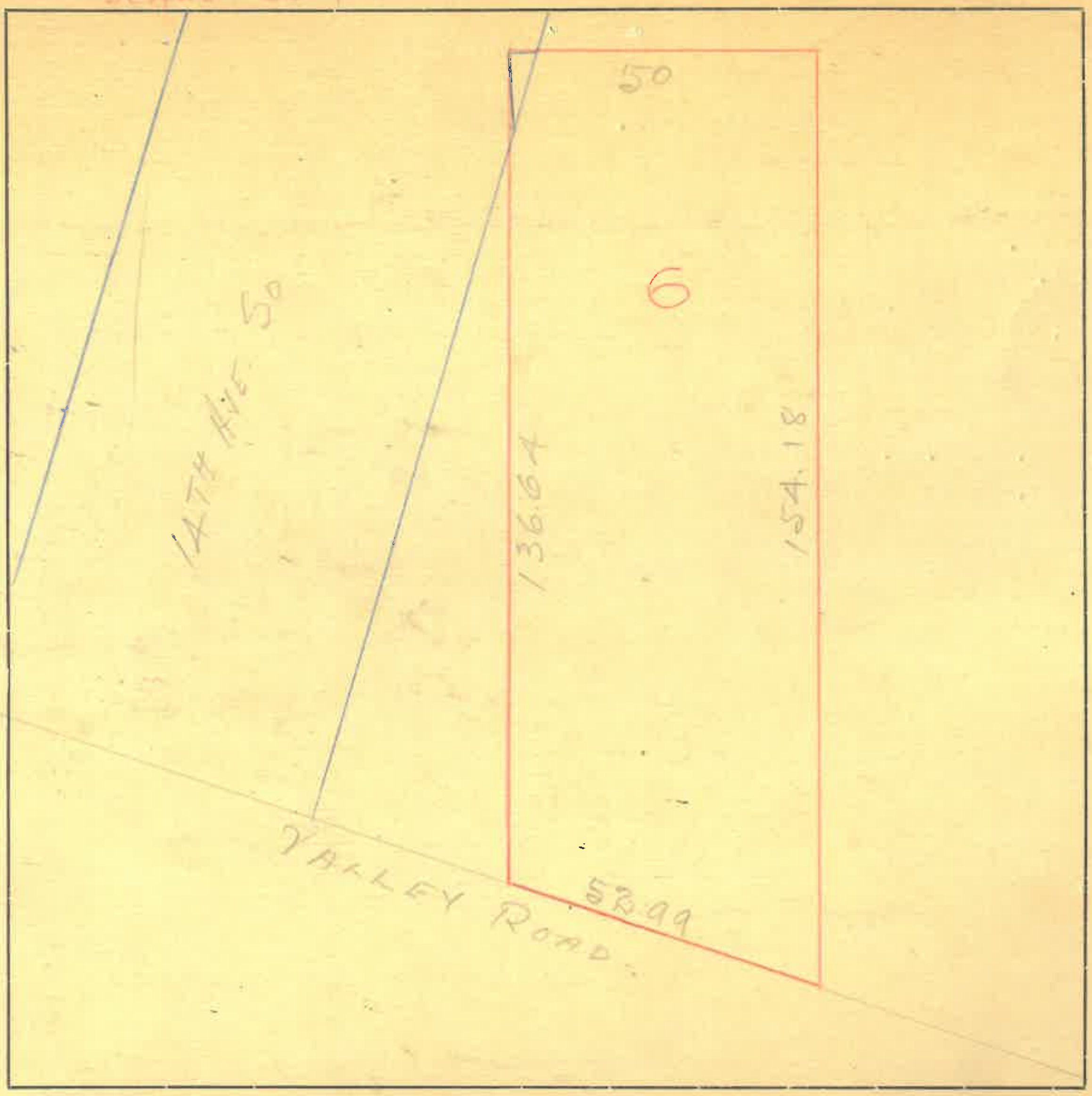


LAND CLASSIFICATION AND SEGREGATION

Section N.E. 32
Twp. 24
Range 4

Tax Lot No.
Parcel No.
Lot No.
Block No.

Aerial Photo
Quarter Map
Plat Map #533360



District	Road	School	Water	Fire
	2	1		

Record of Assessed Value / Decrease or Increase in Assessed Valuation

Year	Ac.	Land	Bldgs.	Total	Date	By	Reason	Land Decrease	Land Increase	Building Decrease	Building Increase
1938		290	710	1000							
1944		650	710	1360	9/3/43	MC					

APPENDIX A.11

Results of Drainage Pathway Investigation

TO:	Guy Crow South Park Marina Limited Partnership	Tom Adams Karr Tuttle Campbell
FROM:	Nicholas Schlagenhaft, Audrey Hackett, and Philip Spadaro TIG Environmental 1200 Westlake Ave N, Suite 809, Seattle, WA 98109	
SUBJECT:	**Results of Drainage Pathway Investigation**	
DATE:	January 16, 2019	

Introduction

TIG Environmental (TIG) has prepared this memorandum to provide South Park Marina Limited Partnership the results of the 2018 Drainage Pathway Investigation at the South Park Marina Site (the Site) (Figure 1). TIG conducted this investigation to confirm stormwater drainage discharge points and to delineate infrastructural pathways at the Site via dye tracing. TIG also used the results of this investigation to quantify concentrations of metals in runoff from roofs at the Site, in anticipation of a future remedial investigation (RI).

Since 2015, TIG has performed a variety of activities to characterize subsurface drainage infrastructure at the Site. Findings from these activities have resulted in the identification of nine stormwater drainage network pathway data gaps, represented by unknown discharge points for stormwater entering catch basins and roof drains at the Site (Table 1). Because the Site is the focus of the Washington Department of Ecology's (Ecology's) ongoing source control investigations, it is important to have a complete understanding of how the Site drains to the Lower Duwamish Waterway (LDW). Additionally, the Site is covered by a National Pollutant Discharge Elimination System (NPDES) permit. The inconclusive extent of coverage of the permit at the Site requires an understanding of the stormwater drainage network pathways and potential sources of contamination associated with drainage infrastructure across the entire footprint of the South Park Marina property, including the portions of the property occupied by tenants Rick's Master Marine and the South Park Tire Factory.

TIG investigated nine stormwater drainage network pathway data gaps and identified their discharge points. However, despite the exhaustive measures executed by TIG, some components of the stormwater drainage pathways could not be ascertained. These components include the precise locations, routing, and connections of subsurface stormwater pipes, as well as the locations of some discharge points where subsurface stormwater pipes have been blocked.

Background

Washington Department of Ecology (Ecology) identified the stormwater pathway as a focus of future investigation at the Site. Ecology has proposed a scope of work under a draft agreed order that includes stormwater sampling and an evaluation of stormwater as a potential source of recontamination to the LDW Superfund Site. Between 2015 and 2017, TIG completed the following activities to investigate the stormwater drainage pathway at the Site:

- Reviewed historical and current drainage maps of the Site
- Conducted multiple site visits to identify drainage features
- Conducted a ground-penetrating radar (GPR) survey in February 2016
- Developed a topographic survey of the Site in March 2017
- Conducted camera surveys within stormwater and sewer pipes in September 2017

However, nine drainage pathway data gaps were identified due to conflicting mapping information, a lack of visible evidence at ground surface, and blocked and/or inaccessible piping. Figure 2 depicts the confirmed stormwater infrastructure following completion of map reviews, site visits, GPR surveys, topographic surveys, and camera surveys. The nine drainage data gaps identified through these activities, which represent the focus of this drainage pathway investigation are also depicted on Figure 2, and summarized below:

1. **South Park Marina outfall:** According to sewer network data provided by the City of Seattle (the City), the South Park Marina outfall is located approximately 25 ft downstream of the South Park Marina dock access ramp. TIG was unable to confirm the existence and precise location of the outfall during site visits, the GPR survey, or camera surveys.
2. **Catch basin CB-01:** According to sewer network data provided by the City, CB-01, located on the northeast portion of the property, conveys stormwater via subsurface piping to the South Park Marina outfall, where it discharges to the LDW. GPR and camera surveys were unable to trace the subsurface piping associated with the catch basin.
3. **Catch basin CB-02:** According to sewer network data provided by the City, CB-02, located west of the restrooms/shower/laundry facility, conveys stormwater via subsurface piping to the South Park Marina outfall, where it discharges to the LDW. Using findings from the camera surveys, TIG identified connections with the upgradient catch basins CB-03 and CB-04. However, the GPR and camera surveys were unable to identify the subsurface drainage pathway downgradient from CB-02.
4. **Catch basin CB-05:** According to sewer network data provided by the City, CB-05, located southeast of the restrooms/showers/laundry facility, conveys stormwater via subsurface piping to CB-06, located approximately 10 ft to the east. From CB-06, the stormwater is conveyed via subsurface piping to the South Park Marina outfall, where it discharges to the LDW. GPR and camera surveys were unable to confirm the connection with CB-06 or a discharge pathway downgradient of the catch basin.
5. **Catch basin CB-06:** According to sewer network data provided by the City, CB-06, located approximately 10 ft east of CB-05, conveys stormwater via subsurface piping to the South Park Marina outfall, where it discharges to the LDW. As stated above, The GPR and camera surveys could not verify a connection between CB-05 and CB-06.

6. **Northeast Rick's Master Marine shop roof drain:** TIG identified one roof drain on the northeast side of the Rick's Master Marine shop that discharges to subsurface piping. Camera surveys were unable to trace the subsurface piping.

7. **Southeast Rick's Master Marine shop roof drain:** TIG identified one roof drain on the southeast corner of the Rick's Master Marine shop that discharges to subsurface piping. Camera surveys were unable to trace the subsurface piping.

8. **South Park Tire Factory shop roof drain:** TIG identified a roof drain on the northwest corner of the South Park Tire Factory Shop that discharges to subsurface piping with an unconfirmed discharge path.

9. **Woodworking shop roof drain:** TIG identified three roof drains on the east side of the woodworking shop that discharge to subsurface piping with an unconfirmed discharge path.

Prior to the drainage pathway investigation presented herein, TIG investigated stormwater runoff from a metal roof at the Site to quantify the concentrations of metals entering the Site's stormwater system. In June 2017, as part of a site-wide stormwater sampling event at South Park Marina, TIG collected a stormwater sample from a roof drain attached to the Rick's Master Marine shop and submitted the sample for analysis of U.S. Environmental Protection Agency's (EPA's) 13 priority metals. Zinc was detected in the sample at a concentration of 1,700 µg/L. This zinc concentration is approximately 20 times greater than the maximum daily discharge benchmark for zinc (90 µg/L), as established under the NPDES boatyard general permit issued on July 6, 2016 (Permit No. WAG-050000).[1] Although Rick's Master Marine, and a second tenant, South Park Tire Factory, are not specifically mentioned in the Site's NPDES boatyard general permit, both businesses are located on the South Park Marina property and could be considered part of the South Park Marina facility. Therefore, stormwater discharges from these portions of the property may also be subject to the regulations established under the Site's NPDES boatyard general permit. The zinc concentration detected in stormwater from the Rick's Master Marine roof drain prior to the drainage pathway investigation indicated that the metal roof may be a potential source of contaminants to stormwater at the Site. However, because the discharge location of the roof was not confirmed prior to the drainage pathway investigation, it was unknown whether the roof runoff was also a potential source of contaminants to the LDW.[2]

In addition to the Rick's Master Marine Shop, there are several other structures at the Site may also be a potential source of contaminants to Site stormwater and/or the LDW. Prior to the drainage pathway investigation, no stormwater samples had been collected from these roof drains their drainage pathways could not be confirmed. It is important to resolve these drainage data gaps, as the stormwater pathway will

[1] Comparison of roof drain sample results to NPDES benchmarks is for reference only. The roof drain at Rick's Master Marine may not be part of the NPDES-permitted facility nor is it representative of stormwater discharges to state water because the samples do not accurately characterize stormwater runoff generated in the designated drainage area of the facility. Under the NPDES Boatyard General Permit, compliance samples are required to be collected from location(s) affected by boatyard related activities. At the Site, all roof drainage is mixed with other stormwater runoff prior to discharge to either the LDW or a storm sewer.

[2] Zinc is a contaminant of concern requiring cleanup in the LDW. However, in sediment data collected from adjacent to the site for the remedial investigation, zinc is not present above the sediment cleanup level of 410 mg/kg, as established by the 2014 LDW Superfund Site Record of Decision (ROD). According to Map 4-58 of the Final Remedial Investigation Report for the LDW dated 2010, maximum concentrations of zinc of up to 110 mg/kg were observed near South Park Marina. Therefore, it is unlikely that discharges from this metal roof have been a historical source of contamination. This memorandum does not evaluate the potential for recontamination.

be a focus of future remedial investigation and source control will potentially be an element of cleanup action at the Site.

Drainage Pathway Investigation

To quantify metals concentrations in stormwater draining from metal roofs at the Site, TIG completed a roof drain inventory and collected stormwater samples from drains connected to metal roofs that have unknown discharge pathways. TIG then compared the new stormwater samples with the NPDES benchmarks to identify those that may be potential sources of zinc and copper to the Site's stormwater. Secondary to the roof drain sampling, the drainage pathway investigation involved the execution of a series of dye tracer studies to confirm drainage pathways at the Site. The sections below provide details and findings from each study. Further specifics are provided in the attached photograph log (Attachment 1).

Roof Drain Inventory

TIG performed a roof drain inventory to identify all metal-roofed structures[3] and their associated roof drains at the Site. This allowed for evaluate whether they are potential sources of zinc to stormwater at the Site. There are four structures with metal roofs in addition to the Rick's Master Marine shop: the South Park Tire Factory shop, the South Park Marina main shop, the lumber storage building, and a shed (Figure 3). During a site visit on March 27, 2018, TIG observed that 15 of the 27 total roof drains at the Site are connected to these metal roofs.

The table below lists the metal roofs, their square footage, and associated roof drains.

Structure	Approximate area of metal roof (ft^2)	Number of roof drains	Number of roof drains with unconfirmed discharge pathways
Rick's Master Marine shop	4,200	4	2
South Park Tire Factory shop	8,500	4	1
Shed	330	2	0
South Park Marina main shop	200	2	1
Lumber storage building	1,000	3[1]	3

Note

[1] These roof drains are not directly attached to the lumber storage building. The lumber storage building's roof overhangs the woodworking shop. Therefore, stormwater from the lumber storage building is routed to three roof drains attached to the woodworking shop.

[3] Metal-roofed structures were identified based on visual observations by TIG staff from the ground surface, aerial photograph review, and input from South Park Marina staff. However, the composition of the roofs has not been confirmed. Roofs identified as non-metal composition were not evaluated in this drainage pathway investigation.

Of the 15 roof drains identified, six have unconfirmed subsurface drainage pathways (Figures 2,3): two roof drains attached to the east side of the Rick's Master Marine shop, one roof drain attached to the northwest corner of the South Park Tire Factory shop, and three roof drains discharging stormwater from the lumber storage building.

Roof Drain Sampling Field Activities

To evaluate whether the roof drains attached to metal roofs at the Site are potential sources of metals contamination, TIG sampled stormwater discharging from roof drains at the Site. Using the benchmarks established under the NPDES General Boatyard permit as screening levels, TIG focused on copper and zinc as potential contaminants of concern.

Following the collection of stormwater samples, TIG compared the sample results with the Site's NPDES benchmarks to identify the roof drains and metal roofs that may be potential sources of copper and zinc to the LDW. In preparation for the sampling event, TIG conducted storm tracking on a weekly basis to target days with extended periods of precipitation, ensuring adequate stormwater flows from roof drains for sample collection. In accordance with TIGs Sampling and Analysis Plan (SAP), TIG collected stormwater samples from a single roof drain at each of the metal-roofed structure at the Site. Each roof's sample serves as a substitution for the other attached roof drains. TIG selected sampling locations based on accessibility. Figure 3 depicts the roof drain sampling locations, and the table below describes each location.

Structure	Sampling location ID	Sampling location description
Rick's Master Marine shop	SRC-01	Roof drain located at the southwest corner of the Rick's Master Marine shop
South Park Tire Factory shop	SRC-02	Roof drain located at the southeast side of the South Park Tire Factory shop
Shed	SRC-03	Roof drain located on the east side of the shed
South Park Marina main shop	SRC-04	Roof drain located on the southwest corner of the South Park Marina Main Shop
Lumber storage building	SRC-05	Roof drain located east side of the woodworking shop[1]

Note

[1] As no roof drains are attached to the lumber storage building, TIG selected the SRC-05 roof drain sampling location because it has the potential to discharge stormwater from the lumber storage building.

On October 25, 2018, TIG collected a total of five stormwater samples and one duplicate sample at the Site. To collect samples, TIG placed a 500 mL high-density polyethylene sample bottle with nitric acid (HNO_3) preservative underneath the discharge point of each roof drain. Following collection, the samples were placed on ice in a properly packaged container and a chain of custody was prepared for all samples to be submitted to the analytical laboratory. OnSite Environmental, Inc. analyzed the samples for total zinc and copper using EPA method 200.8.

Roof Drain Sampling Results

Detectable concentrations of zinc and copper were present in all five samples collected (Figure 3). Copper was detected at concentrations ranging from 18 µg/L to 88 µg/L, none of which exceed the maximum daily benchmark for copper (90 µg/L). Zinc was detected at concentrations ranging from 110 µg/L to 8,700 µg/L, in exceedance of the maximum daily benchmark for copper (147 µg/L). The attached lab reports provide analytical results for zinc and copper concentrations in the roof drain samples (Attachment 3), and the table below summarizes the results.

Structure	Sampling location ID	Sample ID	Total Cu (µg/L)	Total Zn (µg/L)[1]
Rick's Master Marine shop	SRC-01	SPM-SRC-01-SW-20181102	18	**3,300**
South Park Tire Factory shop	SRC-02	SPM-SRC-02-SW-20181102	22	**8,700**
Shed	SRC-03	SPM-SRC-03-SW-20181102	30	**1,700**
South Park Marina main shop	SRC-04	SPM-SRC-04-SW-20181102	88	**670**
Lumber storage building	SRC-05	SPM-SRC-05-SW-20181102	56	**110**
NPDES daily benchmarks			147	90

Note

[1] Bold text indicates concentration is above the Maximum daily benchmark for discharges to the LDW, as established under the NPDES boatyard general permit.

The analytical results from the roof drain sampling event indicate that all five metal roofs at the Site are potential sources of zinc, as the drainage samples contain zinc concentrations are above the maximum daily zinc benchmark established under the NPDES boatyard general permit.

TIG evaluated the data quality assurance and quality control associated with the laboratory analysis. The relative percent difference (RPD) was calculated to measure the precision of the analysis between the original sample and the field duplicate sample—8.4 percent (8,700 µg/L for original, 8,000 µg/L for duplicate)—was less than the RPD limit of 20 percent for zinc, as established in TIG's Quality Assurance Project Plan (QAPP). However, the copper concentrations—58.8% (22 µg/L for original, 12 µg/L for duplicate)—did exceed the RPD limit of 20 percent. This suggests potential heterogeneity of copper in the source material sampled and/or lack of precision in the laboratory instrumentation at the time of the analysis. However, in considering the objectives of the sampling, this observed variability between the original sample and field duplicate are acceptable for the purposes of this investigation.

Dye Tracer Study Field Activities

TIG staff conducted the dye tracer study at the South Park Marina in February, November, and December 2018. To perform this study, TIG staff injected tracer dye into catch basins CB-01, CB-02, CB-05, and CB-06. TIG staff also injected tracer dye into two roof drains attached to the Rick's Master Marine shop, one roof drain attached to the South Park Tire Factory shop, and one roof drain attached to the woodworking shop (Figure 4).

Prior to performing the dye tracer studies, TIG tracked storms on a weekly basis to target dry weather conditions to ensure optimal visibility during the dye tracer field activities. When a favorable stretch of weather was identified, TIG notified Ecology's Environmental Report Tracking System (ERTS) that a dye injection would be taking place at the Site. In notifying ERTS, TIG provided the address where the dye injection would be taking place, the color of the dye, the time and date of the injection, the company performing the injection, and the anticipated receiving water body.

A dye solution was injected at each location investigated. TIG mixed solid non-toxic fluorescein dye tablets with potable water in a portable reservoir and pumped the resulting mixture into each catch basin using a portable ditch pump. To calculate the volume of water required for each injection, TIG estimated the diameter of subsurface piping and the linear distance from the catch basin to the presumed discharge point. Error factors ranging from 50 to 100 percent were added to the estimated volume to account for unknown changes in pipe diameter and/or flow path that may have increased the volume of dye solution required for a visual confirmation of discharge.

Following the injection of the dye solution, TIG staff monitored down-gradient catch basins, sanitary sewer vaults, sanitary sewer lines, and the South Park Marina outfall for visual confirmation of the dye solution. At locations where there was a possibility that drainage data gaps being investigated shared drainage infrastructure, TIG waited at least four days between dye injections to allow for photochemical decay of the dye. For locations where there is no likelihood of shared drainage infrastructure, dye injections were performed on the same day.

Dye Tracer Findings

Through review of results from dye tracing, TIG addressed several drainage pathway data gaps for the Site. Photographs and field reports from each dye tracer study are provided in attachments 1 and 2. An updated stormwater sewer network, incorporating the findings of the dye tracer study, is depicted in Figure 4. Findings of the dye tracing is summarized below:

- **CB-01:** On February 9, 2018, TIG staff injected approximately 400 gallons of dye solution into catch basin CB-01, located approximately 50 feet east of the northeast corner of the Rick's Master Marine shop. Five minutes after the injection, TIG staff obtained visual confirmation of dye solution discharging into the Site's sanitary sewer vault, located northeast of the restrooms/shower/laundry structure. Discharges to the sanitary sewer vault were conveyed to the City's combined sewer system at the time the dye test was completed. Following this result, South Park Marina staff plugged the catch basin. Stormwater from this area is now rerouted to catch basin CB-05 via overland transport.
- **CB-02:** On February 21, 2018, TIG staff injected approximately 210 gallons of dye solution into catch basin CB-02, located east of the South Park Tire Factory shop. Five minutes after the injection, TIG staff obtained visual confirmation of dye solution discharging to the LDW via the South Park Marina outfall. During this dye investigation, no dyed solution was observed in other onsite catch basins or the sanitary sewer vault, indicating a direct drainage path from CB-02 to the South Park Marina outfall. According to the catch basin camera survey performed in 2017, catch basins CB-03 and CB-04, located upgradient from CB-02, share the same drainage infrastructure and therefore also discharge stormwater to the LDW via the South Park Marina outfall.

- **CB-05:** On February 9, 2018, TIG staff injected approximately 110 gallons of dye solution into catch basin CB-05, located southeast of the restrooms/showers/laundry structure. Thirty-eight minutes after the injection, TIG staff obtained visual confirmation of dye solution discharging to the LDW via the South Park Marina outfall. During this dye investigation, no dyed solution was observed in other onsite catch basins or the sanitary sewer vault, indicating a direct drainage path from CB-05 to the South Park Marina outfall. TIG documented an extended lag time between the dye injection at CB-05 and its discharge to the LDW via the South Park Marina outfall. The extended duration may be due to the use of a lower capacity ditch pump to transfer the dye solution to the catch basin or the possibly the result of partially severed subsurface drainage pipes between CB-05 and the South Park Marina outfall.
- **CB-06:** On February 27, 2018, TIG staff injected approximately 110 gallons of dye solution into catch basin CB-06, located approximately 15 ft east of CB-05. Two minutes after the injection, TIG staff obtained visual confirmation of dye solution discharging to the LDW via the South Park Marina outfall. During this dye investigation, no dyed solution was observed in other onsite catch basins or the sanitary sewer vault, indicating a direct drainage path from CB-06 to the South Park Marina outfall.

Dye tracer studies performed in November and December 2018 allowed for the delineation of subsurface drainage pathways associated with four roof drains at the Site. Findings from each dye investigation are depicted on Figure 4 and summarized below:

- **Roof drain at northeast corner of the Rick's Master Marine shop:** On November 16, 2018, TIG staff injected approximately 30 gallons of dye solution into the subsurface piping associated with the roof drain at the northeast corner of the Rick's Master Marine shop. Twenty minutes after the injection, TIG staff obtained visual confirmation of dye solution seeping up to the ground surface through cracks in the asphalt pavement in the immediate vicinity of the roof drain. TIG estimated that less than 1 gallon of water seeped up to the ground surface. During this dye investigation, no dye solution was observed in onsite catch basins, within the sanitary sewer vault, or discharging to the LDW via site outfalls. Since this was the only visual confirmation of dye solution, TIG concluded that stormwater from the roof drain at the northeast corner of the Rick's Master Marine shop infiltrates the ground surface. According to the topographic survey performed at the Site in 2017, stormwater that seeps back up to the ground surface through cracks in the asphalt infiltrates the ground surface through the gravel area along the shoreline of the Site.
- **Roof drain at northwest corner of the South Park Tire Factory shop:** On November 16, 2018, TIG staff injected approximately 100 gallons of dye solution into subsurface piping associated with the roof drain at the northwest corner of the South Park Tire Factory shop. Immediately after the injection, TIG staff obtained visual confirmation of dye solution entering catch basin CB-10 through a subsurface inlet. According to the City's sewer network data, stormwater entering catch basin CB-10 is conveyed to King County-owned stormwater drainage infrastructure located along the west side of S Thistle Street, and ultimately discharges to the LDW via King County-owned outfall OF-2215.
- **Roof drain at southeast corner of the Rick's Master Marine shop:** On November 16, 2018, TIG staff attempted to inject dye solution into the subsurface piping associated with the roof drain at the southeast corner of the Rick's Master Marine shop. However, the subsurface piping was filled with gravel and blocking dye solution from entering the piping, indicating that the subsurface piping associated with this roof drain is completely blocked. Based on the surface topography determined during a 2017 topographic survey conducted at the Site, the roof drain at the southeast corner of Rick's

Master Marine shop discharges to the ground surface, to catch basin CB-03, and ultimately discharges to the LDW via the South Park Marina outfall.

- **Roof drain at east side of woodworking shop:** On December 6, 2018, TIG staff injected approximately 74 gallons of dye solution into subsurface piping associated with the central roof drain at the east side of the woodworking shop. Five minutes after the injection, TIG staff obtained visual confirmation of dye solution discharging from the subsurface piping associated with the roof drain located at the northeast corner of the woodworking shop. During this dye injection, no dye solution was observed in onsite catch basins, within the StormwateRx™ Aquip™ 50 SBE[4] vault, or discharging to the LDW via site outfalls. Nor was dye solution observed in the subsurface pipe on the northeast corner of the Site, presumed to be connected to the roof drain. Since the only visual confirmation of dye solution occurred in the adjacent roof drain because of the backup of subsurface flow, TIG concluded that stormwater from the roof drains on the east side of the woodworking shop infiltrates the ground surface due to failed or collapsed subsurface piping.

The table below summarizes the results of the dye tracer studies.

Injection point	Injection date	Injection volume (gallons)	Time injected	Time discharge observed	Discharge point	Photo log number(s)
CB-01	2/14/2018	400	12:35 PM	12:40 PM	Sanitary sewer vault	1, 2
CB-02	2/21/2018	210	10:53 AM	10:58 AM	South Park Marina outfall	3, 4
CB-05	2/9/2018	110	10:59 AM	11:37 AM	South Park Marina outfall	5, 6
CB-06	2/27/2018	110	10:23 AM	10:25 AM	South Park Marina outfall	7, 8
NE Rick's Master Marine shop roof drain	11/16/2018	30	9:50 AM	10:10 AM	Infiltrates subsurface	9, 10
NW South Park Tire Factory shop roof drain	11/16/2018	100	11:00 AM	11:00 AM	Outfall OF- 2215	11, 12
SE Rick's Master Marine shop roof drain	11/16/2018	0	11:15 AM	N/A	Ground surface	13
East woodworking shop roof drain	12/6/2018	74	11:05 AM	11:20 AM	Infiltrates subsurface	14, 15

[4] StormwateRx™ and Aquip™ are registered trademarks of StormwateRx LLC.

Summary

TIG's drainage pathway investigation has resolved several of the stormwater drainage network data gaps identified at the Site, including the identification of discharge points associated with catch basins in the center and western portions of the Site. TIG confirmed that catch basins CB-02, CB-03, CB-04, CB-05, and CB-06 discharge stormwater to the LDW via the South Park Marina outfall. Catch basin CB-01 discharges stormwater to South Park Marina Limited Partnership's sewer vault, which in turn discharges to the City's combined sewer system.[5] Figure 4 depicts the Site's stormwater drainage network.

Results from TIG's dye tracer studies have also resolved stormwater discharge data gaps associated with roof drains that discharge to subsurface drainage infrastructure. TIG has confirmed that the roof drain located at the northeast corner of the Rick's Master Marine shop infiltrates the ground surface. TIG has also confirmed that the roof drain located at the southeast corner of the Rick's Master Marine Shop is blocked. This roof drain conveys stormwater over land to catch basin CB-03, which ultimately discharge to the LDW. The roof drain located at the northwest corner of the South Park Tire Factory shop conveys stormwater to catch basin CB-10, which in turn drains to subsurface King County-owned stormwater infrastructure along S Thistle Street, and ultimately discharges to the LDW via King County-owned outfall OF-2215 (Figure 4).

TIG has identified the potential drainage pathways for the following roof drains (Figure 4)[6] and describes them as follows:

- **The Rick's Master Marine shop:**
    - Two roof drains on the west side of the Rick's Master Marine shop discharge stormwater onto the ground surface along S Thistle Street, where it may enter King County-owned subsurface drainage infrastructure as sheet flow and subsequently discharge to the LDW via King County-owned outfall OF-2215.
    - The roof drain at the northeast corner of the Rick's Master Marine shop connect to subsurface piping, where stormwater it infiltrates subsurface.
    - The roof drain at the southeast corner of the Rick's Master Marine shop discharges to the paved surface because of blocked subsurface piping, and ultimately discharges to the LDW via the South Park Marina outfall.
- **The South Park Tire factory:**
    - The two roof drains on the west side of the South Park Tire Factory shop connect to catch basin CB-10, which conveys stormwater to the King County-owned subsurface drainage infrastructure along S Thistle Street, and ultimately discharges to the LDW via King County-owned outfall OF-2215.

[5] South Park Marina staff decommissioned catch basin CB-01 following the drainage pathway investigation.

[6] In this analysis, TIG used the roof drain stormwater sample results collected at sampling locations SRC-01 through SRC-05 as substitutions for copper and zinc concentrations in stormwater discharged from all roof drains at each respective metal-roofed structure. Based on this analysis, stormwater collected from the roof drains attached to metal roofs exhibits elevated concentrations of zinc (Figure 3).

- The two roof drains on the east side of the South Park Tire Factory shop connect to subsurface drainage infrastructure in the center portion of the Site, which ultimately discharges to the LDW via the South Park Marina outfall.

- **Shed:** Both roof drains attached to the shed discharge stormwater to the ground surface, which enters catch basins CB-05 and CB-06 as sheet flow, and ultimately discharges to the LDW via the South Park Marina outfall.
- **The South Park Marina main:** Both roof drains attached to this structure discharge stormwater to the ground surface, which enters catch basin CB-08 as sheet flow, and ultimately discharges to the LDW via the South Park Marina outfall.
- **The lumber storage building:** stormwater flows onto roof of the woodworking shop via three roof drains. From the woodworking shop, roof drains discharge stormwater to failed or collapsed subsurface piping in the northeast corner of the site, resulting in ground surface infiltration.

TIG investigated nine stormwater drainage network pathway data gaps and identified their discharge points. However, despite the exhaustive measures executed by TIG, some components of the stormwater drainage pathways could not be ascertained. These components include the precise locations, routing, and connections of subsurface stormwater pipes, as well as the locations of some discharge points where subsurface stormwater pipes have been blocked.

TIG recommends implementing measures in the locations where exceedances of metals' concentrations in samples from roof drains associated with metal roofs were identified to avoid future discharges to the LDW that may contain metal concentrations exceeding the permitted daily benchmarks.

Attachments

Table 1: Stormwater Drainage Network Data Gaps

Figure 1: Site Features

Figure 2: Site Stormwater Drainage Network Data Gaps

Figure 3: Roof Drain Sampling Locations and Results

Figure 4: Updated Site Stormwater Drainage Network

Attachment 1: Photograph Log

Attachment 2: Roof Drain Sampling Lab Reports

1810-324, OnSite Environmental Inc.

Table 1: Stormwater Drainage Network Data Gaps

Results of Drainage Pathway Investigation

Drainage feature associated with data gap	Stormwater drainage network data gap description	Drainage feature discharge surface	Discharge location
Catch basin CB-01	Partially unconfirmed subsurface drainage pathway and unknown discharge point	Subsurface piping	South Park Marina sanitary sewer vault
Catch basin CB-02	Partially unconfirmed subsurface drainage pathway and unknown discharge point	Subsurface piping	South Park Marina outfall
Catch basin CB-05	Unconfirmed subsurface drainage pathway and unknown discharge point	Subsurface piping	South Park Marina outfall
Catch basin CB-06	Unconfirmed subsurface drainage pathway and unknown discharge point	Subsurface piping	South Park Marina outfall
Southeast Rick's Master Marine shop roof drain	Unconfirmed subsurface drainage pathway and discharge point	Subsurface piping	Ground surface (due to blocked subsurface piping)
Northeast Rick's Master Marine shop roof drain	Unconfirmed subsurface drainage pathway and discharge point	Subsurface piping	Infiltration of ground surface (due to blocked subsurface piping)
Northwest South Park Tire Factory shop roof drain	Unconfirmed subsurface drainage pathway and discharge point	Subsurface piping	Outfall OF-2215
Lumber storage building roof drains	Unconfirmed subsurface drainage pathway and discharge point	Subsurface piping	Infiltration of ground surface (due to blocked subsurface piping)
South Park Marina outfall	Unconfirmed existence and location of outfall	LDW	Not applicable

Acronyms and Abbreviations

LDW: Lower Duwamish Waterway

Legend:

- Outfall
- Catch basin/inlet
- Historical sanitary sewer hook up
- Roof drain
- Roof drain associated with metal roof
- Pump vault
- Sanitary sewer vault
- Structure
- StormwateRx™ CONEX box
- Washwater treatment CONEX box
- Shoreline (approximate)
- South Park Marina site boundary

Notes:

1. Satellite imagery collected in 2016 provided by Apollo Mapping (Apollo 2016).

0 70 140 Feet

Graphic Scale

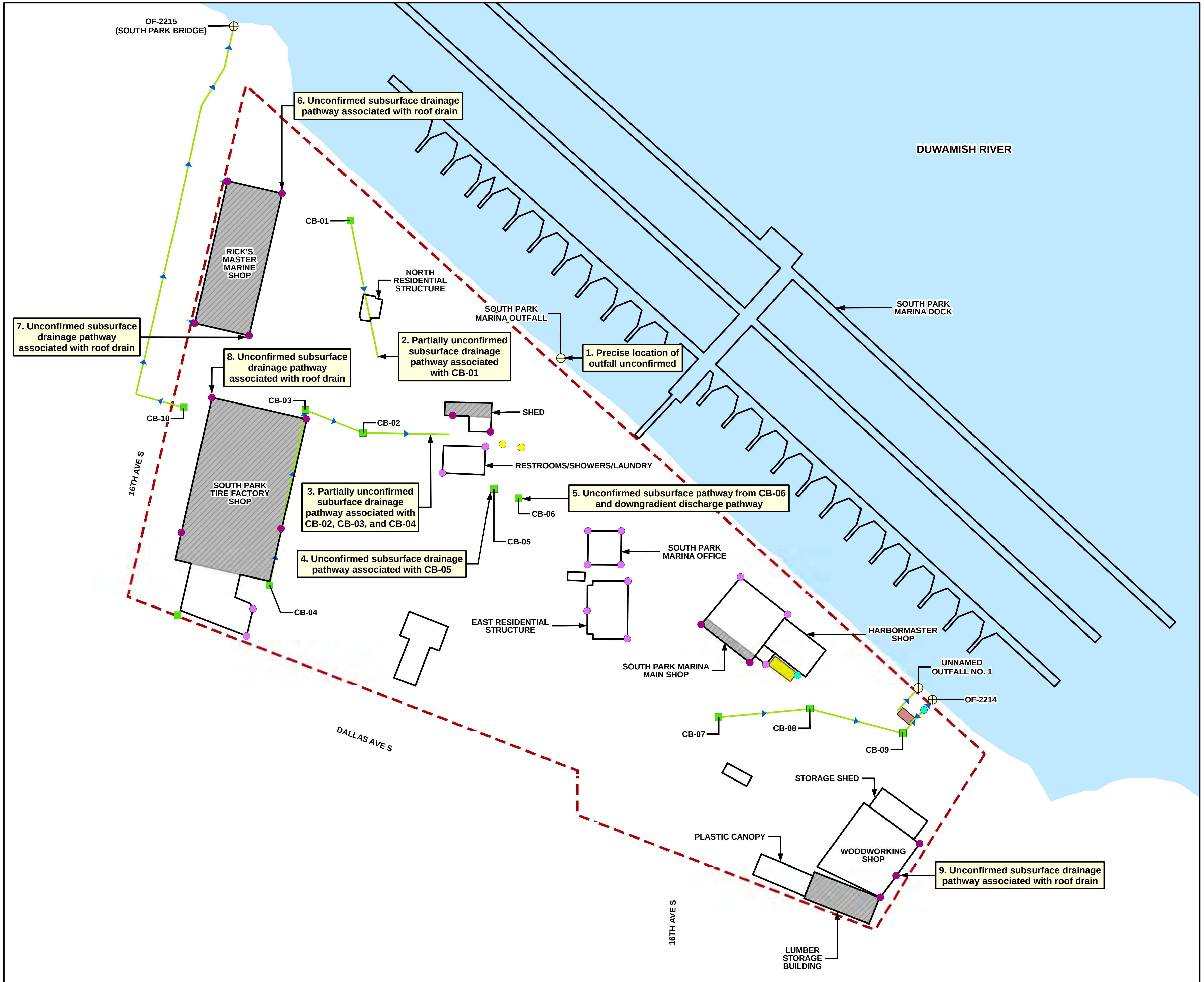
Figure 1

Site Features

Karr Tuttle Campbell
South Park Marina

TIG environmental™

Data Location: Syracuse Created By: mkohberger Modified By: kmontague
G:\GIS\SPMLP\SouthParkMarina\DataGapInvestigationSummaryReport\mxd\Site Features_v2.mxd 12/28/2018 11:41:22 AM



Legend:
- Outfall
- Catch basin/inlet
- Roof drain
- Roof drain associated with metal roof
- Pump vault
- Sanitary sewer vault
- Storm sewer pipe
- Structure
- Metal roof
- StormwaterRx™ CONEX box
- Washwater Treatment CONEX box
- Duwamish River (approximate)
- South Park Marina site boundary
- Stormwater drainage network data gap description

Notes:
1. Sewer network data obtained from the City of Seattle (City of Seattle 2013) and located by Axis Survey and mapping.

0 70 140 Feet

Graphic Scale

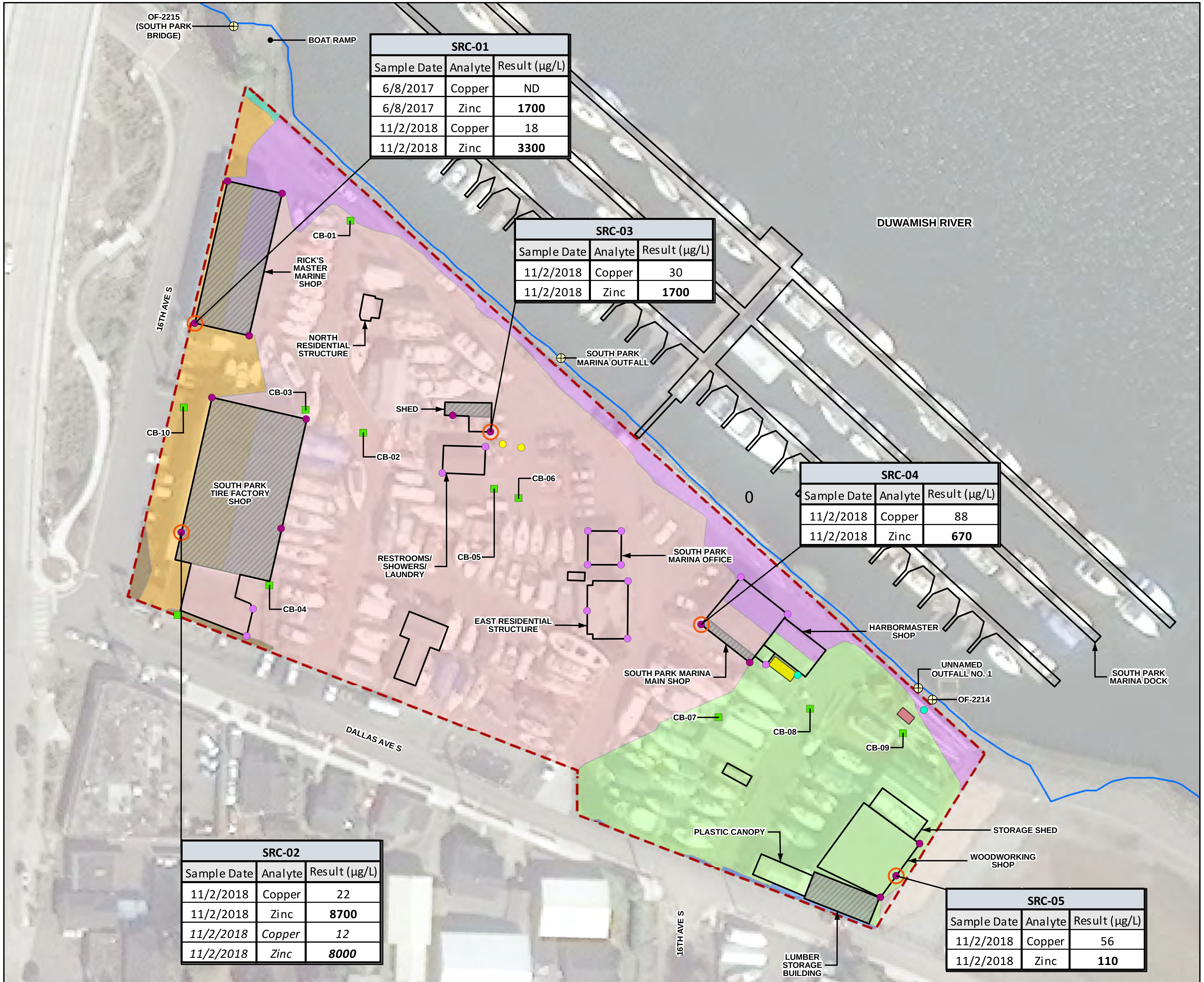
Figure 2

Site Stormwater Drainage Network Data Gaps

Karr Tuttle Campbell
South Park Marina

TIG environmental™

Data Location: Syracuse Created By: mkohberger Modified By: abanda
G:\GIS\SPML\SouthParkMarina\DataGapInvestigationSummaryReport\mxd\Storm and Sewer Network System Data Gaps_v4.mxd 1/16/2019 1:43:53 PM



SRC-01

Sample Date	Analyte	Result (µg/L)
6/8/2017	Copper	ND
6/8/2017	Zinc	**1700**
11/2/2018	Copper	18
11/2/2018	Zinc	**3300**

SRC-03

Sample Date	Analyte	Result (µg/L)
11/2/2018	Copper	30
11/2/2018	Zinc	**1700**

SRC-04

Sample Date	Analyte	Result (µg/L)
11/2/2018	Copper	88
11/2/2018	Zinc	**670**

SRC-02

Sample Date	Analyte	Result (µg/L)
11/2/2018	Copper	22
11/2/2018	Zinc	**8700**
11/2/2018	*Copper*	*12*
11/2/2018	*Zinc*	***8000***

SRC-05

Sample Date	Analyte	Result (µg/L)
11/2/2018	Copper	56
11/2/2018	Zinc	**110**

Legend:

- South Park Marina outfall
- Catch basin/inlet
- Roof drain
- Roof drain associated with metal roof
- Pump vault
- Sanitary sewer vault
- Roof drain sampling location
- Structure
- Metal roof
- StormwateRx™ CONEX box
- Washwater treatment CONEX box
- Shoreline (approximate)
- South Park Marina site boundary

Site Catchment Areas:

- City sewer system
- Infiltrates through gravel surface
- OF-2214
- OF-2215
- Overland drainage
- South Park Marina outfall
- T-117 streets and stormwater project outfall

Notes:

1. Satellite imagery collected in 2016 provided by Apollo Mapping.
2. Sample results depicted in bold text indicate an exceedance of the Site's NPDES benchmark for stormwater discharges to the Lower Duwamish Waterway.
3. Italicized sample results denote a field duplicate sample.

0 70 140 Feet
Graphic Scale

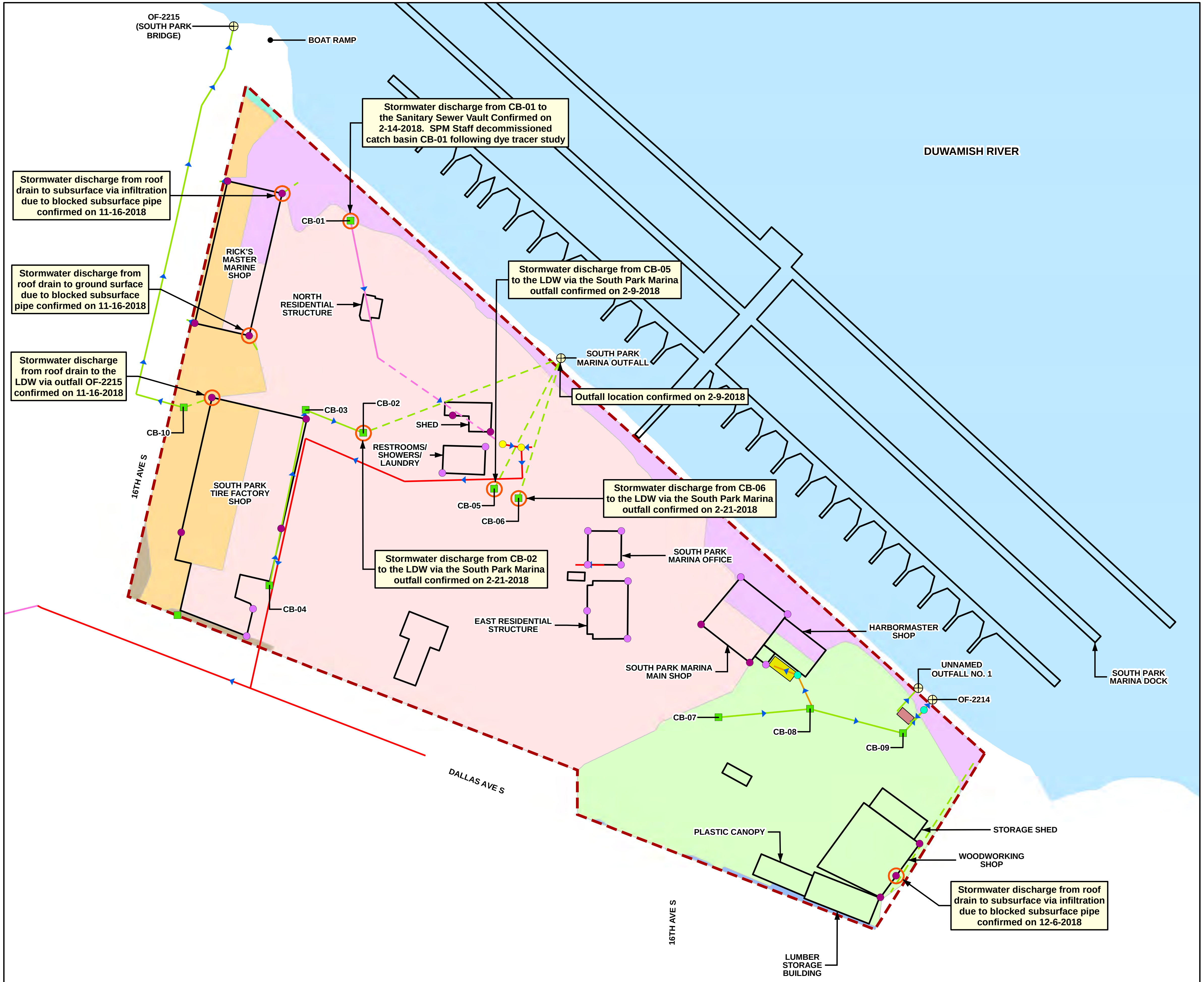
Figure 3

Roof Drain Sampling Locations and Results

Karr Tuttle Campbell
South Park Marina

TIG environmental™

Data Location: Syracuse Created By: mkohberger Modified By: abanda
G:\GIS\SPML\P\SouthParkMarina\DataGapInvestigationSummaryReport\mxd\Roof Drain Sample Locations_v5.mxd 1/16/2019 1:47:16 PM



Legend:

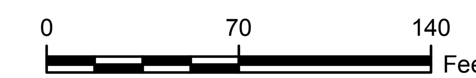
- Outfall
- Catch basin/inlet
- Roof drain
- Roof drain associated with metal roof
- Pump vault
- Sanitary sewer vault
- Dye tracer study injection point
- Combined sewer pipe
- Combined sewer pipe (inferred)
- Sanitary sewer pipe
- Storm sewer pipe
- Storm sewer pipe (discharge point confirmed and drainage pathway inferred)
- Vessel wash collection pipe
- Structure
- StormwateRx™ CONEX box
- Washwater treatment CONEX box
- Duwamish River (approximate)
- South Park Marina site boundary

Site Catchment Areas:

- City sewer system
- Infiltrates through gravel surface
- OF-2214
- OF-2215
- Overland drainage
- South Park Marina outfall
- T-117 streets and stormwater project outfall

Notes:

1. Sewer network data provided by the city of Seattle (City of Seattle 2013) and modified by TIG based on findings from the March 2017 topographic survey, the September 2017 catch basin camera scoping survey, and the February 2018 dye tracer investigation.



Graphic Scale

Figure 4

Updated Site Stormwater Drainage Network

Karr Tuttle Campbell
South Park Marina

TIG environmental™

Data Location: Syracuse Created By: mkohberger Modified By: abanda
G:\GIS\SPML\SouthParkMarina\DataGapInvestigationSummaryReport\mxd\Storm and Sewer Network System_v3.mxd 1/16/2019 1:48:01 PM

Attachment 1

Photograph Log

Attachment 1: Drainage Pathway Investigation Photograph Log

Results of Drainage Pathway Investigation

Photograph 1: Pumping fluorescein dye solution into catch basin CB-01.

Photograph 2: Visual confirmation of fluorescein dye solution discharging from CB-01 to the sanitary sewer vault.

Attachment 1: Drainage Pathway Investigation Photograph Log

Results of Drainage Pathway Investigation

Photograph 3: Pumping fluorescein dye solution into CB-02.

Photograph 4: Visual confirmation of fluorescein dye discharging from CB-02 to the Lower Duwamish Waterway (LDW) via the South Park Marina outfall.

Attachment 1: Drainage Pathway Investigation Photograph Log

Results of Drainage Pathway Investigation

Photograph 5: Pumping fluorescein dye solution into CB-05.

Photograph 6: Visual confirmation of dye discharging from CB-05 to the LDW via the South Park Marina outfall.

Attachment 1: Drainage Pathway Investigation Photograph Log

Results of Drainage Pathway Investigation

Photograph 7: Pumping fluorescein dye solution into CB-06.

Photograph 8: Visual confirmation of dye discharging from CB-06 to the LDW via the South Park Marina outfall.

Attachment 1: Drainage Pathway Investigation Photograph Log

Results of Drainage Pathway Investigation

Photograph 9: Pumping dye solution into the roof drain attached to the northeast corner of the RMM Shop. Note the seepage of dye solution through cracks in the asphalt.

Photograph 10: Looking southeast at dye solution seeping up to ground surface through cracks in asphalt following the pumping of dye solution into the roof drain attached to the northeast corner of the RMM Shop.

Attachment 1: Drainage Pathway Investigation Photograph Log

Results of Drainage Pathway Investigation

Photograph 11: Pumping dye solution into the roof drain located the northwest corner of the SPTF shop.

Photograph 12: Visual confirmation of dye solution discharging to catch basin CB-10 immediately following the initiation of dye pumping into the roof drain located at the northwest corner of the SPTF Shop.

Attachment 1: Drainage Pathway Investigation Photograph Log

Results of Drainage Pathway Investigation

Photograph 13: Refusal of dye solution into clogged subsurface piping associated with the roof drain located at the southeast corner of the RMM Shop.

Photograph 14: Pouring dye solution into central roof drain on east side of the Woodworking Shop.

Attachment 1: Drainage Pathway Investigation Photograph Log

Results of Drainage Pathway Investigation

Photograph 15: Visual confirmation of dye solution leaking from the roof drain located at the northeast corner of the Woodworking Shop, approximately 20 feet downgradient from the central roof drain where dye solution was injected.

Attachment 2

Roof Drain Sampling Lab Reports

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

November 1, 2018

Audrey Hackett
The Intelligence Group
1200 Westlake Avenue N., Suite 809
Seattle, WA 98109

Re: Analytical Data for Project 2017.0323 Task 4.1.3
Laboratory Reference No. 1810-324

Dear Audrey:

Enclosed are the analytical results and associated quality control data for samples submitted on October 25, 2018.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: November 1, 2018
Samples Submitted: October 25, 2018
Laboratory Reference: 1810-324
Project: 2017.0323 Task 4.1.3

Case Narrative

Samples were collected on October 25, 2018 and received by the laboratory on October 25, 2018. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: November 1, 2018
Samples Submitted: October 25, 2018
Laboratory Reference: 1810-324
Project: 2017.0323 Task 4.1.3

TOTAL METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SPM-SRC-01-SW-20181025**					
Laboratory ID:	10-324-01					
Copper	**18**	2.0	EPA 200.8	10-26-18	10-29-18	
Zinc	**3300**	130	EPA 200.8	10-26-18	10-29-18	
Client ID:	**SPM-SRC-02-SW-20181025**					
Laboratory ID:	10-324-02					
Copper	**22**	2.0	EPA 200.8	10-26-18	10-29-18	
Zinc	**8700**	130	EPA 200.8	10-26-18	10-29-18	
Client ID:	**SPM-SRC2-02-SW-20181025**					
Laboratory ID:	10-324-03					
Copper	**12**	2.0	EPA 200.8	10-26-18	10-29-18	
Zinc	**8000**	130	EPA 200.8	10-26-18	10-29-18	
Client ID:	**SPM-SRC-03-SW-20181025**					
Laboratory ID:	10-324-04					
Copper	**30**	2.0	EPA 200.8	10-26-18	10-29-18	
Zinc	**1700**	130	EPA 200.8	10-26-18	10-29-18	
Client ID:	**SPM-SRC-04-SW-20181025**					
Laboratory ID:	10-324-05					
Copper	**88**	2.0	EPA 200.8	10-26-18	10-29-18	
Zinc	**670**	130	EPA 200.8	10-26-18	10-29-18	
Client ID:	**SPM-SRC-05-SW-20181025**					
Laboratory ID:	10-324-06					
Copper	**56**	2.0	EPA 200.8	10-26-18	10-29-18	
Zinc	**110**	2.5	EPA 200.8	10-26-18	10-29-18	

Date of Report: November 1, 2018
Samples Submitted: October 25, 2018
Laboratory Reference: 1810-324
Project: 2017.0323 Task 4.1.3

TOTAL METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1026WH1					
Copper	**ND**	2.0	EPA 200.8	10-26-18	10-29-18	
Zinc	**ND**	2.5	EPA 200.8	10-26-18	10-29-18	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	10-212-15										
	ORIG	DUP									
Copper	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Zinc	**3.14**	**3.24**	NA	NA		NA		NA	3	20	
MATRIX SPIKES											
Laboratory ID:	10-212-15										
	MS	MSD	MS	MSD		MS	MSD				
Copper	**106**	**107**	100	100	ND	**106**	**107**	75-125	1	20	
Zinc	**108**	**111**	100	100	3.14	**105**	**108**	75-125	3	20	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.

Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 10-324

Company: TIG ENVIRONMENTAL

Project Number: 2017.0323 TASK 4.1.3

Project Name: SPM SOURCE CONTROL (ROOF DRAIN)

Project Manager: AUDREY HACKETT

Sampled by: NICHOLAS W. SCHLAGENHAFT

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ ________ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	TOTAL Cu, TOTAL Zn (200.8)				% Moisture
1	SPM-SRC-01-SW-20181025	10-25-2018	11:03	STORM WATER	1																		X				
2	SPM-SRC-02-SW-20181025	10-25-2018	11:10	STORM WATER	1																		X				
3	SPM-SRC2-02-SW-20181025	10-25-2018	11:14	STORM WATER	1																		X				
4	SPM-SRC-03-SW-20181025	10-25-2018	11:35	STORM WATER	1																		X				
5	SPM-SRC-04-SW-20181025	10-25-2018	11:29	STORM WATER	1																		X				
6	SPM-SRC-05-SW-20141025	10-25-2018	11:37	STORM WATER	1																		X				

	Signature	Company	Date	Time
Relinquished	[illegible]	TIG	10/25/18	13:14
Received	[illegible]	Speedy	10-25-18	13/4
Relinquished	[illegible]	Speedy	10-25-18	1448
Received	[illegible]	OSE	10/25/18	1448
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☒ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

APPENDIX B

Boring Logs

SAIC, 2008a, Additional Site Characterization Activities Data Report

TIG Environmental, 2019, SPM Boring Logs B-01 to B-04

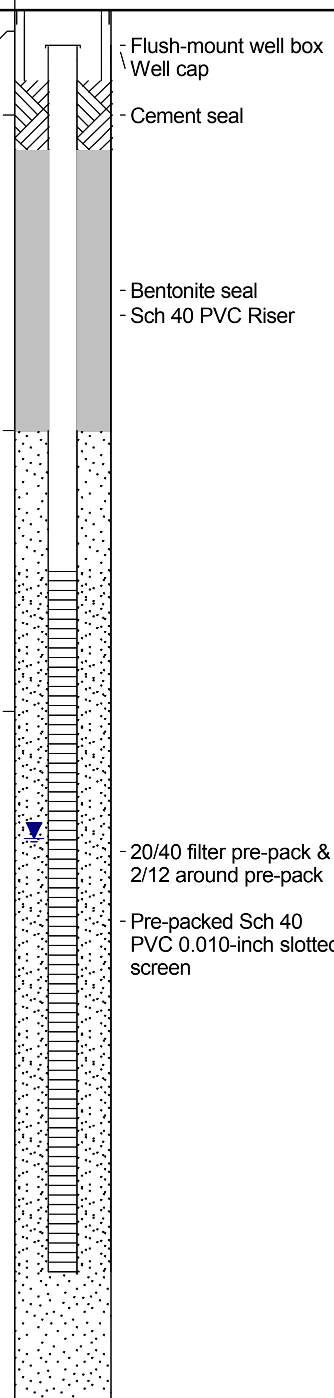
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Monitoring Well: MW-1

Project: South Park Marina	Date Started: 9/26/2007	Total Boring Depth: 20 ft	Well Diameter: 0.75 in
Client: Washington State Dept of Ecology	Date Completed: 9/27/2007	Hole Diameter: 3 in.	Well Screen: 8-18 ft
Location: Seattle, Washington	Driller: Cascade Drilling, Inc.	Well Depth: 18 ft	Filter Pack: 2/12 & 20/40
Logged By: S Bloom	Drill Method: Hand Auger/Geoprobe	TOC Elevation: 15.43 (msl) ft	Well Casing: Sch 40 PVC

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				0	Asphalt surface
					Road base/rocks with fine to medium grained sand
			SP	1.5	(SP) Sand, fine to medium grained sand, very dark gray, damp, loose, no odor
Damp	1.8			5	Well boring was hand cleared to 5 ft bgs
Damp	1.5				
Damp	2.0		ML	6	(ML) Silt, trace of fine grained sand, dark brown, damp, soft, no odor
Damp	2.0			7	Grades to Sandy Silt at 9 feet - fine grained sand, dark brown, soft, no odor
Damp	1.0				
Damp	1.7	SB-1-9		9	
Saturated	1.8		SP	10	(SP) Sand, medium to fine grained sand, very dark gray, saturated, loose, no odor
Saturated	1.7				
Saturated	0.4				
Saturated	1.5				
Saturated	1.4				
Saturated	1.3				
Saturated	1.6				
Saturated	1.7				
Saturated	1.8				
				20	Bottom of borehole at 20.0 feet.

WELL DIAGRAM



18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Monitoring Well: MW-2

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington
Logged By: S Bloom

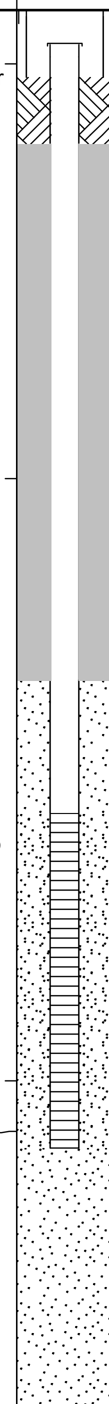
Date Started: 9/26/2007
Date Completed: 9/28/2007
Driller: Cascade Drilling, Inc.
Drill Method: Hand Auger/Geoprobe

Total Boring Depth: 21 ft
Hole Diameter: 3 in.
Well Depth: 17 ft
TOC Elevation: 14.84 (msl) ft

Well Diameter: 0.75 in
Well Screen: 12-17 ft
Filter Pack: 2/12 & 20/40
Well Casing: Sch 40 PVC

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION
							Road base/rocks with fine to medium grained sand
Damp	1.7					1	(SP) Sand, fine to medium grained, very dark gray, damp, no odor
Damp	2.7					2	
Damp	2.6					3	
Damp	2.4			SP		4	
Damp	3.3					5	Well boring hand cleared to 5 ft bgs
Damp	0.6					6	
Damp	0.9					7	(ML) Sandy Silt, fine grained sand, very dark gray to very dark brown, damp, very soft/loose, no odor
Saturated	0.9					8	Encountered water table at 8 ft bgs
			SB-2-9	ML		9	
Saturated	0.4					10	
Saturated	0.6			ML		11	(ML) Silt, very dark gray, soft, no odor, some pieces of organic material (roots/wood)
Saturated	0.5					12	(ML) Sandy Silt, very fine to fine grained sand, very dark brown to dark gray, loose/soft, no odor
Saturated	0.3					13	
Saturated	0.4			ML		14	
Saturated	0.2					15	
Saturated	0.5			SM		16	(SM) Silty Sand, fine to medium grained sand, very dark gray, no odor
						17	(ML) Sandy Silt, fine grained sand, very dark gray, no odor
Saturated	0.1			ML		18	
Saturated	0.0					19	
Saturated	0.1					20	
						21	Bottom of borehole at 21.0 feet.
						22	

WELL DIAGRAM



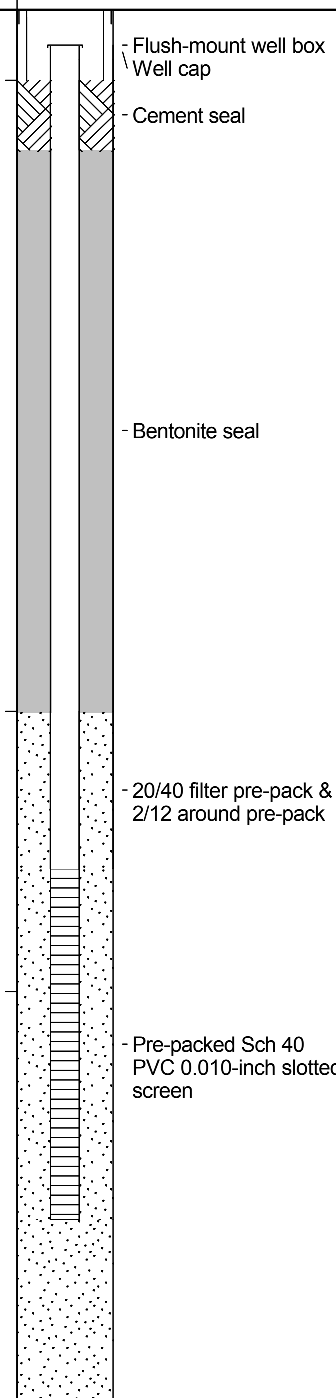
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Monitoring Well: MW-3

Project: South Park Marina	Date Started: 9/26/2007	Total Boring Depth: 20 ft	Well Diameter: 0.75 in
Client: Washington State Dept of Ecology	Date Completed: 9/27/2007	Hole Diameter: 3 in.	Well Screen: 12.25-17.25 ft
Location: Seattle, Washington	Driller: Cascade Drilling, Inc.	Well Depth: 17.25 ft	Filter Pack: 2/12/ & 20/40
Logged By: S Bloom	Drill Method: Hand Auger/Geoprobe	TOC Elevation: 14.91 (msl) ft	Well Casing: Sch 40 PVC

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				0	Road base/rocks with fine to medium grained sand
Dry	0.8			1	(SP) Sand, fine to medium grained, very dark gray, damp, loose, no odor
Damp	0.7			2	
Damp	0.9			3	
Damp	0.4			4	Grades to medium grained sand
Damp	0.5		SP	5	Well Boring hand cleared to 5 ft bgs
Saturated	2.0			6.5	Encountered water table at 6.5 ft bgs
Saturated	1.9	SB-3-7		7	
Saturated	1.6			8	
Saturated	2.1			9	
Wet	1.7		ML	10	(ML) Sandy Silt, fine grained sand, very dark gray, soft, no odor
				10.5	(ML) Silt, very dark gray, stiff, no odor, some organics (wood pieces)
Wet	2.2		ML	11	
Wet	1.8			12	
Wet	2.2	SB-3-13.5	ML	13	(ML) Sandy Silt, fine to very fine grained sand, dark brown, loose, no odor
Wet	2.0			14	(SM) Silty Sand, fine grained sand, very dark gray, loose, no odor
Wet	2.2			15	Grain size changes to medium grained. Becomes meduim dense at 15 ft bgs
Wet	0.9		SM	17	
Wet	1.0			19	
				20	Bottom of borehole at 20.0 feet.

WELL DIAGRAM



18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Boring: SB-4

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: S Bloom
Date Started: 9/27/2007
Date Completed: 9/27/2007

Driller: Cascade Drilling, Inc.
Drill Method: Hand Auger/Geoprobe
Total Boring Depth: 20 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION
							Asphalt
							Road base/rocks, with fine to medium grained sand
						1	(SP) Sand, fine to medium grained, very dark gray, damp, loose, no odor
						2	
						3	
						4	
Damp	1.2			SP		5	Boring was hand cleared to 5 ft bgs
Damp	1.0						
Damp	1.6					6	
Damp	2.3					7	
Damp	2.5		SB-4-8			8	
						9	Encountered water table at 9 ft bgs
Saturated	2.5			ML			(ML) Sandy Silt, fine grained sand, olive gray, saturated, very soft, no odor
Saturated	2.7			ML		10	(ML) Silt, olive gray, grades from soft to firm, no odor
Saturated	0.7					11	(ML) Sandy Silt, fine to very fine grained sand, dark brown, very soft, no odor
Saturated	1.2			ML		12	Color changes to dark gray
Saturated	2.0					13	
Saturated	2.3					14	(SP) Sand, fine to medium grained sand, dark brown to dark gray, soft, no odor
Saturated	1.3			SP		15	
Saturated	2.2					16	
Saturated	2.0			SM		17	(SM) Silty Sand, fine to medium grained sand, very dark brown, loose, no odor
Saturated	2.0					18	(SP) Sand, fine to medium grained sand, very dark gray, loose, no odor.
Saturated	1.5			SP		19	
						20	Bottom of borehole at 20.0 feet.
						21	

18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Boring: SB-5

Project: South Park Marina	Logged By: S Bloom	Driller: Cascade Drilling, Inc.
Client: Washington State Dept of Ecology	Date Started: 9/27/2007	Drill Method: Hand Auger/Geoprobe
Location: Seattle, Washington	Date Completed: 9/27/2007	Total Boring Depth: 16 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				0	Asphalt
				0.2	Road base/rocks, fine to medium grained SAND, damp, loose, no odor
			SP	1	(SP) Sand, fine to medium grained, damp, loose, no odor
Damp	1.4			5	Boring was hand cleared to 5 ft bgs
Damp	0.7			7.5	
		SB-5-8		8	Encountered water table at 8 ft bgs
Saturated	1.8			8.5	
Saturated	1.8		ML	9.5	(ML) Silt, very dark gray, very soft, no odor; saturated
Saturated	1.7			10.5	Becomes firm
	1.4		SM	11.5	(SM) Silty Sand, fine to medium grained sand, dark brown, loose, no odor
Saturated	2.0			12.5	
Saturated	1.1			13.5	
	1.9			14.5	
Saturated	1.5			15.5	
				16	Bottom of borehole at 16.0 feet.

18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Boring: SB-6

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: S Bloom
Date Started: 9/26/2007
Date Completed: 9/28/2007

Driller: Cascade Drilling, Inc.
Drill Method: Hand Auger/Geoprobe
Total Boring Depth: 17 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				0	Asphalt
					Road base/rocks with fine to medium grained sand, very dark gray
Damp	1.2		SP	1	(SP) Sand, fine to medium grained, very dark gray, damp, very loose, no odor
Damp	0.4			2	
Damp	1.1			3	
Damp	1.2			4	Density increases to loose
Damp	1.7			5	Boring was hand cleared to 5 ft bgs
Damp	0.6				
Damp	0.8			6	
Damp	0.7			7	
		SB-6-8		8	
				9	(ML) Sandy Silt, fine to very fine grained sand, very dark gray, damp, no odor
Saturated	1.0		ML		
Saturated	1.0		ML	10	(ML) Silt, very dark gray, soft to medium stiff (density increases with depth), no odor, some organic material (wood pieces)
Saturated	1.2			11	
Saturated	1.2			12	(ML) Sandy Silt, fine to very fine grained sand, very dark gray
				13	
				14	Color changes to very dark brown
Saturated	1.5		ML		
Saturated	1.1			15	
Saturated	1.1			16	
				17	Bottom of borehole at 17.0 feet.
				18	
				19	

18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Boring: SB-7

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: S Bloom
Date Started: 9/28/2007
Date Completed: 9/28/2007

Driller: Cascade Drilling, Inc.
Drill Method: Hand Auger/Geoprobe
Total Boring Depth: 17 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION
						0	Asphalt
							Road base/rocks, with fine to medium grained sand
						1	(SP) Sand, fine to medium grained, very dark gray, loose, no odor
Damp	0.9			SP		3	
Damp	0.9					5	Boring was hand cleared to 5 ft bgs Sand grades to fine grained
Damp	1.4						
Damp	1.5					7	(SM) Silty Sand, fine to medium grained sand, very dark brown to very dark gray, loose, no odor
						8	Encountered the water table at 8 ft bgs
Saturated	1.6						
Saturated	1.4		SB-7-9	SM		9	
Saturated	1.3						
Saturated	1.5			ML		11	(ML) Silt, very dark gray, soft, no odor, some organic material (wood pieces)
						12	Becomes firm
Saturated	1.6						(ML) Sandy Silt, very fine to medium grained sand, very dark gray, no odor
Wet	1.6			ML			
Wet	1.5						Color changes to very dark brown
Wet	1.3						
						17	Bottom of borehole at 17.0 feet.

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Boring: SB-8

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: S Bloom
Date Started: 9/26/2007
Date Completed: 9/27/2007

Driller: Cascade Drilling, Inc.
Drill Method: Hand Auger/Geoprobe
Total Boring Depth: 16 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				0	Asphalt
					Road base/rocks, with fine to medium grained sand, very dark gray
	0.0			1	(SP) Sand, fine to medium grained sand, very dark gray, damp, loose, no odor
				2	
Damp	0.0			3	
Damp	0.0			4	
Damp	0.1		SP	5	Boring was hand cleared down to 5 ft bgs
Damp	1.5				
				6	
Damp	1.5				
				7	Color changes to dark brown
Damp	1.7				
				8	
Damp	0.9				
				9	(ML) Sandy Silt, fine to very fine grained sand, very dark gray, very soft, no odor
Saturated	1.2	SB-8-9	ML		
				10	
Saturated	1.0				(ML) Silt, very dark gray, soft, no odor, some organic material (wood pieces)
				11	
Wet	1.0				
				12	
			ML	13	
Wet	0.9				
				14	Becomes stiff
Wet	1.4				
				15	(SP) Sand, fine to medium grained, very dark gray, loose, no odor
Wet	1.2		SP		
				16	Bottom of borehole at 16.0 feet.
				17	
				18	

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Boring: SB-9

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: S Bloom
Date Started: 9/26/2007
Date Completed: 9/27/2007

Driller: Cascade Drilling, Inc.
Drill Method: Hand Auger/Geoprobe
Total Boring Depth: 20 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				0	Asphalt
					Road base/rocks, fine to medium grained sand
	0.0			1	(SP) Sand, fine to medium grained, very dark gray, damp, very loose, no odor
Damp	0.0			2	
				3	
Damp	0.0			4	Becomes loose
Damp	0.0			5	Boring was hand cleared to 5 ft bgs
Damp	0.2				
			SP	6	
				7	Color changes to dark olive gray
				8	
				9	
Damp	0.5				
		SB-9-10		10	
Damp	0.6				Color changes to dark olive brown
				11	
Saturated	0.4				(ML) Sandy Silt, very fine grained sand, dark gray, saturated, no odor
				12	
Saturated	0.8				
			ML	13	
Saturated	0.5				
				14	
Saturated	0.8				
			ML	15	(ML) Silt, dark gray, no odor, some organic material (wood pieces)
Wet	0.7				(ML) Sandy Silt, very fine grained sand, dark gray, saturated, no odor
				16	
			ML	17	
Wet	1.1				
				18	
Wet	1.0				
				19	(ML) Silt, light brown, saturated, soft, no odor, some organic material (wood pieces)
Wet	1.0		ML		Color changes to dark gray
				20	Bottom of borehole at 20.0 feet.
				21	

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Boring: SB-10

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: S Bloom
Date Started: 9/26/2007
Date Completed: 9/28/2007

Driller: Cascade Drilling, Inc.
Drill Method: Hand Auger/Geoprobe
Total Boring Depth: 20 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
					Asphalt
					Road base/rocks, fine to medium graind sand, very dark gray
Damp	0.3			1	(SP) Sand, fine to medium grained, very dark gray, very loose, no odor
Damp	0.2			2	
Damp	0.6		SP	3	
Damp	1.6			4	Becomes loose
Damp	1.4			5	Boring was hand cleared to 5 ft bgs
				6	(SM) Silty Sand, fine grained sand, very dark gray, loose, no odor
Damp	1.3		SM	7	
Damp	1.3		ML		(ML) Silt, very dark brown
				8	(SM) Sandy Silt, very dark gray
Damp	1.1		SM		
				9	(ML) Silt, very dark gray, soft, grades to medium stiff, no odor
				10	
Damp	1.0				
				11	Encountered water table at 11 ft bgs
Saturated	1.1				
				12	
Saturated	1.0				Color changes to brown
				13	
Saturated	1.8		ML		
		SB-10-14		14	
Saturated	1.7				
				15	
Wet	1.7				
				16	
Wet	1.5				
				17	
Wet	1.4				
				18	(ML) Sandy Silt, fine to very fine grained sand, very dark gray, loose/soft, no odor
Wet	1.5				
			ML	19	
Wet	1.6				Color changes to very dark brown
				20	Bottom of borehole at 20.0 feet.
				21	

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Boring: SB-11

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: T Dube
Date Started: 9/28/2007
Date Completed: 9/28/2007

Driller: --
Drill Method: Hand Auger
Total Boring Depth: 2.75 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				SM		0	(SM) Sand, fine to coarse grained with some silt and gravel (up to 6" in size), brown-gray, damp, dense, waste debris (bolts, wood pieces, tubing, etc.) FILL
						1	
						1.5	Strong odor observed (Solvent/Fuel) from 1.5 to 2.5 ft
	78					2	Strong sheen observed at 2 ft
	88						
	65		SB-11-2.5				
						2.75	Refusal at 2.75 ft on rock
						3	
							This boring was attempted twice - the first boring was done one foot away from second location. The first boring was advanced to 2 ft bgs. The second boring was advanced to a total depth of 2.75 ft bgs.
							Bottom of borehole at 2.8 feet.
						4	
						5	
						6	
						7	

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Boring: SB-12

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: T Dube
Date Started: 9/28/2007
Date Completed: 9/28/2007

Driller: --
Drill Method: Hand Auger
Total Boring Depth: 2 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				GP			(GP) Gravel up to 3/4" in size, gray-brown, loose, no odor. FILL
	1.5						(SM) Sand, fine to coarse grained, some silt and gravel (up to 5" in size), dark brown, damp, dense.
	3.9					1	Waste debris. FILL
	23.9			SM			
	8.2		SB-12-1.5				Moderate odor observed between 1-2 ft bgs (solvent/fuel)
	33.9					2	Weak to moderate sheen at 2 ft
						3	Refusal at 2 ft bgs on rock
							Bottom of borehole at 2.0 feet.
						4	
						5	
						6	
						7	

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Boring: SB-13

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: S Bloom
Date Started: 10/1/2007
Date Completed: 10/1/2007

Driller: --
Drill Method: Hand Auger
Total Boring Depth: 7.5 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				GP		0	(GP) Sandy gravel wiht cobbles and waste debris. (FILL)
			SB-13-1			1	(SM) Sand, very fine to medium grained sand, some silt, very dark gray, damp, loose, no odor
Damp	0.8						
						2	
						3	
			SB-13-3.5				
Damp	0.6			SM		4	
Damp	0.6					5	
Damp	0.4					6	
Saturated	0.8		SB-13-7	ML		7	(ML) Sandy Silt, very fine to fine grained sand, very dark gray, saturated, soft/loose, no odor Encountered water table at 7 ft bgs
							Bottom of borehole at 7.5 feet.
						8	
						9	
						10	

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Boring: SB-14

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: T Dube
Date Started: 10/1/2007
Date Completed: 10/1/2007

Driller: --
Drill Method: Hand Auger
Total Boring Depth: 8 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
			GP	0	(GP) Sandy Gravel, gravel up to 1/2", gray-brown, damp, no odor, loose. FILL
			ML	0.5	(ML) Gravelly Silt, gravel up to 3", gray-brown, moist, dense, no odor, some waste debris. FILL
Moist	0.6		SP	1.5	(SP) Sand, fine to medium grained sand, trace silt and fine gravel (to 0.25 inch), gray-brown, damp, no odor
Moist	0.9			2.5	
Moist	0.9	SB-14-3		3	
Moist	0.7			5	Sand becomes slight coarser
Moist	1.0			6	
Moist	55			7	Strong solvent/petroleum odor and heavy sheen at 7 to 8 ft bgs
Saturated	15/23.7	SB-14-7.5		7.5	Encountered water table at 7.5 ft bgs
				8	Bottom of borehole at 8.0 feet.

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Boring: SB-15

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: T Dube
Date Started: 10/1/2007
Date Completed: 10/1/2007

Driller: --
Drill Method: Hand Auger
Total Boring Depth: 4 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				GP		0	(GP) Sandy Gravel, gravel up to 3/4" big, gray-brown, damp, no odor. FILL
				ML		1	(ML) Gravelly Silt, gravel up to 6", some medium grained sand, gray-brown, very moist, stiff, no odor, some waste debris. FILL
				SP			(SP) Sand, fine to medium grained, minor silt and gravel (up to 1"), gray-brown, very moist to wet, loose, slight solvent/petroleum odor
Very Moist	1.0					2	
Very Moist	2.2					3	
Saturated	36						Solvent/petroleum odor observed
Saturated	42		SB-15-3.5				Encountered water table at 3.25 ft bgs (after completion water level measured at 2.8 ft); dense below 3.5 ft
						4	Bottom of borehole at 4.0 feet.
						5	
						6	
						7	

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Boring: SB-16

Project: South Park Marina
Client: Washington State Dept of Ecology
Location: Seattle, Washington

Logged By: T Dube
Date Started: 10/1/2007
Date Completed: 10/1/2007

Driller: --
Drill Method: Hand Auger
Total Boring Depth: 4 ft

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION
				GP		0	(GP) Sandy gravel, gravel up to 3/4", gray-brown, damp, loose, no odor. FILL
						0.75	(ML) Gravelly Silt, gravel is up to 3.5", some sand, gray-brown, damp, stiff, some waste debris (wire, nails, etc), FILL
						1	
Moist	2.1					1.25	Faint odor observed at 1.25', increasing with depth to moderate odor at 4 ft bgs
						1.5	Subtle sheen at 1.5 ft bgs.
	23					2	
Moist	12			ML		2.25	
	95					2.5	Moderate sheen 2.5 to 4 ft bgs
	164					3	
Moist	171		SB-16-3.5			3.5	
						4	
						4.5	Refusal on rock at 4 ft bgs
							Bottom of borehole at 4.0 feet.
						5	
						6	
						7	

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Client:	South Park Marina Limited Partnership	**Boring ID**	B-01
Project Name and No.:	South Park Marina – PCB Data Gaps Investigation – 2017.0376 Task 13.2		
Project Location:	8604 Dallas Avenue South, Seattle WA 98108		
Logged by:	Sabine Datum	**Reviewed by:**	Audrey Hackett/Philip Spadaro
Drilling Start Date:	11/17/2017	**Drilling End Date:**	11/17/2017
Horizontal Location (Datum):	1275087.291	**Water Depth at Time of Drilling:**	NE
Vertical Location (Datum):	195772.3085	**Water Depth After Completion:**	NE
Surface Conditions:	5/8" minus gravel		

Depth (ft bgs)	Interval (ft)	Blow Count	% Recovery	PID (ppmv)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Detail/ Water Depth
1 2 3 4 5	0–5	NA	65	0.5 0.6	B-01-2-3 B-01-3.5-4.5	SM/GM SP		0–2 ft: No recovery 2–3.5 ft: Brown to greenish gray gravelly fine SAND/sandy fine GRAVEL; with silt (Fill); dry to moist; very minor sheen 3.5–5 ft: Brown fine SAND, trace silt; dry to moist	
6 7 8 9 10	5–10	NA	70	0.1 1.3 0.1	B-01-5-6 B-01-8.5-9.5	SP SP-SM CL		Brown fine SAND, trace silt; 2-in grey silty layer with hydrocarbon odor and sheen above an orange seam at 8 ft 7 in; Grey fine SAND, trace silt; 0.5-in gray silt layer at 9.5 ft overlying brown and orange fine to medium SILT with hydrocarbon odor and oil sheen; 2-in CLAY layer at the bottom of the sampler with hydrocarbon odor	
								Bottom of boring: 10 ft bgs	

Drilling Co./Driller:	Holt Services Inc.; Michael Running	**Well/Auger Diameter:**	NA
Drilling Equipment/ Rig Model:	Geoprobe 7822 DT	**Boring Diameter**	2 in
Drilling Method/ Sampler Type:	Direct-Push	**Well Screened Interval:**	NA
Hammer Type/Weight:	NA	**Screen Slot Size:**	NA
Total Boring Depth:	10 ft bgs	**Filter Pack Used:**	NA
Backfill:	Bentonite	**Surface Seal:**	NA
Total Well Depth:	NA	**Annular Seal:**	NA
State Well ID No.:	NA	**Monument Type:**	NA
Notes/Comments:	bgs: below ground surface NA: not applicable NE: not encountered	PID: photoionization detector ppmv: parts per million volume USCS: United Soil Classification System	

Client:	South Park Marina Limited Partnership	**Boring ID**	B-02
Project Name and No.:	South Park Marina – PCB Data Gaps Investigation – 2017.0376 Task 13.2		
Project Location:	8604 Dallas Avenue South, Seattle WA 98108		
Logged by:	Sabine Datum	**Reviewed by:**	Audrey Hackett/Philip Spadaro
Drilling Start Date:	11/17/2017	**Drilling End Date:**	11/17/2017
Horizontal Location (Datum):	1275100.52	**Water Depth at Time of Drilling:**	NE
Vertical Location (Datum):	195768.592	**Water Depth After Completion:**	NE
Surface Conditions:	5/8" minus gravel		

Depth (ft bgs)	Interval (ft)	Blow Count	% Recovery	PID (ppmv)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Detail/ Water Depth
1 2 3 4 5	0–5	NA	70	0.5 3.4	B-02-2.5-3	GM SP SP		Brown sandy fine to medium GRAVEL with silt (Fill); orange coloration at 2 ft; 2 ft–2 ft 9 in: brown SAND, trace silt; dry to moist; Brown to dark gray SAND, trace fine gravel; dry to moist; heavy oil sheen 2.5–3 ft	
6 7 8 9 10	5–10	NA	70	40.1 19.6	B-02-5.5-6 B-02-6.5-7	SM		Dark gray silty SAND; wood at 6 ft; strong hydrocarbon odor and heavy oil sheen throughout and below 6.5 ft; dry to moist; 6.5–10 ft: same as above, moist	
								Bottom of boring: 10 ft bgs	

Drilling Co./Driller:	Holt Services Inc.; Michael Running	**Well/Auger Diameter:**	NA
Drilling Equipment/ Rig Model:	Geoprobe 7822 DT	**Boring Diameter**	2 in
Drilling Method/ Sampler Type:	Direct-Push	**Well Screened Interval:**	NA
Hammer Type/Weight:	NA	**Screen Slot Size:**	NA
Total Boring Depth:	10 ft bgs	**Filter Pack Used:**	NA
Backfill:	Bentonite	**Surface Seal:**	NA
Total Well Depth:	NA	**Annular Seal:**	NA
State Well ID No.:	NA	**Monument Type:**	NA
Notes/Comments:	bgs: below ground surface NA: not applicable NE: not encountered	PID: photoionization detector ppmv: parts per million volume USCS: United Soil Classification System	

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Client:	South Park Marina Limited Partnership	**Boring ID**	B-03
Project Name and No.:	South Park Marina – PCB Data Gaps Investigation – 2017.0376 Task 13.2		
Project Location:	8604 Dallas Avenue South, Seattle WA 98108		
Logged by:	Sabine Datum	**Reviewed by:**	Audrey Hackett/Philip Spadaro
Drilling Start Date:	11/17/2017	**Drilling End Date:**	11/17/2017
Horizontal Location (Datum):	1275086.34	**Water Depth at Time of Drilling:**	NE
Vertical Location (Datum):	195754.2348	**Water Depth After Completion:**	NE
Surface Conditions:	5/8" minus gravel		

Depth (ft bgs)	Interval (ft)	Blow Count	% Recovery	PID (ppmv)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Detail/ Water Depth
1 2 3 4 5	0–5	NA	60	0.2 1.0	B-03-0-1 B-03-2-3	GW-GP		Brown to light gray sandy, fine to medium GRAVEL (Fill); decreasing sand content toward bottom; dry to moist; slight oil sheen 0–1 ft	
6 7 8 9 10	5–10	NA	50	7.2 0.2	B-03-5-6 B-03-6.5-7	SM SM CL		3 in of dark gray w/reddish brown silty fine to coarse SAND with fine gravel; dry to moist; gravel lense at 5 ft 7 in; brown to gray silty SAND below 6 ft; moist below 6.5 ft; alternating light and dark brown laminations from 6 to 6.5 ft; 2 in of gray CLAY at bottom; hydrocarbon odor and heavy sheen throughout interval; metal pieces in sampler shoe	
								Bottom of boring: 10 ft bgs	

Drilling Co./Driller:	Holt Services Inc.; Michael Running	**Well/Auger Diameter:**	NA
Drilling Equipment/ Rig Model:	Geoprobe 7822 DT	**Boring Diameter**	2 in
Drilling Method/ Sampler Type:	Direct-Push	**Well Screened Interval:**	NA
Hammer Type/Weight:	NA	**Screen Slot Size:**	NA
Total Boring Depth:	10 ft bgs	**Filter Pack Used:**	NA
Backfill:	Bentonite	**Surface Seal:**	NA
Total Well Depth:	NA	**Annular Seal:**	NA
State Well ID No.:	NA	**Monument Type:**	NA
Notes/Comments:	bgs: below ground surface NA: not applicable NE: not encountered	PID: photoionization detector ppmv: parts per million volume USCS: United Soil Classification System	

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Client:	South Park Marina Limited Partnership	**Boring ID**	B-04
Project Name and No.:	South Park Marina – PCB Data Gaps Investigation – 2017.0376 Task 13.2		
Project Location:	8604 Dallas Avenue South, Seattle WA 98108		
Logged by:	Sabine Datum	**Reviewed by:**	Audrey Hackett/Philip Spadaro
Drilling Start Date:	11/17/2017	**Drilling End Date:**	11/17/2017
Horizontal Location (Datum):	1275091.934	**Water Depth at Time of Drilling:**	NE
Vertical Location (Datum):	195695.2371	**Water Depth After Completion:**	NE
Surface Conditions:	5/8" minus gravel		

Depth (ft bgs)	Interval (ft)	Blow Count	% Recovery	PID (ppmv)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Detail/ Water Depth
1 2 3 4 5	0–5	NA	50	0.0 31.1	B-01-2-3 B-01-3.5-4.5	GP SM GP/SP		0–10 in: Reddish brown fine GRAVEL with sand (Fill); dry to moist; moderate sheen; 10 in–1.5 ft: Brown to reddish brown silty fine SAND (potential Fill); dry to moist; heavy sheen; 1.5 ft–2 ft 4 in: Reddish brown to gray gravelly SAND/sandy GRAVEL (Fill); dry to moist	
6 7 8 9 10	5–10	NA	50	29.5 47.8	B-01-5-6 B-01-8.5-9.5	SM		Gray silty fine SAND, trace fine to medium gravel; orange-brown layer at 6 ft 7in to 9 in; dry to moist; moist to slightly wet below 6.5 ft; heavy sheen and strong hydrocarbon odor	
								Bottom of boring: 10 ft bgs	

Drilling Co./Driller:	Holt Services Inc.; Michael Running	**Well/Auger Diameter:**	NA
Drilling Equipment/ Rig Model:	Geoprobe 7822 DT	**Boring Diameter**	2 in
Drilling Method/ Sampler Type:	Direct-Push	**Well Screened Interval:**	NA
Hammer Type/Weight:	NA	**Screen Slot Size:**	NA
Total Boring Depth:	10 ft bgs	**Filter Pack Used:**	NA
Backfill:	Bentonite	**Surface Seal:**	NA
Total Well Depth:	NA	**Annular Seal:**	NA
State Well ID No.:	NA	**Monument Type:**	NA
Notes/Comments:	bgs: below ground surface NA: not applicable NE: not encountered	PID: photoionization detector ppmv: parts per million volume USCS: United Soil Classification System	

Unified Soil Classification System Key

Primary Divisions			Group Symbol	Graphic	Descriptions
Coarse grained soils More than 50% of material is larger than no. 200 sieve	Gravels More than 60% of coarse fraction retained on no. 4 sieve	Clean gravels Little or no fines	GW		Well-graded gravels, gravel-sand mixtures, little or no fines
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with fines Appreciable amount of fines	GM		Silty gravels, gravel-sand-silt mixtures
			GC		Clayey gravels, gravel-sand-clay mixtures
	Sands More than 50% of coarse fraction passing no. 4 sieve	Clean sands Less than 5% fines	SW		Well-graded sands, gravelly sands, little or no fines
			SP		Poorly graded sands, gravelly sands, little or no fines
		Sands with fines Appreciable amount of fines	SM		Silty sands, sand-silt mixtures
			SC		Clayey sands, sand-clay mixtures
Fine grained soils More than 50% of material is smaller than no. 200 sieve size	Silts and clays Liquid limit less than 50%		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, or lean clays
			OL		Organic silts and organic silty clays of low plasticity
	Silts and clays Liquid limit greater than 50%		MH		Inorganic silts, micaceous or diatomaceous fine sand or silty soils
			CH		Inorganic clays of high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
Highly organic soils			PT		Peat, humus, swamp soils with high organic contents

APPENDIX C

Screening Levels for RI

C. Screening Levels for RI

This appendix describes the basis for numerical screening levels against which data for media sampled at the Site will be compared to identify chemicals of potential concern during the RI.

The RI soil and groundwater screening levels address the environmental transport and exposure pathways applicable at the Site, as defined in Ecology's 2019 *Lower Duwamish Waterway PCUL Workbook and Supplemental Information* (Ecology, 2019b).

Screening levels for media not regulated under MTCA—stormwater and catch basin solids—are also developed to assess potential contaminant transport to the Lower Duwamish Waterway (LDW) via stormwater and thus the need for stormwater source control measures in accordance with the LDW Source Control Strategy (Ecology, 2016).

In accordance with MTCA, screening levels in the RI will not be set at concentrations less than the analytical practical quantitation limit (PQL) or natural background concentrations. No adjustment for PQLs has been made to the screening levels in this RI Work Plan, but adjustments for PQLs and area or natural background concentrations will be made as appropriate during preparation of the RI.

Sections C.1, C.2, and C.3 respectively describe the derivation of screening levels for groundwater, soil, and stormwater and catch basin solids to be applied in the RI.

C.1. Groundwater Screening Levels

This section describes derivation of RI groundwater screening levels based on the highest beneficial use of Site groundwater, as defined in Section C.1.1 and the corresponding applicable exposure pathways.

C.1.1. Highest Beneficial Use of Site Groundwater

Washington Administrative Code (WAC) 173-340-720(1)(a) states that, "Groundwater cleanup levels shall be based on estimates of the highest beneficial use and the reasonable maximum exposure expected to occur under both current and potential future site use conditions." It is proposed that groundwater within the Site is classified as non-potable in accordance with WAC 173-340-720(2), as follows:

> **(2)(a) The groundwater does not serve as a current source of drinking water.** Groundwater at the SPM Property is not used for any purpose. The Site is within City of Seattle municipal water service area and this potable water supply will continue in perpetuity.
>
> **(2)(b) The groundwater is not a potential future source of drinking water due to low yield or naturally poor water quality.** Naturally brackish groundwater conditions occur throughout the Site water-bearing units due to proximity to the LDW (saltwater intrusion) and the fact that much of the fill was likely dredged from the marine environment. Although SAIC (2008a) did not report specific

conductivity[1] measurements for their Site groundwater samples, conductivity measurements collected in comparable water-bearing units at the Terminal-117 (T-117) upland area immediately south of the Site commonly exceeded the Washington State drinking water criterion (secondary maximum contaminant level of 0.7 millisiemens per centimeter [WAC 246-290-310(3)(a)]) (Windward, 2010a).

(2)(c) It is unlikely that hazardous substances will be transported from the contaminated groundwater to groundwater that is a current or potential future source of drinking water, as defined in (a) and (b) of this subsection, at concentrations which exceed groundwater quality criteria published in chapter 173-200 WAC. There are no drinking water wells within the Site, and the LDW forms the downgradient limit of the shallow water-bearing units on the Site. Furthermore, the LDW is a regional groundwater discharge area; therefore, regional groundwater flow is generally moving upward toward the discharge area, preventing downward flow from the shallow to deeper aquifers.

(2)(d) There is an extremely low probability that the groundwater will be used for that purpose because of the site's proximity to surface water that is not suitable as a domestic water supply. At such sites, groundwater may be classified as non-potable if each of the following conditions can be demonstrated[2]:

(i) There are known or projected points of entry of the groundwater into the surface water. Hydrogeologic data from the SPM Property and adjacent properties (e.g., T-117) document that groundwater on the Site discharges to the LDW.

(ii) The surface water is not classified as a suitable domestic water supply source under chapter 173-205.1 WAC. The LDW is a marine surface water body and does not classify as a domestic water supply in Table 602 of Chapter 173-201A WAC.

(iii) The groundwater is sufficiently hydraulically connected to the surface water that the groundwater is not practicable to use as a drinking water source. Because of its substantial hydraulic connection with the LDW, it is not practicable to use groundwater on the Site as a drinking water source due to the potential for drawing saline water into the water-bearing zone (e.g., saltwater intrusion).

Because drinking water is not a practicable future use for groundwater at the Site, the highest beneficial use of the groundwater is considered discharge to the LDW. This is consistent with the groundwater non-potability determination made for the T-117 site immediately south of the Site (Windward, 2010a).

[1] An approximate measure of groundwater salinity.
[2] These determinations must be for reasons other than that the groundwater or surface water has been contaminated by a release of a hazardous substance at the site.

C.1.2. Groundwater Pathways and Screening Levels

The applicable transport pathways, and their corresponding Preliminary Cleanup Level (PCUL) workbook codes in parentheses (Ecology, 2019b), incorporated into the RI groundwater screening levels are as follows:

- Discharge of contaminated groundwater to LDW (marine) surface water (GW-2), incorporating the most stringent of state and federal water quality standards for protection of aquatic organisms and human health
- Partitioning of groundwater contamination to LDW (marine) sediment (GW-3), incorporating the most stringent of the minimum sediment cleanup levels in the LDW Record of Decision (ROD; EPA, 2014) and, for chemicals not included in the ROD, sediment cleanup objectives in the state Sediment Management Standards (Chapter 173-304 WAC), all expressed as dry weight values[3]
- Groundwater vapor intrusion into an occupied building assuming unrestricted (non-industrial) land use (GW-4)
- Natural background concentrations for groundwater (GW-5)

Table C.1 presents the applicable groundwater screening levels based on these pathways, with selection of the RI screening level for groundwater as the most stringent value (red header in table).

C.2. Soil Screening Levels

The applicable pathways, and corresponding PCUL workbook codes in parentheses (Ecology, 2019b), incorporated into the RI soil screening levels are as follows:

- Human direct contact with soil contamination assuming unrestricted (non-industrial) land use (SL-1)
- Leaching of soil contaminants from soil to groundwater followed by transport to LDW surface water (SL-3 for vadose-zone soil, SL-6 for saturated-zone soil)
- Leaching of soil contaminants from soil to groundwater followed by transport to LDW sediment (SL-4 for vadose-zone soil, SL-7 for saturated-zone soil)
- Erosion of contaminated bank soils directly to LDW sediment (SL-8)
- Terrestrial ecological receptor (plants, soil biota, wildlife) direct contact with soil contamination (SL-9)
- Natural background concentrations for soil (SL-10)

Table C.2 presents the soil screening levels based on these pathways without adjustment for PQLs. Table C.3 presents screening levels specific to erodible bank soils (SL-8 pathway only).

[3] Dry-weight values are used for GW-3 because carbon-normalized values cannot be used for modeling the partitioning between groundwater and sediment (Ecology, 2019b).

C.3. Screening Levels for Stormwater and Catch Basin Solids

For stormwater samples, copper and zinc data will be compared against the most stringent benchmark values[4] in the Boatyard (Stormwater) General Permit for the SPM Property. For all other contaminants (without permit benchmarks), the most stringent of state or federal marine water quality standards will be applied. Table C.4 presents the screening levels for stormwater to be carried forward in the RI without adjustment for PQLs.

There are no regulatory standards for catch basin solids, inline solids, and sediment trap samples. Therefore, consistent with City of Seattle (2016) and King County (2019) approaches for source tracing in their LDW Source Control Implementation Plans, catch basins solids data will be compared against the second-lowest apparent effects thresholds (2LAETs) for marine sediment in Ecology's *Sediment Cleanup User's Manual II* (Ecology, 2017). Table C.5 presents the screening levels for catch basin solids to be carried forward in the RI without adjustment for PQLs.

[4] Seasonal average benchmark for discharge of stormwater runoff to marine water.

APPENDIX C

TABLES

Table C.1. Groundwater Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Reproduced from LDW PCUL Workbook - Groundwater Summary (Ecology, 2019)

Sort Order	Chemical (all concentrations are in ug/L)	RI Screening Level for Groundwater	Protect Sediment Is "TBD"	GW-2 Protect Surface Water GW-Detail-SW	GW-3 Protect Sediment Mod.747-1	GW-4 Screening Level Protect Indoor Air GW-Detail-PW	GW-5 Natural Background
1	***PCBs***						
2	Total PCB Aroclors	7.0E-06	--	7.0E-06	2.2E-02	na	na
3	Total PCB congeners	7.0E-06	--	7.0E-06	3.4E-04	na	na
4	Total PCB TEQ	4.4E-09	--	4.4E-09	1.2E-07	na	na
5	***Dioxins/Furans***						
6	2,3,7,8-TCDD	5.1E-09	--	5.1E-09	na	na	na
7	Total dioxin/furan TEQ	5.1E-09	--	5.1E-09	na	na	na
8	Total chlorinated dioxins	na	--	na	na	na	na
9	Total chlorinated furans	na	--	na	na	na	na
10	***Metals***						
11	Aluminum	na	--	na	na	na	na
12	Antimony	9.0E+01	--	9.0E+01	na	na	na
13	Arsenic	8.0E+00	--	1.4E-01	2.2E+02	na	8.0E+00
14	Barium	2.0E+02	--	2.0E+02	8.3E+05	na	na
15	Beryllium	4.4E+00	--	7.6E+01	4.4E+00	na	na
16	Cadmium	1.2E+00	--	7.9E+00	1.2E+00	na	na
17	Chromium, total	na	--	na	na	na	na
18	Chromium, trivalent	2.7E+01	--	2.7E+01	7.6E+01	na	na
19	Chromium, hexavalent	5.0E+01	--	5.0E+01	4.5E+04	na	na
20	Cobalt	na	--	na	na	na	na
21	Copper	1.4E+01	--	5.0E+01	1.4E+01	na	na
22	Iron	na	--	na	na	na	na
23	Lead	8.1E+00	--	8.1E+00	1.9E+01	na	na
24	Manganese	1.0E+02	--	1.0E+02	na	na	na
25	Mercury, inorganic	2.5E-02	--	2.5E-02	2.0E+00	2.9E-01	na
26	Methylmercury	3.0E-02	--	3.0E-02	na	na	na
27	Molybdenum	na	--	na	na	na	na
28	Nickel	8.2E+00	--	8.2E+00	2.3E+03	na	na
29	Selenium	7.1E+01	--	7.1E+01	3.9E+05	na	na
30	Silver	1.9E+00	--	1.9E+00	5.5E+01	na	na
31	Thallium	6.2E-02	--	6.2E-02	2.3E+01	na	na
32	Tin	na	--	na	na	na	na
33	Vanadium	na	--	na	na	na	na
34	Zinc	8.5E+01	--	8.5E+01	7.7E+02	na	na
35	***Metals - Butyltins***						
36	Monobutyltin	na	--	na	na	na	na
37	Dibutyltin	na	--	na	na	na	na
38	Tributyltin	7.4E-03	--	7.4E-03	na	na	na
39	Tetrabutyltin	na	--	na	na	na	na
40	***SVOCs - PAHs***						
41	Acenaphthene	5.3E+00	--	3.0E+01	5.3E+00	na	na
42	Acenaphthylene	na	--	na	na	na	na
43	Anthracene	2.1E+00	--	1.0E+02	2.1E+00	na	na
44	Benzo(a)anthracene	1.6E-04	--	1.6E-04	1.9E-01	na	na
45	Benzo(b)fluoranthene	1.6E-04	--	1.6E-04	na	na	na
46	Benzo(k)fluoranthene	1.6E-03	--	1.6E-03	na	na	na
47	Total benzofluoranthenes	na	--	na	na	na	na
48	Benzo(g,h,i)perylene	na	--	na	na	na	na
49	Benzo(a)pyrene	1.6E-05	--	1.6E-05	8.7E-02	na	na
50	Chrysene	1.6E-02	--	1.6E-02	1.9E-01	na	na
51	Dibenz(a,h)anthracene	1.6E-05	--	1.6E-05	6.8E-03	na	na
52	Dibenzofuran	na	--	na	na	na	na
53	Fluoranthene	1.8E+00	--	6.0E+00	1.8E+00	na	na
54	Fluorene	3.7E+00	--	1.0E+01	3.7E+00	na	na
55	Indeno(1,2,3-cd)pyrene	1.6E-04	--	1.6E-04	9.1E-03	na	na
56	Methyl isopropyl phenanthrene	na	--	na	na	na	na
57	1-Methylnaphthalene	na	--	na	na	na	na
58	2-Methylnaphthalene	na	--	na	na	na	na
59	Naphthalene	1.4E+00	--	1.4E+00	9.0E+01	8.9E+00	na
60	Phenanthrene	na	--	na	na	na	na
61	Pyrene	2.0E+00	--	8.0E+00	2.0E+00	na	na
62	Total LPAHs	na	--	na	na	na	na
63	Total HPAHs	na	--	na	na	na	na
64	Total PAHs	na	--	na	na	na	na
65	Total cPAH TEQ	1.6E-05	--	1.6E-05	4.9E-03	na	na

Table C.1. Groundwater Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Reproduced from LDW PCUL Workbook - Groundwater Summary (Ecology, 2019)

Sort Order	Chemical (all concentrations are in ug/L)	RI Screening Level for Groundwater	Protect Sediment Is "TBD"	GW-2 Protect Surface Water GW-Detail-SW	GW-3 Protect Sediment Mod.747-1	GW-4 Screening Level Protect Indoor Air GW-Detail-PW	GW-5 Natural Background
66	***Other SVOCs***						
67	Aniline	na	--	na	na	na	na
68	Azobenzene	na	--	na	na	na	na
69	Benzidine	2.3E-05	--	2.3E-05	na	na	na
70	Benzoic acid	5.9E+02	--	na	5.9E+02	na	na
71	Benzyl alcohol	na	--	na	na	na	na
72	Bis(2-chloroethoxy)methane	na	--	na	na	na	na
73	Bis(2-chloroethyl)ether	6.0E-02	--	6.0E-02	3.8E+02	2.6E+01	na
74	Bis(2-chloro-1-methylethyl)ether	9.0E+02	--	9.0E+02	na	na	na
75	2,6-Bis(1,1-dimethylethyl) phenol	na	--	na	na	na	na
76	Bis(2-ethylhexyl) phthalate	4.6E-02	--	4.6E-02	6.2E-01	na	na
77	4-Bromophenyl phenyl ether	na	--	na	na	na	na
78	Butyl benzyl phthalate	1.3E-02	--	1.3E-02	2.4E-01	na	na
79	Butyl diphenyl phosphate	na	--	na	na	na	na
80	Carbazole	na	--	na	na	na	na
81	4-Chloroaniline	2.3E+03	--	na	2.3E+03	na	na
82	4-Chloro-3-methylphenol	3.6E+01	--	3.6E+01	na	na	na
83	2-Chloronaphthalene	1.0E+02	--	1.0E+02	na	na	na
84	2-Chlorophenol	1.7E+01	--	1.7E+01	2.9E+03	na	na
85	4-Chlorophenyl phenyl ether	na	--	na	na	na	na
86	Dibutyl phthalate	8.0E+00	--	8.0E+00	4.6E+01	na	na
87	Dibutyl phenyl phosphate	na	--	na	na	na	na
88	1,2-Dichlorobenzene	4.6E+00	--	8.0E+02	4.6E+00	2.6E+03	na
89	1,3-Dichlorobenzene	2.0E+00	--	2.0E+00	na	na	na
90	1,4-Dichlorobenzene	4.9E+00	--	6.0E+01	8.9E+00	4.9E+00	na
91	3,3'-Dichlorobenzidine	3.3E-03	--	3.3E-03	1.3E+02	na	na
92	2,4-Dichlorophenol	1.0E+01	--	1.0E+01	7.0E+03	na	na
93	Di(2-ethylhexyl)adipate	na	--	na	na	na	na
94	Diethyl phthalate	9.3E+01	--	2.0E+02	9.3E+01	na	na
95	Dimethyl phthalate	6.0E+02	--	6.0E+02	na	na	na
96	2,4-Dimethylphenol	6.3E+00	--	9.7E+01	6.3E+00	na	na
97	1,2-Dinitrobenzene	na	--	na	na	na	na
98	1,3-Dinitrobenzene	na	--	na	na	na	na
99	1,4-Dinitrobenzene	na	--	na	na	na	na
100	4,6-Dinitro-2-methylphenol	7.0E+00	--	7.0E+00	na	na	na
101	2,4-Dinitrophenol	1.0E+02	--	1.0E+02	5.5E+05	na	na
102	2,4-Dinitrotoluene	1.8E-01	--	1.8E-01	1.1E+03	na	na
103	2,6-Dinitrotoluene	3.0E+02	--	na	3.0E+02	na	na
104	Di-n-octyl phthalate	3.9E-03	--	na	3.9E-03	na	na
105	1,4-Dioxane	na	--	na	na	na	na
106	1,2-Diphenylhydrazine	2.0E-02	--	2.0E-02	na	na	na
107	Hexachlorobenzene	5.0E-06	--	5.0E-06	1.4E-02	na	na
108	Hexachlorobutadiene	1.0E-02	--	1.0E-02	1.1E-02	8.1E-01	na
109	Hexachlorocyclopentadiene	1.0E+00	--	1.0E+00	2.7E+02	na	na
110	Hexachloroethane	2.0E-02	--	2.0E-02	6.2E+02	3.1E+00	na
111	Isophorone	1.1E+02	--	1.1E+02	6.0E+05	na	na
112	2-Methoxynaphthalene	na	--	na	na	na	na
113	2-Methylphenol	2.7E+01	--	na	2.7E+01	na	na
114	3-Methylphenol	na	--	na	na	na	na
115	4-Methylphenol	na	--	na	na	na	na
116	2-Nitroaniline	na	--	na	na	na	na
117	3-Nitroaniline	na	--	na	na	na	na
118	4-Nitroaniline	na	--	na	na	na	na
119	Nitrobenzene	1.0E+02	--	1.0E+02	1.2E+05	1.6E+02	na
120	2-Nitrophenol	na	--	na	na	na	na
121	4-Nitrophenol	na	--	na	na	na	na
122	n-Nitrosodimethylamine	3.4E-01	--	3.4E-01	na	na	na
123	n-Nitrosodiphenylamine	6.9E-01	--	6.9E-01	1.1E+00	na	na
124	n-Nitrosodi-n-propylamine	5.8E-02	--	5.8E-02	1.2E+02	na	na
125	Pentachlorophenol	2.0E-03	--	2.0E-03	8.8E-01	na	na
126	Phenol	3.7E+02	--	7.0E+04	3.7E+02	na	na
127	Pyridine	na	--	na	na	na	na
128	2,3,4,6-Tetrachlorophenol	na	--	na	na	na	na
129	1,2,4-Trichlorobenzene	3.7E-02	--	3.7E-02	9.6E-01	3.9E+01	na
130	2,4,5-Trichlorophenol	6.0E+02	--	6.0E+02	5.7E+04	na	na
131	2,4,6-Trichlorophenol	2.8E-01	--	2.8E-01	5.9E+02	na	na

Table C.1. Groundwater Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

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Sort Order	Chemical (all concentrations are in ug/L)	RI Screening Level for Groundwater	Protect Sediment Is "TBD"	GW-2 Protect Surface Water GW-Detail-SW	GW-3 Protect Sediment Mod.747-1	GW-4 Screening Level Protect Indoor Air GW-Detail-PW	GW-5 Natural Background
132	***Volatile Organic Compounds***						
133	Acetone	na	--	na	na	na	na
134	Acrolein	1.1E+00	--	1.1E+00	na	2.9E+00	na
135	Acrylonitrile	2.8E-02	--	2.8E-02	na	1.6E+01	na
136	Benzaldehyde	na	--	na	na	na	na
137	Benzene	1.6E+00	--	1.6E+00	na	2.4E+00	na
138	Bromobenzene	na	--	na	na	na	na
139	Bromochloromethane	na	--	na	na	na	na
140	Bromoethane	na	--	na	na	na	na
141	Bromoform	1.2E+01	--	1.2E+01	na	2.0E+02	na
142	Bromomethane	1.3E+01	--	2.7E+02	na	1.3E+01	na
143	2-Butoxyethanol	na	--	na	na	na	na
144	n-Butylbenzene	na	--	na	na	na	na
145	sec-Butylbenzene	na	--	na	na	na	na
146	tert-Butylbenzene	na	--	na	na	na	na
147	Carbon disulfide	4.0E+02	--	na	na	4.0E+02	na
148	Carbon tetrachloride	3.5E-01	--	3.5E-01	na	5.6E-01	na
149	Chlorobenzene	2.0E+02	--	2.0E+02	na	2.9E+02	na
150	Chloroethane	1.9E+04	--	na	na	1.9E+04	na
151	2-Chloroethyl vinyl ether	na	--	na	na	na	na
152	Chloroform	1.2E+00	--	1.5E+02	na	1.2E+00	na
153	Chloromethane	1.5E+02	--	na	na	1.5E+02	na
154	3-Chloro-1-propene	na	--	na	na	na	na
155	2-Chlorotoluene	na	--	na	na	na	na
156	4-Chlorotoluene	na	--	na	na	na	na
157	Dibromochloromethane	2.2E+00	--	2.2E+00	na	na	na
158	1,2-Dibromo-3-chloropropane	na	--	na	na	na	na
159	Dibromomethane	na	--	na	na	na	na
160	Dichlorobromomethane	1.8E+00	--	2.8E+00	na	1.8E+00	na
161	trans-1,4-Dichloro-2-butene	na	--	na	na	na	na
162	Dichlorodifluoromethane	5.6E+00	--	na	na	5.6E+00	na
163	1,1-Dichloroethane	1.1E+01	--	na	na	1.1E+01	na
164	1,2-Dichloroethane	4.2E+00	--	7.3E+01	na	4.2E+00	na
165	1,1-Dichloroethylene	1.3E+02	--	4.0E+03	na	1.3E+02	na
166	cis-1,2-Dichloroethylene	na	--	na	na	na	na
167	trans-1,2-Dichloroethylene	1.0E+03	--	1.0E+03	na	na	na
168	1,2-Dichloroethylene (mixed isomers)	na	--	na	na	na	na
169	1,2-Dichloropropane	3.1E+00	--	3.1E+00	na	1.0E+01	na
170	1,3-Dichloropropane	na	--	na	na	na	na
171	2,2-Dichloropropane	na	--	na	na	na	na
172	1,1-Dichloropropene	na	--	na	na	na	na
173	cis-1,3-Dichloropropene	2.0E+00	--	2.0E+00	na	na	na
174	trans-1,3-Dichloropropene	2.0E+00	--	2.0E+00	na	na	na
175	Ethane	na	--	na	na	na	na
176	Ethylbenzene	3.1E+01	--	3.1E+01	na	2.8E+03	na
177	Ethylene	na	--	na	na	na	na
178	Ethyl ether	na	--	na	na	na	na
179	Ethylene dibromide	2.7E-01	--	na	na	2.7E-01	na
180	Formaldehyde	na	--	na	na	na	na
181	2-Hexanone	na	--	na	na	na	na
182	Isopropylbenzene	na	--	na	na	na	na
183	4-Isopropyltoluene	na	--	na	na	na	na
184	Methane	na	--	na	na	na	na
185	Methyl ethyl ketone	1.7E+06	--	na	na	1.7E+06	na
186	Methyl iodide	na	--	na	na	na	na
187	Methyl isobutyl ketone	4.7E+05	--	na	na	4.7E+05	na
188	Methyl tert-butyl ether	6.0E+02	--	na	na	6.0E+02	na
189	Methylene chloride	1.0E+02	--	1.0E+02	na	4.4E+03	na
190	2-Pentanone	na	--	na	na	na	na
191	n-Propylbenzene	na	--	na	na	na	na
192	Styrene	8.2E+03	--	na	na	8.2E+03	na
193	1,1,1,2-Tetrachloroethane	7.4E+00	--	na	na	7.4E+00	na
194	1,1,2,2-Tetrachloroethane	3.0E-01	--	3.0E-01	na	6.2E+00	na
195	Tetrachloroethylene	2.9E+00	--	2.9E+00	na	2.4E+01	na
196	Toluene	1.3E+02	--	1.3E+02	na	1.5E+04	na
197	1,2,3-Trichlorobenzene	na	--	na	na	na	na
198	1,1,1-Trichloroethane	5.5E+03	--	5.0E+04	na	5.5E+03	na
199	1,1,2-Trichloroethane	9.0E-01	--	9.0E-01	na	4.6E+00	na
200	Trichloroethylene	7.0E-01	--	7.0E-01	na	1.5E+00	na
201	Trichlorofluoroethane	na	--	na	na	na	na
202	Trichlorofluoromethane	1.2E+02	--	na	na	1.2E+02	na
203	1,2,3-Trichloropropane	na	--	na	na	na	na
204	Trichlorotrifluoroethane	1.8E+02	--	na	na	1.8E+02	na
205	1,2,3-Trimethylbenzene	na	--	na	na	na	na
206	1,2,4-Trimethylbenzene	2.4E+02	--	na	na	2.4E+02	na
207	1,3,5-Trimethylbenzene	na	--	na	na	na	na
208	Vinyl acetate	7.8E+03	--	na	na	7.8E+03	na
209	Vinyl chloride	1.8E-01	--	1.8E-01	na	3.5E-01	na
210	Total xylenes	3.3E+02	--	na	na	3.3E+02	na

Table C.1. Groundwater Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Reproduced from LDW PCUL Workbook - Groundwater Summary (Ecology, 2019)

Sort Order	Chemical (all concentrations are in ug/L)	RI Screening Level for Groundwater	Protect Sediment Is "TBD"	GW-2 Protect Surface Water GW-Detail-SW	GW-3 Protect Sediment Mod.747-1	GW-4 Screening Level Protect Indoor Air GW-Detail-PW	GW-5 Natural Background
211	***Petroleum Hydrocarbons***						
212	Gasoline range hydrocarbons	na	--	na	na	na	na
213	Diesel range hydrocarbons	na	--	na	na	na	na
214	Oil range hydrocarbons	na	--	na	na	na	na
215	Total diesel & oil range hydrocarbons	na	--	na	na	na	na
216	***Pesticides***						
217	Aldrin	4.1E-08	--	4.1E-08	1.1E-04	3.2E-01	na
218	alpha-BHC	4.8E-05	--	4.8E-05	4.0E+00	na	na
219	beta-BHC	1.4E-03	--	1.4E-03	1.1E+01	na	na
220	delta-BHC	na	--	na	na	na	na
221	gamma-BHC	1.3E-01	--	1.3E-01	3.0E+01	na	na
222	cis-Chlordane	1.0E-04	--	3.6E-04	1.0E-04	na	na
223	trans-Chlordane	1.0E-04	--	3.6E-04	1.0E-04	na	na
224	Chlordane	2.2E-05	X	2.2E-05	TBD	na	na
225	Chlorpyrifos	5.6E-03	--	5.6E-03	na	na	na
226	4,4'-DDD	7.9E-06	--	7.9E-06	4.1E+00	na	na
227	4,4'-DDE	8.8E-07	--	8.8E-07	1.5E+00	na	na
228	4,4'-DDT	1.2E-06	--	1.2E-06	7.8E-06	na	na
229	Total DDD	1.0E-03	--	1.0E-03	4.1E+00	na	na
230	Total DDE	1.0E-03	--	1.0E-03	1.5E+00	na	na
231	Total DDT	1.0E-03	X	1.0E-03	TBD	na	na
232	Diazinon	na	--	na	na	na	na
233	Dieldrin	1.2E-06	--	1.2E-06	2.1E-04	na	na
234	Endosulfan I	8.7E-03	--	8.7E-03	2.6E+04	na	na
235	Endosulfan II	8.7E-03	--	8.7E-03	2.6E+04	na	na
236	Endosulfan sulfate	1.0E+01	--	1.0E+01	na	na	na
237	Endrin	2.0E-03	--	2.0E-03	2.5E+02	na	na
238	Endrin aldehyde	3.5E-02	--	3.5E-02	na	na	na
239	Endrin ketone	na	--	na	na	na	na
240	Heptachlor	3.4E-07	--	3.4E-07	5.5E-04	na	na
241	Heptachlor epoxide	2.4E-06	X	2.4E-06	TBD	na	na
242	Malathion	1.0E-01	--	1.0E-01	na	na	na
243	Methoxychlor	2.0E-02	--	2.0E-02	5.6E+02	na	na
244	Mirex	1.0E-03	--	1.0E-03	na	na	na
245	Nonachlor	na	--	na	na	na	na
256	Toxaphene	3.2E-05	--	3.2E-05	4.3E-01	na	na

Table C.2. Soil Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Reproduced from LDW PCUL Workbook - Soil Summary (Ecology, 2019)

Sort Order	Chemical (all concentrations are in mg/kg)	RI Screening Level for Vadose Soil (SL #s 1, 3, 4, 8-10)	RI Screening Level for Saturated Soil (SL #s 1, 6-10)	Protect Sediment Is "TBD"	SL-1 Direct Contact SL-Detail	SL-3 Protect Surface Water via Ground Water Vadose Zone 747-1	SL-4 Protect Sediment via Ground Water Vadose Zone 747-1	SL-6 Protect Surface Water via Ground Water Saturated Zone 747-1	SL-7 Protect Sediment via Ground Water Saturated Zone 747-1	SL-8 Protect Sediment via Bank Erosion Min. ROD CUL + SMS Lower Tier Sed	SL-9 Site-Specific TEE Unrest. Land Use SL-Detail	SL-10 Natural Background Ecology (1994)
1	***PCBs***											
2	Total PCB Aroclors	4.3E-05	2.2E-06	--	1.0E+00	4.3E-05	1.3E-01	2.2E-06	6.7E-03	1.3E-01	6.5E-01	na
3	Total PCB congeners	4.3E-05	2.2E-06	--	1.0E+00	4.3E-05	2.1E-03	2.2E-06	1.1E-04	2.0E-03	6.5E-01	na
4	Total PCB TEQ	2.7E-08	1.4E-09	--	7.7E-06	2.7E-08	7.4E-07	1.4E-09	3.7E-08	7.0E-07	na	na
5	***Dioxins/Furans***											
6	2,3,7,8-TCDD	5.2E-06	5.2E-06	--	1.3E-05	na	na	na	na	7.0E-07	na	5.2E-06
7	Total dioxin/furan TEQ	5.2E-06	5.2E-06	--	1.3E-05	na	na	na	na	2.0E-06	na	5.2E-06
8	Total chlorinated dioxins	2.0E-06	2.0E-06	--	na	na	na	na	na	na	2.0E-06	na
9	Total chlorinated furans	2.0E-06	2.0E-06	--	na	na	na	na	na	na	2.0E-06	na
10	***Metals***											
11	Aluminum	3.3E+04	3.3E+04	--	8.0E+04	na	na	na	na	2.2E+05	5.0E+01	3.3E+04
12	Antimony	5.0E+00	4.1E+00	--	3.2E+01	8.1E+01	na	4.1E+00	na	8.8E+01	5.0E+00	na
13	Arsenic	7.0E+00	7.0E+00	--	6.7E-01	8.2E-02	1.3E+02	4.1E-03	6.5E+00	7.0E+00	7.0E+00	7.0E+00
14	Barium	1.0E+02	8.3E+00	--	1.6E+04	1.6E+02	6.9E+05	8.3E+00	3.4E+04	4.4E+04	1.0E+02	na
15	Beryllium	1.0E+01	3.5E+00	--	1.6E+02	1.2E+03	6.9E+01	6.0E+01	3.5E+00	4.4E+02	1.0E+01	6.0E-01
16	Cadmium	3.0E-01	3.0E-01	--	8.0E+01	1.1E+00	1.6E-01	5.5E-02	8.3E-03	5.1E+00	4.0E+00	3.0E-01
17	Chromium, total	4.8E+01	4.8E+01	--	na	na	na	na	na	2.6E+02	4.2E+01	4.8E+01
18	Chromium, trivalent	5.5E+02	2.7E+01	--	1.2E+05	5.5E+02	1.5E+03	2.7E+01	7.6E+01	3.3E+05	na	na
19	Chromium, hexavalent	1.9E+01	9.6E-01	--	2.4E+02	1.9E+01	1.7E+04	9.6E-01	8.7E+02	6.6E+02	na	na
20	Cobalt	2.0E+01	2.0E+01	--	2.4E+01	na	na	na	na	6.6E+01	2.0E+01	na
21	Copper	3.6E+01	3.6E+01	--	3.2E+03	2.2E+01	6.1E+00	1.1E+00	3.0E-01	3.9E+02	5.0E+01	3.6E+01
22	Iron	5.6E+04	5.6E+04	--	5.6E+04	na	na	na	na	1.5E+05	na	3.6E+04
23	Lead	5.0E+01	5.0E+01	--	2.5E+02	1.6E+03	3.9E+03	8.1E+01	1.9E+02	4.5E+02	5.0E+01	2.4E+01
24	Manganese	1.1E+03	1.1E+03	--	3.7E+03	1.3E+02	na	6.5E+00	na	1.0E+04	1.1E+03	1.1E+03
25	Mercury, inorganic	7.0E-02	7.0E-02	--	2.4E+01	2.6E-02	2.1E+00	1.3E-03	1.1E-01	4.1E-01	1.0E-01	7.0E-02
26	Methylmercury	4.0E-01	4.0E-01	--	8.0E+00	na	na	na	na	2.2E+01	4.0E-01	na
27	Molybdenum	2.0E+00	2.0E+00	--	4.0E+02	na	na	na	na	1.1E+03	2.0E+00	na
28	Nickel	4.8E+01	4.8E+01	--	1.6E+03	1.1E+01	3.0E+03	5.4E-01	1.5E+02	4.4E+03	3.0E+01	4.8E+01
29	Selenium	3.0E-01	3.0E-01	--	4.0E+02	7.4E+00	4.1E+04	3.8E-01	2.1E+03	1.1E+03	3.0E-01	na
30	Silver	3.2E-01	1.6E-02	--	4.0E+02	3.2E-01	9.4E+00	1.6E-02	4.7E-01	6.1E+00	2.0E+00	na
31	Thallium	8.8E-02	4.4E-03	--	8.0E-01	8.8E-02	3.2E+01	4.4E-03	1.6E+00	2.2E+00	1.0E+00	na
32	Tin	5.0E+01	5.0E+01	--	4.8E+04	na	na	na	na	1.3E+05	5.0E+01	na
33	Vanadium	2.0E+00	2.0E+00	--	7.2E+02	na	na	na	na	2.0E+03	2.0E+00	na
34	Zinc	8.6E+01	8.5E+01	--	2.4E+04	1.1E+02	9.6E+02	5.3E+00	4.8E+01	4.1E+02	8.6E+01	8.5E+01
35	***Metals - Butyltins***											
36	Monobutyltin	na	na	--	na	na	na	na	na	na	na	na
37	Dibutyltin	na	na	--	na	na	na	na	na	na	na	na
38	Tributyltin	1.2E-01	1.2E-01	--	2.4E+01	na	na	na	na	1.2E-01	na	na
39	Tetrabutyltin	na	na	--	na	na	na	na	na	na	na	na
40	***SVOCs - PAHs***											
41	Acenaphthene	5.0E-01	2.8E-02	--	4.8E+03	3.1E+00	5.4E-01	1.6E-01	2.8E-02	5.0E-01	2.0E+01	na
42	Acenaphthylene	1.3E+00	1.3E+00	--	na	na	na	na	na	1.3E+00	na	na
43	Anthracene	9.6E-01	5.1E-02	--	2.4E+04	4.7E+01	1.0E+00	2.4E+00	5.1E-02	9.6E-01	na	na
44	Benzo(a)anthracene	1.1E-03	5.7E-05	--	na	1.1E-03	1.4E+00	5.7E-05	6.8E-02	1.3E+00	na	na
45	Benzo(b)fluoranthene	3.9E-03	2.0E-04	--	na	3.9E-03	na	2.0E-04	na	na	na	na
46	Benzo(k)fluoranthene	3.9E-02	2.0E-03	--	na	3.9E-02	na	2.0E-03	na	na	na	na
47	Total benzofluoranthenes	3.2E+00	3.2E+00	--	na	na	na	na	na	3.2E+00	na	na
48	Benzo(g,h,i)perylene	6.7E-01	6.7E-01	--	na	na	na	na	na	6.7E-01	na	na
49	Benzo(a)pyrene	3.1E-04	1.6E-05	--	1.9E-01	3.1E-04	1.7E+00	1.6E-05	8.4E-02	1.6E+00	1.2E+01	na
50	Chrysene	1.3E-01	6.4E-03	--	na	1.3E-01	1.5E+00	6.4E-03	7.4E-02	1.4E+00	na	na
51	Dibenz(a,h)anthracene	5.7E-04	2.9E-05	--	na	5.7E-04	2.4E-01	2.9E-05	1.2E-02	2.3E-01	na	na
52	Dibenzofuran	5.4E-01	5.4E-01	--	8.0E+01	na	na	na	na	5.4E-01	na	na
53	Fluoranthene	1.7E+00	9.0E-02	--	3.2E+03	5.9E+00	1.8E+00	3.0E-01	9.0E-02	1.7E+00	na	na
54	Fluorene	5.4E-01	2.9E-02	--	3.2E+03	1.6E+00	5.8E-01	8.0E-02	2.9E-02	5.4E-01	3.0E+01	na
55	Indeno(1,2,3-cd)pyrene	1.1E-02	5.6E-04	--	na	1.1E-02	6.3E-01	5.6E-04	3.2E-02	6.0E-01	na	na
56	Methyl isopropyl phenanthrene	na	na	--	na	na	na	na	na	na	na	na
57	1-Methylnaphthalene	2.9E+01	2.9E+01	--	3.4E+01	na	na	na	na	2.9E+01	na	na
58	2-Methylnaphthalene	6.7E-01	6.7E-01	--	3.2E+02	na	na	na	na	6.7E-01	na	na
59	Naphthalene	3.9E-02	2.1E-03	--	1.6E+03	3.9E-02	2.5E+00	2.1E-03	1.3E-01	2.1E+00	na	na
60	Phenanthrene	1.5E+00	1.5E+00	--	na	na	na	na	na	1.5E+00	na	na
61	Pyrene	2.6E+00	1.4E-01	--	2.4E+03	1.1E+01	2.7E+00	5.5E-01	1.4E-01	2.6E+00	na	na
62	Total LPAHs	5.2E+00	5.2E+00	--	na	na	na	na	na	5.2E+00	na	na
63	Total HPAHs	1.2E+01	1.2E+01	--	na	na	na	na	na	1.2E+01	na	na
64	Total PAHs	na	na	--	na	na	na	na	na	na	na	na
65	Total cPAH TEQ	3.1E-04	1.6E-05	--	1.9E-01	3.1E-04	9.5E-02	1.6E-05	4.7E-03	9.0E-02	na	na
66	***Other SVOCs***											
67	Aniline	1.5E+02	1.5E+02	--	1.8E+02	na	na	na	na	1.5E+02	na	na
68	Azobenzene	7.8E+00	7.8E+00	--	9.1E+00	na	na	na	na	7.8E+00	na	na
69	Benzidine	3.7E-03	3.7E-03	--	4.3E-03	na	na	na	na	3.7E-03	na	na
70	Benzoic acid	6.5E-01	1.7E-01	--	3.2E+05	na	2.4E+00	na	1.7E-01	6.5E-01	na	na
71	Benzyl alcohol	5.7E-02	5.7E-02	--	8.0E+03	na	na	na	na	5.7E-02	na	na
72	Bis(2-chloroethoxy)methane	na	na	--	na	na	na	na	na	na	na	na
73	Bis(2-chloroethyl)ether	3.3E-04	2.2E-05	--	9.1E-01	3.3E-04	2.1E+00	2.2E-05	1.4E-01	7.8E-01	na	na
74	Bis(2-chloro-1-methylethyl)ether	3.2E+03	3.2E+03	--	3.2E+03	na	na	na	na	6.8E+03	na	na
75	2,6-Bis(1,1-dimethylethyl) phenol	na	na	--	na	na	na	na	na	na	na	na
76	Bis(2-ethylhexyl) phthalate	1.0E-01	5.1E-03	--	7.1E+01	1.0E-01	1.4E+00	5.1E-03	6.9E-02	1.3E+00	na	na
77	4-Bromophenyl phenyl ether	na	na	--	na	na	na	na	na	na	na	na
78	Butyl benzyl phthalate	3.6E-03	1.8E-04	--	5.3E+02	3.6E-03	6.7E-02	1.8E-04	3.4E-03	6.3E-02	na	na
79	Butyl diphenyl phosphate	na	na	--	na	na	na	na	na	na	na	na
80	Carbazole	na	na	--	na	na	na	na	na	na	na	na
81	4-Chloroaniline	4.3E+00	8.1E-01	--	5.0E+00	na	1.2E+01	na	8.1E-01	4.3E+00	na	na
82	4-Chloro-3-methylphenol	na	na	--	na	na	na	na	na	na	na	na
83	2-Chloronaphthalene	6.4E+03	6.4E+03	--	6.4E+03	na	na	na	na	1.4E+04	na	na
84	2-Chlorophenol	2.0E-01	1.1E-02	--	4.0E+02	2.0E-01	3.5E+01	1.1E-02	2.0E+00	8.4E+02	na	na
85	4-Chlorophenyl phenyl ether	na	na	--	na	na	na	na	na	na	na	na
86	Dibutyl phthalate	2.8E-01	1.5E-02	--	8.0E+03	2.8E-01	1.6E+00	1.5E-02	8.5E-02	1.4E+00	2.0E+02	na
87	Dibutyl phenyl phosphate	na	na	--	na	na	na	na	na	na	na	na
88	1,2-Dichlorobenzene	3.6E-02	3.1E-03	--	7.2E+03	9.3E+00	5.4E-02	5.3E-01	3.1E-03	3.6E-02	na	na
89	1,3-Dichlorobenzene	na	na	--	na	na	na	na	na	na	na	na
90	1,4-Dichlorobenzene	1.1E-01	8.1E-03	--	1.9E+02	9.8E-01	1.5E-01	5.4E-02	8.1E-03	1.1E-01	2.0E+01	na
91	3,3'-Dichlorobenzidine	6.1E-05	3.3E-06	--	2.2E+00	6.1E-05	2.4E+00	3.3E-06	1.3E-01	1.9E+00	na	na
92	2,4-Dichlorophenol	6.9E-02	4.3E-03	--	2.4E+02	6.9E-02	4.8E+01	4.3E-03	3.0E+00	5.1E+02	na	na
93	Di(2-ethylhexyl)adipate	7.1E+02	7.1E+02	--	8.3E+02	na	na	na	na	7.1E+02	na	na
94	Diethyl phthalate	2.0E-01	3.4E-02	--	6.4E+04	1.1E+00	5.2E-01	7.4E-02	3.4E-02	2.0E-01	1.0E+02	na
95	Dimethyl phthalate	7.1E-02	7.1E-02	--	na	na	na	na	na	7.1E-02	2.0E+02	na
96	2,4-Dimethylphenol	2.9E-02	3.1E-03	--	1.6E+03	7.9E-01	5.2E-02	4.8E-02	3.1E-03	2.9E-02	na	na
97	1,2-Dinitrobenzene	8.0E+00	8.0E+00	--	8.0E+00	na	na	na	na	1.7E+01	na	na
98	1,3-Dinitrobenzene	8.0E+00	8.0E+00	--	8.0E+00	na	na	na	na	1.7E+01	na	na
99	1,4-Dinitrobenzene	8.0E+00	8.0E+00	--	8.0E+00	na	na	na	na	1.7E+01	na	na
100	4,6-Dinitro-2-methylphenol	na	na	--	na	na	na	na	na	na	na	na
101	2,4-Dinitrophenol	4.0E-01	2.9E-02	--	1.6E+02	4.0E-01	2.2E+03	2.9E-02	1.6E+02	3.4E+02	2.0E+01	na
102	2,4-Dinitrotoluene	1.1E-03	6.9E-05	--	3.2E+00	1.1E-03	6.7E+00	6.9E-05	4.4E-01	2.8E+00	na	na
103	2,6-Dinitrotoluene	5.7E-01	1.1E-01	--	6.7E-01	na	1.6E+00	na	1.1E-01	5.7E-01	na	na
104	Di-n-octyl phthalate	6.2E+00	3.3E-01	--	8.0E+02	na	6.5E+00	na	3.3E-01	6.2E+00	na	na
105	1,4-Dioxane	8.5E+00	8.5E+00	--	1.0E+01	na	na	na	na	8.5E+00	na	na
106	1,2-Diphenylhydrazine	1.1E+00	1.1E+00	--	1.3E+00	na	na	na	na	1.1E+00	na	na
107	Hexachlorobenzene	8.0E-06	4.0E-07	--	6.3E-01	8.0E-06	2.3E-02	4.0E-07	1.2E-03	2.2E-02	1.7E+01	na
108	Hexachlorobutadiene	1.1E-02	5.4E-04	--	1.3E+01	1.1E-02	1.2E-02	5.4E-04	5.8E-04	1.1E-02	na	na
109	Hexachlorocyclopentadiene	4.0E+00	2.0E-01	--	4.8E+02	4.0E+00	1.1E+03	2.0E-01	5.3E+01	1.0E+03	1.0E+01	na
110	Hexachloroethane	7.9E-04	4.1E-05	--	2.5E+01	7.9E-04	2.5E+01	4.1E-05	1.3E+00	2.1E+01	na	na
111	Isophorone	5.4E-01	3.7E-02	--	1.1E+03	5.4E-01	3.0E+03	3.7E-02	2.0E+02	9.0E+02	na	na
112	2-Methoxynaphthalene	na	na	--	na	na	na	na	na	na	na	na
113	2-Methylphenol	6.3E-02	1.0E-02	--	4.0E+03	na	1.6E-01	na	1.0E-02	6.3E-02	na	na
114	3-Methylphenol	4.0E+03	4.0E+03	--	4.0E+03	na	na	na	na	8.4E+03	na	na
115	4-Methylphenol	6.7E-01	6.7E-01	--	8.0E+03	na	na	na	na	6.7E-01	na	na
116	2-Nitroaniline	8.0E+02	8.0E+02	--	8.0E+02	na	na	na	na	1.7E+03	na	na
117	3-Nitroaniline	na	na	--	na	na	na	na	na	na	na	na
118	4-Nitroaniline	3.2E+02	3.2E+02	--	3.2E+02	na	na	na	na	6.8E+02	na	na
119	Nitrobenzene	6.4E-01	4.1E-02	--	1.6E+02	6.4E-01	7.5E+02	4.1E-02	4.8E+01	3.4E+02	4.0E+01	na
120	2-Nitrophenol	na	na	--	na	na	na	na	na	na	na	na
121	4-Nitrophenol	7.0E+00	7.0E+00	--	na	na	na	na	na	na	7.0E+00	na
122	n-Nitrosodimethylamine	1.7E-02	1.7E-02	--	2.0E-02	na	na	na	na	1.7E-02	na	na
123	n-Nitrosodiphenylamine	2.1E-02	1.1E-03	--	2.0E+02	2.1E-02	3.3E-02	1.1E-03	1.8E-03	2.8E-02	2.0E+01	na
124	n-Nitrosodi-n-propylamine	2.6E-04	1.8E-05	--	1.4E-01	2.6E-04	5.2E-01	1.8E-05	3.6E-02	1.2E-01	na	na
125	Pentachlorophenol	3.2E-05	1.8E-06	--	2.5E+00	3.2E-05	1.4E-02	1.8E-06	7.7E-04	3.6E-01	3.0E+00	na
126	Phenol	4.2E-01	1.2E-01	--	2.4E+04	3.2E+02	1.7E+00	2.2E+01	1.2E-01	4.2E-01	3.0E+01	na
127	Pyridine	8.0E+01	8.0E+01	--	8.0E+01	na	na	na	na	1.7E+02	na	na
128	2,3,4,6-Tetrachlorophenol	2.4E+03	2.4E+03	--	2.4E+03	na	na	na	na	5.1E+03	na	na
129	1,2,4-Trichlorobenzene	1.4E-03	7.2E-05	--	3.4E+01	1.4E-03	3.6E-02	7.2E-05	1.9E-03	3.1E-02	2.0E+01	na
130	2,4,5-Trichlorophenol	4.0E+00	1.1E+00	--	8.0E+03	2.2E+01	2.0E+03	1.1E+00	1.1E+02	1.7E+04	4.0E+00	na

Table C.2. Soil Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Reproduced from LDW PCUL Workbook - Soil Summary (Ecology, 2019)

Sort Order	Chemical (all concentrations are in mg/kg)	RI Screening Level for Vadose Soil (SL #s 1, 3, 4, 8-10)	RI Screening Level for Saturated Soil (SL #s 1, 6-10)	Protect Sediment Is "TBD"	SL-1 Direct Contact SL-Detail	SL-3 Protect Surface Water via Ground Water Vadose Zone 747-1	SL-4 Protect Sediment via Ground Water Vadose Zone 747-1	SL-6 Protect Surface Water via Ground Water Saturated Zone 747-1	SL-7 Protect Sediment via Ground Water Saturated Zone 747-1	SL-8 Protect Sediment via Bank Erosion Min. ROD CUL + SMS Lower Tier Sed	SL-9 Site-Specific TEE Unrest. Land Use SL-Detail	SL-10 Natural Background Ecology (1994)
131	2,4,6-Trichlorophenol	3.3E-03	1.9E-04	--	8.0E+01	3.3E-03	6.9E+00	1.9E-04	3.9E-01	7.8E+01	1.0E+01	na
132	***Volatile Organic Compounds***											
133	Acetone	7.2E+04	7.2E+04	--	7.2E+04	na	na	na	na	na	na	na
134	Acrolein	4.0E+01	4.0E+01	--	4.0E+01	na	na	na	na	na	na	na
135	Acrylonitrile	1.9E+00	1.9E+00	--	1.9E+00	na	na	na	na	na	na	na
136	Benzaldehyde	2.5E+02	2.5E+02	--	2.5E+02	na	na	na	na	na	na	na
137	Benzene	8.8E-03	5.6E-04	--	1.8E+01	8.8E-03	na	5.6E-04	na	na	na	na
138	Bromobenzene	6.4E+02	6.4E+02	--	6.4E+02	na	na	na	na	na	na	na
139	Bromochloromethane	na	na	--	na	na	na	na	na	na	na	na
140	Bromoethane	na	na	--	na	na	na	na	na	na	na	na
141	Bromoform	7.8E-02	5.0E-03	--	1.3E+02	7.8E-02	na	5.0E-03	na	na	na	na
142	Bromomethane	1.2E+00	7.9E-02	--	1.1E+02	1.2E+00	na	7.9E-02	na	na	na	na
143	2-Butoxyethanol	8.0E+03	8.0E+03	--	8.0E+03	na	na	na	na	na	na	na
144	n-Butylbenzene	4.0E+03	4.0E+03	--	4.0E+03	na	na	na	na	na	na	na
145	sec-Butylbenzene	8.0E+03	8.0E+03	--	8.0E+03	na	na	na	na	na	na	na
146	tert-Butylbenzene	8.0E+03	8.0E+03	--	8.0E+03	na	na	na	na	na	na	na
147	Carbon disulfide	8.0E+03	8.0E+03	--	8.0E+03	na	na	na	na	na	na	na
148	Carbon tetrachloride	2.9E-03	1.5E-04	--	1.4E+01	2.9E-03	na	1.5E-04	na	na	na	na
149	Chlorobenzene	1.7E+00	1.0E-01	--	1.6E+03	1.7E+00	na	1.0E-01	na	na	4.0E+01	na
150	Chloroethane	na	na	--	na	na	na	na	na	na	na	na
151	2-Chloroethyl vinyl ether	na	na	--	na	na	na	na	na	na	na	na
152	Chloroform	8.1E-01	5.2E-02	--	3.2E+01	8.1E-01	na	5.2E-02	na	na	na	na
153	Chloromethane	na	na	--	na	na	na	na	na	na	na	na
154	3-Chloro-1-propene	4.8E+01	4.8E+01	--	4.8E+01	na	na	na	na	na	na	na
155	2-Chlorotoluene	1.6E+03	1.6E+03	--	1.6E+03	na	na	na	na	na	na	na
156	4-Chlorotoluene	na	na	--	na	na	na	na	na	na	na	na
157	Dibromochloromethane	1.2E-02	7.7E-04	--	1.2E+01	1.2E-02	na	7.7E-04	na	na	na	na
158	1,2-Dibromo-3-chloropropane	1.3E+00	1.3E+00	--	1.3E+00	na	na	na	na	na	na	na
159	Dibromomethane	8.0E+02	8.0E+02	--	8.0E+02	na	na	na	na	na	na	na
160	Dichlorobromomethane	1.4E-02	9.6E-04	--	1.6E+01	1.4E-02	na	9.6E-04	na	na	na	na
161	trans-1,4-Dichloro-2-butene	na	na	--	na	na	na	na	na	na	na	na
162	Dichlorodifluoromethane	1.6E+04	1.6E+04	--	1.6E+04	na	na	na	na	na	na	na
163	1,1-Dichloroethane	1.8E+02	1.8E+02	--	1.8E+02	na	na	na	na	na	na	na
164	1,2-Dichloroethane	3.5E-01	2.4E-02	--	1.1E+01	3.5E-01	na	2.4E-02	na	na	na	na
165	1,1-Dichloroethylene	2.5E+01	1.4E+00	--	4.0E+03	2.5E+01	na	1.4E+00	na	na	na	na
166	cis-1,2-Dichloroethylene	1.6E+02	1.6E+02	--	1.6E+02	na	na	na	na	na	na	na
167	trans-1,2-Dichloroethylene	5.2E+00	3.2E-01	--	1.6E+03	5.2E+00	na	3.2E-01	na	na	na	na
168	1,2-Dichloroethylene (mixed isomers	7.2E+02	7.2E+02	--	7.2E+02	na	na	na	na	na	na	na
169	1,2-Dichloropropane	1.6E-02	1.0E-03	--	2.7E+01	1.6E-02	na	1.0E-03	na	na	7.0E+02	na
170	1,3-Dichloropropane	na	na	--	na	na	na	na	na	na	na	na
171	2,2-Dichloropropane	na	na	--	na	na	na	na	na	na	na	na
172	1,1-Dichloropropene	na	na	--	na	na	na	na	na	na	na	na
173	cis-1,3-Dichloropropene	1.0E-02	6.3E-04	--	1.0E+01	1.0E-02	na	6.3E-04	na	na	na	na
174	trans-1,3-Dichloropropene	1.0E-02	6.3E-04	--	1.0E+01	1.0E-02	na	6.3E-04	na	na	na	na
175	Ethane	na	na	--	na	na	na	na	na	na	na	na
176	Ethylbenzene	2.6E-01	1.5E-02	--	8.0E+03	2.6E-01	na	1.5E-02	na	na	na	na
177	Ethylene	na	na	--	na	na	na	na	na	na	na	na
178	Ethyl ether	1.6E+04	1.6E+04	--	1.6E+04	na	na	na	na	na	na	na
179	Ethylene dibromide	5.0E-01	5.0E-01	--	5.0E-01	na	na	na	na	na	na	na
180	Formaldehyde	4.8E+01	4.8E+01	--	4.8E+01	na	na	na	na	na	na	na
181	2-Hexanone	4.0E+02	4.0E+02	--	4.0E+02	na	na	na	na	na	na	na
182	Isopropylbenzene	8.0E+03	8.0E+03	--	8.0E+03	na	na	na	na	na	na	na
183	4-Isopropyltoluene	na	na	--	na	na	na	na	na	na	na	na
184	Methane	na	na	--	na	na	na	na	na	na	na	na
185	Methyl ethyl ketone	4.8E+04	4.8E+04	--	4.8E+04	na	na	na	na	na	na	na
186	Methyl iodide	na	na	--	na	na	na	na	na	na	na	na
187	Methyl isobutyl ketone	6.4E+03	6.4E+03	--	6.4E+03	na	na	na	na	na	na	na
188	Methyl tert-butyl ether	5.6E+02	5.6E+02	--	5.6E+02	na	na	na	na	na	na	na
189	Methylene chloride	4.3E-01	3.0E-02	--	4.8E+02	4.3E-01	na	3.0E-02	na	na	na	na
190	2-Pentanone	na	na	--	na	na	na	na	na	na	na	na
191	n-Propylbenzene	8.0E+03	8.0E+03	--	8.0E+03	na	na	na	na	na	na	na
192	Styrene	3.0E+02	3.0E+02	--	1.6E+04	na	na	na	na	na	3.0E+02	na
193	1,1,1,2-Tetrachloroethane	3.8E+01	3.8E+01	--	3.8E+01	na	na	na	na	na	na	na
194	1,1,2,2-Tetrachloroethane	1.7E-03	1.1E-04	--	5.0E+00	1.7E-03	na	1.1E-04	na	na	na	na
195	Tetrachloroethylene	2.9E-02	1.6E-03	--	4.8E+02	2.9E-02	na	1.6E-03	na	na	na	na
196	Toluene	9.2E-01	5.5E-02	--	6.4E+03	9.2E-01	na	5.5E-02	na	na	2.0E+02	na
197	1,2,3-Trichlorobenzene	2.0E+01	2.0E+01	--	na	na	na	na	na	na	2.0E+01	na
198	1,1,1-Trichloroethane	3.7E+02	2.1E+01	--	1.6E+05	3.7E+02	na	2.1E+01	na	na	na	na
199	1,1,2-Trichloroethane	5.0E-03	3.3E-04	--	1.8E+01	5.0E-03	na	3.3E-04	na	na	na	na
200	Trichloroethylene	4.4E-03	2.7E-04	--	1.2E+01	4.4E-03	na	2.7E-04	na	na	na	na
201	Trichlorofluoroethane	na	na	--	na	na	na	na	na	na	na	na
202	Trichlorofluoromethane	2.4E+04	2.4E+04	--	2.4E+04	na	na	na	na	na	na	na
203	1,2,3-Trichloropropane	3.3E-02	3.3E-02	--	3.3E-02	na	na	na	na	na	na	na
204	Trichlorotrifluoroethane	2.4E+06	2.4E+06	--	2.4E+06	na	na	na	na	na	na	na
205	1,2,3-Trimethylbenzene	8.0E+02	8.0E+02	--	8.0E+02	na	na	na	na	na	na	na
206	1,2,4-Trimethylbenzene	8.0E+02	8.0E+02	--	8.0E+02	na	na	na	na	na	na	na
207	1,3,5-Trimethylbenzene	8.0E+02	8.0E+02	--	8.0E+02	na	na	na	na	na	na	na
208	Vinyl acetate	8.0E+04	8.0E+04	--	8.0E+04	na	na	na	na	na	na	na
209	Vinyl chloride	1.0E-03	5.5E-05	--	6.7E-01	1.0E-03	na	5.5E-05	na	na	na	na
210	Total xylenes	1.6E+04	1.6E+04	--	1.6E+04	na	na	na	na	na	na	na
211	***Petroleum Hydrocarbons***											
212	Gasoline range hydrocarbons	1.2E+02	1.2E+02	--	1.5E+03	na	na	na	na	na	1.2E+02	na
213	Diesel range hydrocarbons	2.6E+02	2.6E+02	--	na	na	na	na	na	na	2.6E+02	na
214	Oil range hydrocarbons	na	na	--	na	na	na	na	na	na	na	na
215	Total diesel & oil range hydrocarbon	na	na	--	na	na	na	na	na	na	na	na
216	***Pesticides***											
217	Aldrin	4.0E-08	2.0E-09	--	5.9E-02	4.0E-08	1.1E-04	2.0E-09	5.3E-06	1.0E-04	1.0E-01	na
218	alpha-BHC	1.9E-06	9.8E-08	--	1.6E-01	1.9E-06	1.6E-01	9.8E-08	8.1E-03	1.4E-01	6.0E+00	na
219	beta-BHC	6.6E-05	3.4E-06	--	5.6E-01	6.6E-05	5.4E-01	3.4E-06	2.8E-02	4.7E-01	6.0E+00	na
220	delta-BHC	6.0E+00	6.0E+00	--	na	na	na	na	na	na	6.0E+00	na
221	gamma-BHC	3.9E-03	2.1E-04	--	9.1E-01	3.9E-03	9.2E-01	2.1E-04	4.8E-02	7.8E-01	6.0E+00	na
222	cis-Chlordane	1.0E-04	5.3E-06	--	2.9E+00	3.7E-04	1.1E-04	1.9E-05	5.3E-06	1.0E-04	1.0E+00	na
223	trans-Chlordane	1.0E-04	5.3E-06	--	2.9E+00	3.7E-04	1.1E-04	1.9E-05	5.3E-06	1.0E-04	1.0E+00	na
224	Chlordane	2.3E-05	1.1E-06	X	2.9E+00	2.3E-05	TBD	1.1E-06	TBD	PQL	1.0E+00	na
225	Chlorpyrifos	8.0E+01	8.0E+01	--	8.0E+01	na	na	na	na	1.7E+02	na	na
226	4,4'-DDD	7.3E-06	3.6E-07	--	2.4E+00	7.3E-06	3.8E+00	3.6E-07	1.9E-01	3.6E+00	7.5E-01	na
227	4,4'-DDE	1.5E-06	7.6E-08	--	2.9E+00	1.5E-06	2.6E+00	7.6E-08	1.3E-01	2.5E+00	7.5E-01	na
228	4,4'-DDT	1.6E-05	8.1E-07	--	2.9E+00	1.6E-05	1.1E-04	8.1E-07	5.3E-06	1.0E-04	7.5E-01	na
229	Total DDD	9.2E-04	4.6E-05	--	2.4E+00	9.2E-04	3.8E+00	4.6E-05	1.9E-01	3.6E+00	7.5E-01	na
230	Total DDE	1.7E-03	8.7E-05	--	2.9E+00	1.7E-03	2.6E+00	8.7E-05	1.3E-01	2.5E+00	7.5E-01	na
231	Total DDT	1.4E-02	6.8E-04	X	2.9E+00	1.4E-02	TBD	6.8E-04	TBD	PQL	7.5E-01	na
232	Diazinon	5.6E+01	5.6E+01	--	5.6E+01	na	na	na	na	1.2E+02	na	na
233	Dieldrin	6.2E-07	3.1E-08	--	6.3E-02	6.2E-07	1.1E-04	3.1E-08	5.3E-06	1.0E-04	7.0E-02	na
234	Endosulfan I	3.9E-04	2.0E-05	--	4.8E+02	3.9E-04	1.2E+03	2.0E-05	6.0E+01	1.0E+03	na	na
235	Endosulfan II	3.9E-04	2.0E-05	--	4.8E+02	3.9E-04	1.2E+03	2.0E-05	6.0E+01	1.0E+03	na	na
236	Endosulfan sulfate	4.8E+02	4.8E+02	--	4.8E+02	na	na	na	na	1.0E+03	na	na
237	Endrin	4.4E-04	2.2E-05	--	2.4E+01	4.4E-04	5.4E+01	2.2E-05	2.7E+00	5.1E+01	2.0E-01	na
238	Endrin aldehyde	na	na	--	na	na	na	na	na	na	na	na
239	Endrin ketone	na	na	--	na	na	na	na	na	na	na	na
240	Heptachlor	6.6E-08	3.3E-09	--	2.2E-01	6.6E-08	1.1E-04	3.3E-09	5.4E-06	1.0E-04	4.0E-01	na
241	Heptachlor epoxide	4.0E-06	2.0E-07	X	1.1E-01	4.0E-06	TBD	2.0E-07	TBD	PQL	4.0E-01	na
242	Malathion	1.6E+03	1.6E+03	--	1.6E+03	na	na	na	na	3.4E+03	na	na
243	Methoxychlor	3.2E-02	1.6E-03	--	4.0E+02	3.2E-02	8.9E+02	1.6E-03	4.5E+01	8.4E+02	na	na
244	Mirex	4.7E-02	4.7E-02	--	5.6E-02	na	na	na	na	4.7E-02	na	na
245	Nonachlor	na	na	--	na	na	na	na	na	na	na	na
256	Toxaphene	6.1E-05	3.1E-06	--	9.1E-01	6.1E-05	8.2E-01	3.1E-06	4.1E-02	7.8E-01	na	na

Table C.3. Erodible Bank Soil Screening Level Derivation

FINAL

Project No. 190293, South Park Marina, Seattle, Washington

Condensed from LDW PCUL Workbook - Soil Summary (Ecology, 2019)

Sort Order	Chemical (all concentrations are in mg/kg)	RI Screening Level for Erodible Bank Soil	SL-8 Protect Sediment via Bank Erosion Min. ROD CUL + SMS Lower Tier Sed	SL-10 Natural Background Ecology (1994)
1	***PCBs***			
2	Total PCB Aroclors	1.3E-01	1.3E-01	na
3	Total PCB congeners	2.0E-03	2.0E-03	na
4	Total PCB TEQ	7.0E-07	7.0E-07	na
5	***Dioxins/Furans***			
6	2,3,7,8-TCDD	5.2E-06	7.0E-07	5.2E-06
7	Total dioxin/furan TEQ	5.2E-06	2.0E-06	5.2E-06
8	Total chlorinated dioxins	na	na	na
9	Total chlorinated furans	na	na	na
10	***Metals***			
11	Aluminum	2.2E+05	2.2E+05	3.3E+04
12	Antimony	8.8E+01	8.8E+01	na
13	Arsenic	7.0E+00	7.0E+00	7.0E+00
14	Barium	4.4E+04	4.4E+04	na
15	Beryllium	4.4E+02	4.4E+02	6.0E-01
16	Cadmium	5.1E+00	5.1E+00	3.0E-01
17	Chromium, total	2.6E+02	2.6E+02	4.8E+01
18	Chromium, trivalent	3.3E+05	3.3E+05	na
19	Chromium, hexavalent	6.6E+02	6.6E+02	na
20	Cobalt	6.6E+01	6.6E+01	na
21	Copper	3.9E+02	3.9E+02	3.6E+01
22	Iron	1.5E+05	1.5E+05	3.6E+04
23	Lead	4.5E+02	4.5E+02	2.4E+01
24	Manganese	1.0E+04	1.0E+04	1.1E+03
25	Mercury, inorganic	4.1E-01	4.1E-01	7.0E-02
26	Methylmercury	2.2E+01	2.2E+01	na
27	Molybdenum	1.1E+03	1.1E+03	na
28	Nickel	4.4E+03	4.4E+03	4.8E+01
29	Selenium	1.1E+03	1.1E+03	na
30	Silver	6.1E+00	6.1E+00	na
31	Thallium	2.2E+00	2.2E+00	na
32	Tin	1.3E+05	1.3E+05	na
33	Vanadium	2.0E+03	2.0E+03	na
34	Zinc	4.1E+02	4.1E+02	8.5E+01
35	***Metals - Butyltins***			
36	Monobutyltin	na	na	na
37	Dibutyltin	na	na	na
38	Tributyltin	1.2E-01	1.2E-01	na
39	Tetrabutyltin	na	na	na
40	***SVOCs - PAHs***			
41	Acenaphthene	5.0E-01	5.0E-01	na
42	Acenaphthylene	1.3E+00	1.3E+00	na
43	Anthracene	9.6E-01	9.6E-01	na
44	Benzo(a)anthracene	1.3E+00	1.3E+00	na
45	Benzo(b)fluoranthene	na	na	na
46	Benzo(k)fluoranthene	na	na	na
47	Total benzofluoranthenes	3.2E+00	3.2E+00	na
48	Benzo(g,h,i)perylene	6.7E-01	6.7E-01	na
49	Benzo(a)pyrene	1.6E+00	1.6E+00	na
50	Chrysene	1.4E+00	1.4E+00	na
51	Dibenz(a,h)anthracene	2.3E-01	2.3E-01	na
52	Dibenzofuran	5.4E-01	5.4E-01	na
53	Fluoranthene	1.7E+00	1.7E+00	na
54	Fluorene	5.4E-01	5.4E-01	na
55	Indeno(1,2,3-cd)pyrene	6.0E-01	6.0E-01	na
56	Methyl isopropyl phenanthrene	na	na	na
57	1-Methylnaphthalene	2.9E+01	2.9E+01	na
58	2-Methylnaphthalene	6.7E-01	6.7E-01	na
59	Naphthalene	2.1E+00	2.1E+00	na
60	Phenanthrene	1.5E+00	1.5E+00	na
61	Pyrene	2.6E+00	2.6E+00	na
62	Total LPAHs	5.2E+00	5.2E+00	na
63	Total HPAHs	1.2E+01	1.2E+01	na
64	Total PAHs	na	na	na
65	Total cPAH TEQ	9.0E-02	9.0E-02	na
66	***Other SVOCs***			
67	Aniline	1.5E+02	1.5E+02	na
68	Azobenzene	7.8E+00	7.8E+00	na
69	Benzidine	3.7E-03	3.7E-03	na
70	Benzoic acid	6.5E-01	6.5E-01	na
71	Benzyl alcohol	5.7E-02	5.7E-02	na
72	Bis(2-chloroethoxy)methane	na	na	na
73	Bis(2-chloroethyl)ether	7.8E-01	7.8E-01	na
74	Bis(2-chloro-1-methylethyl)ether	6.8E+03	6.8E+03	na
75	2,6-Bis(1,1-dimethylethyl) phenol	na	na	na
76	Bis(2-ethylhexyl) phthalate	1.3E+00	1.3E+00	na
77	4-Bromophenyl phenyl ether	na	na	na
78	Butyl benzyl phthalate	6.3E-02	6.3E-02	na
79	Butyl diphenyl phosphate	na	na	na
80	Carbazole	na	na	na
81	4-Chloroaniline	4.3E+00	4.3E+00	na
82	4-Chloro-3-methylphenol	na	na	na
83	2-Chloronaphthalene	1.4E+04	1.4E+04	na
84	2-Chlorophenol	8.4E+02	8.4E+02	na
85	4-Chlorophenyl phenyl ether	na	na	na
86	Dibutyl phthalate	1.4E+00	1.4E+00	na
87	Dibutyl phenyl phosphate	0.0E+00	na	na
88	1,2-Dichlorobenzene	3.6E-02	3.6E-02	na

Table C.3. Erodible Bank Soil Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Condensed from LDW PCUL Workbook - Soil Summary (Ecology, 2019)

Sort Order	Chemical (all concentrations are in mg/kg)	RI Screening Level for Erodible Bank Soil	SL-8 Protect Sediment via Bank Erosion Min. ROD CUL + SMS Lower Tier Sed	SL-10 Natural Background Ecology (1994)
89	1,3-Dichlorobenzene	na	na	na
90	1,4-Dichlorobenzene	1.1E-01	1.1E-01	na
91	3,3'-Dichlorobenzidine	1.9E+00	1.9E+00	na
92	2,4-Dichlorophenol	5.1E+02	5.1E+02	na
93	Di(2-ethylhexyl)adipate	7.1E+02	7.1E+02	na
94	Diethyl phthalate	2.0E-01	2.0E-01	na
95	Dimethyl phthalate	7.1E-02	7.1E-02	na
96	2,4-Dimethylphenol	2.9E-02	2.9E-02	na
97	1,2-Dinitrobenzene	1.7E+01	1.7E+01	na
98	1,3-Dinitrobenzene	1.7E+01	1.7E+01	na
99	1,4-Dinitrobenzene	1.7E+01	1.7E+01	na
100	4,6-Dinitro-2-methylphenol	na	na	na
101	2,4-Dinitrophenol	3.4E+02	3.4E+02	na
102	2,4-Dinitrotoluene	2.8E+00	2.8E+00	na
103	2,6-Dinitrotoluene	5.7E-01	5.7E-01	na
104	Di-n-octyl phthalate	6.2E+00	6.2E+00	na
105	1,4-Dioxane	8.5E+00	8.5E+00	na
106	1,2-Diphenylhydrazine	1.1E+00	1.1E+00	na
107	Hexachlorobenzene	2.2E-02	2.2E-02	na
108	Hexachlorobutadiene	1.1E-02	1.1E-02	na
109	Hexachlorocyclopentadiene	1.0E+03	1.0E+03	na
110	Hexachloroethane	2.1E+01	2.1E+01	na
111	Isophorone	9.0E+02	9.0E+02	na
112	2-Methoxynaphthalene	na	na	na
113	2-Methylphenol	6.3E-02	6.3E-02	na
114	3-Methylphenol	8.4E+03	8.4E+03	na
115	4-Methylphenol	6.7E-01	6.7E-01	na
116	2-Nitroaniline	1.7E+03	1.7E+03	na
117	3-Nitroaniline	na	na	na
118	4-Nitroaniline	6.8E+02	6.8E+02	na
119	Nitrobenzene	3.4E+02	3.4E+02	na
120	2-Nitrophenol	na	na	na
121	4-Nitrophenol	na	na	na
122	n-Nitrosodimethylamine	1.7E-02	1.7E-02	na
123	n-Nitrosodiphenylamine	2.8E-02	2.8E-02	na
124	n-Nitrosodi-n-propylamine	1.2E-01	1.2E-01	na
125	Pentachlorophenol	3.6E-01	3.6E-01	na
126	Phenol	4.2E-01	4.2E-01	na
127	Pyridine	1.7E+02	1.7E+02	na
128	2,3,4,6-Tetrachlorophenol	5.1E+03	5.1E+03	na
129	1,2,4-Trichlorobenzene	3.1E-02	3.1E-02	na
130	2,4,5-Trichlorophenol	1.7E+04	1.7E+04	na
131	2,4,6-Trichlorophenol	7.8E+01	7.8E+01	na
132	***Volatile Organic Compounds***			
133	Acetone	na	na	na
134	Acrolein	na	na	na
135	Acrylonitrile	na	na	na
136	Benzaldehyde	na	na	na
137	Benzene	na	na	na
138	Bromobenzene	na	na	na
139	Bromochloromethane	na	na	na
140	Bromoethane	na	na	na
141	Bromoform	na	na	na
142	Bromomethane	na	na	na
143	2-Butoxyethanol	na	na	na
144	n-Butylbenzene	na	na	na
145	sec-Butylbenzene	na	na	na
146	tert-Butylbenzene	na	na	na
147	Carbon disulfide	na	na	na
148	Carbon tetrachloride	na	na	na
149	Chlorobenzene	na	na	na
150	Chloroethane	na	na	na
151	2-Chloroethyl vinyl ether	na	na	na
152	Chloroform	na	na	na
153	Chloromethane	na	na	na
154	3-Chloro-1-propene	na	na	na
155	2-Chlorotoluene	na	na	na
156	4-Chlorotoluene	na	na	na
157	Dibromochloromethane	na	na	na
158	1,2-Dibromo-3-chloropropane	na	na	na
159	Dibromomethane	na	na	na
160	Dichlorobromomethane	na	na	na
161	trans-1,4-Dichloro-2-butene	na	na	na
162	Dichlorodifluoromethane	na	na	na
163	1,1-Dichloroethane	na	na	na
164	1,2-Dichloroethane	na	na	na
165	1,1-Dichloroethylene	na	na	na
166	cis-1,2-Dichloroethylene	na	na	na
167	trans-1,2-Dichloroethylene	na	na	na
168	1,2-Dichloroethylene (mixed isomers)	na	na	na
169	1,2-Dichloropropane	na	na	na
170	1,3-Dichloropropane	na	na	na
171	2,2-Dichloropropane	na	na	na
172	1,1-Dichloropropene	na	na	na
173	cis-1,3-Dichloropropene	na	na	na
174	trans-1,3-Dichloropropene	na	na	na
175	Ethane	na	na	na
176	Ethylbenzene	na	na	na

Table C.3. Erodible Bank Soil Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Condensed from LDW PCUL Workbook - Soil Summary (Ecology, 2019)

Sort Order	Chemical (all concentrations are in mg/kg)	RI Screening Level for Erodible Bank Soil	SL-8 Protect Sediment via Bank Erosion Min. ROD CUL + SMS Lower Tier Sed	SL-10 Natural Background Ecology (1994)
177	Ethylene	na	na	na
178	Ethyl ether	na	na	na
179	Ethylene dibromide	na	na	na
180	Formaldehyde	na	na	na
181	2-Hexanone	na	na	na
182	Isopropylbenzene	na	na	na
183	4-Isopropyltoluene	na	na	na
184	Methane	na	na	na
185	Methyl ethyl ketone	na	na	na
186	Methyl iodide	na	na	na
187	Methyl isobutyl ketone	na	na	na
188	Methyl tert-butyl ether	na	na	na
189	Methylene chloride	na	na	na
190	2-Pentanone	na	na	na
191	n-Propylbenzene	na	na	na
192	Styrene	na	na	na
193	1,1,1,2-Tetrachloroethane	na	na	na
194	1,1,2,2-Tetrachloroethane	na	na	na
195	Tetrachloroethylene	na	na	na
196	Toluene	na	na	na
197	1,2,3-Trichlorobenzene	na	na	na
198	1,1,1-Trichloroethane	na	na	na
199	1,1,2-Trichloroethane	na	na	na
200	Trichloroethylene	na	na	na
201	Trichlorofluoroethane	na	na	na
202	Trichlorofluoromethane	na	na	na
203	1,2,3-Trichloropropane	na	na	na
204	Trichlorotrifluoroethane	na	na	na
205	1,2,3-Trimethylbenzene	na	na	na
206	1,2,4-Trimethylbenzene	na	na	na
207	1,3,5-Trimethylbenzene	na	na	na
208	Vinyl acetate	na	na	na
209	Vinyl chloride	na	na	na
210	Total xylenes	na	na	na
211	***Petroleum Hydrocarbons***			
212	Gasoline range hydrocarbons	na	na	na
213	Diesel range hydrocarbons	na	na	na
214	Oil range hydrocarbons	na	na	na
215	Total diesel & oil range hydrocarbons	na	na	na
216	***Pesticides***			
217	Aldrin	1.0E-04	1.0E-04	na
218	alpha-BHC	1.4E-01	1.4E-01	na
219	beta-BHC	4.7E-01	4.7E-01	na
220	delta-BHC	na	na	na
221	gamma-BHC	7.8E-01	7.8E-01	na
222	cis-Chlordane	1.0E-04	1.0E-04	na
223	trans-Chlordane	1.0E-04	1.0E-04	na
224	Chlordane	PQL	PQL	na
225	Chlorpyrifos	1.7E+02	1.7E+02	na
226	4,4'-DDD	3.6E+00	3.6E+00	na
227	4,4'-DDE	2.5E+00	2.5E+00	na
228	4,4'-DDT	1.0E-04	1.0E-04	na
229	Total DDD	3.6E+00	3.6E+00	na
230	Total DDE	2.5E+00	2.5E+00	na
231	Total DDT	PQL	PQL	na
232	Diazinon	1.2E+02	1.2E+02	na
233	Dieldrin	1.0E-04	1.0E-04	na
234	Endosulfan I	1.0E+03	1.0E+03	na
235	Endosulfan II	1.0E+03	1.0E+03	na
236	Endosulfan sulfate	1.0E+03	1.0E+03	na
237	Endrin	5.1E+01	5.1E+01	na
238	Endrin aldehyde	na	na	na
239	Endrin ketone	na	na	na
240	Heptachlor	1.0E-04	1.0E-04	na
241	Heptachlor epoxide	PQL	PQL	na
242	Malathion	3.4E+03	3.4E+03	na
243	Methoxychlor	8.4E+02	8.4E+02	na
244	Mirex	4.7E-02	4.7E-02	na
245	Nonachlor	na	na	na
256	Toxaphene	7.8E-01	7.8E-01	na

Table C.4. Stormwater Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Reproduced from LDW PCUL Workbook - Groundwater Detail for Protection of Surface Water (Ecology, 2019) with addition of SPM permit benchmarks

Sort Order	Chemical (All concentrations in ug/L)	RI Screening Level for Stormwater	South Park Marina Stormwater Permit Benchmark	WA State WQC Aquatic Life Marine-Chronic WAC 173-201A-240, Table 240	NRWQC Aquatic Life Marine - Chronic CWA Section 304	WA State WQC Human Health Consumption of Organisms WAC 173-201A-240, Table 240	WA Toxics Rule Human Health Consumption of Organisms 40 CFR 131.45	NRWQC Human Health Consumption of Organisms CWA Section 304	Aquatic Life: Literature Values Ecology (2016) Table 5	Most Stringent ARAR (including literature values)	MTCA-B Surface Water Fish Consumption Noncancer Eq. 730-1 GW-Eq	ARAR Evaluation Column J / Column K	Does ARAR need adjustment for noncancer health effects?	Protection of Surface Water Noncancer	MTCA-B Surface Water Fish Consumption Cancer Eq. 730-2 GW-Eq	ARAR Evaluation Column J / Column O	Does ARAR need adjustment for cancer health effects?	Protection of Surface Water Cancer
1	***PCBs***																	
2	Total PCB Aroclors	7.00E-06		3.00E-02	3.00E-02	1.70E-04	7.00E-06	6.40E-05	na	7.00E-06	na	na	na	7.00E-06	2.88E-05	2.43E-01	no	7.00E-06
3	Total PCB congeners	7.00E-06		3.00E-02	3.00E-02	1.70E-04	7.00E-06	6.40E-05	na	7.00E-06	na	na	na	7.00E-06	2.88E-05	2.43E-01	no	7.00E-06
4	Total PCB TEQ	4.43E-09		3.00E-02	3.00E-02	1.70E-04	7.00E-06	6.40E-05	na	7.00E-06	1.61E-08	4.35E+02	YES	1.61E-08	4.43E-10	1.58E+04	YES	4.43E-09
5	***Dioxins/Furans***																	
6	2,3,7,8-TCDD	5.10E-09		na	na	6.40E-08	1.40E-08	5.10E-09	1.20E-05	5.10E-09	1.01E-07	5.07E-02	no	5.10E-09	2.76E-09	1.85E+00	no	5.10E-09
7	Total dioxin/furan TEQ	5.10E-09		na	na	6.40E-08	1.40E-08	5.10E-09	1.20E-05	5.10E-09	1.01E-07	5.07E-02	no	5.10E-09	2.76E-09	1.85E+00	no	5.10E-09
8	Total chlorinated dioxins	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
9	Total chlorinated furans	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
10	***Metals***																	
11	Aluminum	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
12	Antimony	9.00E+01		na	na	1.80E+02	9.00E+01	6.40E+02	na	9.00E+01	2.87E+02	3.13E-01	no	9.00E+01	na	na	na	na
13	Arsenic	1.40E-01		3.60E+01	3.60E+01	1.00E+01	1.40E-01	1.40E-01	na	1.40E-01	4.90E+00	2.86E-02	no	1.40E-01	2.72E-02	5.15E+00	no	1.40E-01
14	Barium	2.00E+02		na	na	na	na	na	2.00E+02	2.00E+02	na	na	na	2.00E+02	na	na	na	na
15	Beryllium	7.56E+01		na	na	na	na	na	na	na	7.56E+01	na	na	7.56E+01	na	na	na	na
16	Cadmium	7.90E+00		9.30E+00	7.90E+00	na	na	na	na	7.90E+00	1.12E+01	7.04E-01	no	7.90E+00	na	na	na	na
17	Chromium, total	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
18	Chromium, trivalent	2.74E+01		na	na	na	na	na	2.74E+01	2.74E+01	6.73E+04	4.07E-04	no	2.74E+01	na	na	na	na
19	Chromium, hexavalent	5.00E+01		5.00E+01	5.00E+01	na	na	na	na	5.00E+01	1.35E+02	3.71E-01	no	5.00E+01	na	na	na	na
20	Cobalt	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
21	Copper	5.00E+01	5.00E+01	3.10E+00	3.10E+00	na	na	na	na	3.10E+00	7.98E+02	3.89E-03	no	3.10E+00	na	na	na	na
22	Iron	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
23	Lead	8.10E+00		8.10E+00	8.10E+00	na	na	na	na	8.10E+00	na	na	na	8.10E+00	na	na	na	na
24	Manganese	1.00E+02		na	na	na	na	1.00E+02	na	1.00E+02	na	na	na	1.00E+02	na	na	na	na
25	Mercury, inorganic	2.50E-02		2.50E-02	9.40E-01	na	na	na	na	2.50E-02	na	na	na	2.50E-02	na	na	na	na
26	Methylmercury	3.00E-02		na	9.40E-01	na	3.00E-02	3.00E-01	na	3.00E-02	na	na	na	3.00E-02	na	na	na	na
27	Molybdenum	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
28	Nickel	8.20E+00		8.20E+00	8.20E+00	1.90E+02	1.00E+02	4.60E+03	na	8.20E+00	3.06E+02	2.68E-02	no	8.20E+00	na	na	na	na
29	Selenium	7.10E+01		7.10E+01	7.10E+01	4.80E+02	2.00E+02	4.20E+03	na	7.10E+01	7.48E+02	9.49E-02	no	7.10E+01	na	na	na	na
30	Silver	1.90E+00		1.90E+00	1.90E+00	na	na	na	na	1.90E+00	7.18E+03	2.65E-04	no	1.90E+00	na	na	na	na
31	Thallium	6.19E-02		na	na	2.70E-01	6.30E+00	4.70E-01	na	2.70E-01	6.19E-02	4.36E+00	YES	6.19E-02	na	na	na	na
32	Tin	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
33	Vanadium	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
34	Zinc	8.50E+01	8.50E+01	8.10E+01	8.10E+01	2.90E+03	1.00E+03	2.60E+04	na	8.10E+01	4.58E+03	1.77E-02	no	8.10E+01	na	na	na	na
35	***Metals - Butyltins***																	
36	Monobutyltin	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
37	Dibutyltin	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
38	Tributyltin	7.40E-03		na	7.40E-03	na	na	na	na	7.40E-03	na	na	na	7.40E-03	na	na	na	na
39	Tetrabutyltin	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
40	***SVOCs - PAHs***																	
41	Acenaphthene	3.00E+01		na	na	1.10E+02	3.00E+01	9.00E+01	na	3.00E+01	1.78E+02	1.69E-01	no	3.00E+01	na	na	na	na
42	Acenaphthylene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
43	Anthracene	1.00E+02		na	na	4.60E+03	1.00E+02	4.00E+02	na	1.00E+02	7.18E+03	1.39E-02	no	1.00E+02	na	na	na	na
44	Benzo(a)anthracene	1.60E-04		na	na	2.10E-02	1.60E-04	1.30E-03	1.20E-02	1.60E-04	na	na	na	1.60E-04	na	na	na	na
45	Benzo(b)fluoranthene	1.60E-04		na	na	2.10E-02	1.60E-04	1.30E-03	1.70E-02	1.60E-04	na	na	na	1.60E-04	na	na	na	na
46	Benzo(k)fluoranthene	1.60E-03		na	na	2.10E-01	1.60E-03	1.30E-02	1.70E-02	1.60E-03	na	na	na	1.60E-03	na	na	na	na
47	Total benzofluoranthenes	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
48	Benzo(g,h,i)perylene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
49	Benzo(a)pyrene	1.60E-05		na	na	2.10E-03	1.60E-05	1.30E-04	2.20E-02	1.60E-05	7.18E+00	2.23E-06	no	1.60E-05	1.19E-02	1.34E-03	no	1.60E-05
50	Chrysene	1.60E-02		na	na	2.10E+00	1.60E-02	1.30E-01	7.00E-02	1.60E-02	na	na	na	1.60E-02	na	na	na	na
51	Dibenz(a,h)anthracene	1.60E-05		na	na	2.10E-03	1.60E-05	1.30E-04	1.40E-03	1.60E-05	na	na	na	1.60E-05	na	na	na	na
52	Dibenzofuran	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
53	Fluoranthene	6.00E+00		na	na	1.60E+01	6.00E+00	2.00E+01	na	6.00E+00	2.50E+01	2.40E-01	no	6.00E+00	na	na	na	na
54	Fluorene	1.00E+01		na	na	6.10E+02	1.00E+01	7.00E+01	na	1.00E+01	9.57E+02	1.04E-02	no	1.00E+01	na	na	na	na
55	Indeno(1,2,3-cd)pyrene	1.60E-04		na	na	2.10E-02	1.60E-04	1.30E-03	2.70E-03	1.60E-04	na	na	na	1.60E-04	na	na	na	na
56	Methyl isopropyl phenanthrene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
57	1-Methylnaphthalene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
58	2-Methylnaphthalene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
59	Naphthalene	1.40E+00		na	na	na	na	na	1.40E+00	1.40E+00	1.37E+03	1.02E-03	no	1.40E+00	na	na	na	na
60	Phenanthrene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
61	Pyrene	8.00E+00		na	na	4.60E+02	8.00E+00	3.00E+01	na	8.00E+00	7.18E+02	1.11E-02	no	8.00E+00	na	na	na	na
62	Total LPAHs	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
63	Total HPAHs	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
64	Total PAHs	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
65	Total cPAH TEQ	1.60E-05		na	na	2.10E-03	1.60E-05	1.30E-04	na	1.60E-05	na	na	na	1.60E-05	1.19E-02	1.34E-03	no	1.60E-05
66	***Other SVOCs***																	
67	Aniline	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
68	Azobenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
69	Benzidine	2.30E-05		na	na	2.30E-05	na	1.10E-02	na	2.30E-05	2.46E+01	9.34E-07	no	2.30E-05	8.92E-05	2.58E-01	no	2.30E-05
70	Benzoic acid	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
71	Benzyl alcohol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
72	Bis(2-chloroethoxy)methane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
73	Bis(2-chloroethyl)ether	6.00E-02		na	na	6.00E-02	na	2.20E+00	na	6.00E-02	na	na	na	6.00E-02	2.36E-01	2.54E-01	no	6.00E-02
74	Bis(2-chloro-1-methylethyl)ether	9.00E+02		na	na	na	9.00E+02	4.00E+03	na	9.00E+02	1.16E+04	7.74E-02	no	9.00E+02	na	na	na	na
75	2,6-Bis(1,1-dimethylethyl) phenol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
76	Bis(2-ethylhexyl) phthalate	4.60E-02		na	na	2.50E-01	4.60E-02	3.70E-01	3.60E+02	4.60E-02	1.10E+02	4.16E-04	no	4.60E-02	9.86E-01	4.66E-02	no	4.60E-02
77	4-Bromophenyl phenyl ether	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
78	Butyl benzyl phthalate	1.30E-02		na	na	5.80E-01	1.30E-02	1.00E-01	3.40E+00	1.30E-02	3.47E+02	3.75E-05	no	1.30E-02	2.28E+00	5.70E-03	no	1.30E-02
79	Butyl diphenyl phosphate	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
80	Carbazole	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
81	4-Chloroaniline	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
82	4-Chloro-3-methylphenol	3.60E+01		na	na	3.60E+01	na	na	na	3.60E+01	na	na	na	3.60E+01	na	na	na	na
83	2-Chloronaphthalene	1.00E+02		na	na	1.80E+02	1.00E+02	1.00E+03	na	1.00E+02	2.84E+02	3.52E-01	no	1.00E+02	na	na	na	na
84	2-Chlorophenol	1.70E+01		na	na	1.70E+01	na	8.00E+02	na	1.70E+01	2.68E+01	6.35E-01	no	1.70E+01	na	na	na	na
85	4-Chlorophenyl phenyl ether	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
86	Dibutyl phthalate	8.00E+00		na	na	5.10E+02	8.00E+00	3.00E+01	na	8.00E+00	8.07E+02	9.92E-03	no	8.00E+00	na	na	na	na
87	Dibutyl phenyl phosphate	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
88	1,2-Dichlorobenzene	8.00E+02		na	na	2.50E+03	8.00E+02	3.00E+03	na	8.00E+02	1.16E+03	6.88E-01	no	8.00E+02	na	na	na	na
89	1,3-Dichlorobenzene	2.00E+00		na	na	1.60E+01	2.00E+00	1.00E+01	na	2.00E+00	na	na	na	2.00E+00	na	na	na	na
90	1,4-Dichlorobenzene	5.98E+01		na	na	5.80E+02	2.00E+02	9.00E+02	na	2.00E+02	9.04E+02	2.21E-01	no	2.00E+02	5.98E+00	3.35E+01	YES	5.98E+01
91	3,3'-Dichlorobenzidine	3.30E-03		na	na	3.30E-03	na	1.50E-01	na	3.30E-03	na	na	na	3.30E-03	1.28E-02	2.58E-01	no	3.30E-03
92	2,4-Dichlorophenol	1.00E+01		na	na	3.40E+01	1.00E+01	6.00E+01	na	1.00E+01	5.29E+01	1.89E-01	no	1.00E+01	na	na	na	na
93	Di(2-ethylhexyl)adipate	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
94	Diethyl phthalate	2.00E+02		na	na	5.00E+03	2.00E+02	6.00E+02	na	2.00E+02	7.87E+03	2.54E-02	no	2.00E+02	na	na	na	na
95	Dimethyl phthalate	6.00E+02		na	na	1.30E+05	6.00E+02	2.00E+03	na	6.00E+02	na	na	na	6.00E+02	na	na	na	na
96	2,4-Dimethylphenol	9.70E+01		na	na	9.70E+01	na	3.00E+03	na	9.70E+01	1.53E+02	6.34E-01	no	9.70E+01	na	na	na	na
97	1,2-Dinitrobenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
98	1,3-Dinitrobenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
99	1,4-Dinitrobenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
100	4,6-Dinitro-2-methylphenol	7.00E+00		na	na	2.50E+01	7.00E+00	3.00E+01	na	7.00E+00	na	na	na	7.00E+00	na	na	na	na
101	2,4-Dinitrophenol	1.00E+02		na	na	6.10E+02	1.00E+02	3.00E+02	na	1.00E+02	9.57E+02	1.04E-01	no	1.00E+02	na	na	na	na
102	2,4-Dinitrotoluene	1.80E-01		na	na	1.80E-01	na	1.70E+00	na	1.80E-01	3.78E+02	4.76E-04	no	1.80E-01	1.52E+00	1.18E-01	no	1.80E-01
103	2,6-Dinitrotoluene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
104	Di-n-octyl phthalate	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
105	1,4-Dioxane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
106	1,2-Diphenylhydrazine	2.00E-02		na	na	2.30E-02	2.00E-02	2.00E-01	na	2.00E-02	na	na	na	2.00E-02	9.01E-02	2.22E-01	no	2.00E-02
107	Hexachlorobenzene	5.00E-06		na	na	5.20E-05	5.00E-06	7.90E-05	na	5.00E-06	6.61E-02	7.56E-05	no	5.00E-06	1.29E-04	3.87E-02	no	5.00E-06
108	Hexachlorobutadiene	1.00E-02		na	na	4.10E+00	1.00E-02	1.00E-02	na	1.00E-02	2.58E+02	3.87E-05	no	1.00E-02	8.28E+00	1.21E-03	no	1.00E-02
109	Hexachlorocyclopentadiene	1.00E+00		na	na	6.30E+02	1.00E+00	4.00E+00	na	1.00E+00	9.93E+02	1.01E-03	no	1.00E+00	na	na	na	na
110	Hexachloroethane	2.00E-02		na	na	1.30E-01	2.00E-02	1.00E-01	na	2.00E-02	5.78E+00	3.46E-03	no	2.00E-02	5.16E-01	3.87E-02	no	2.00E-02
111	Isophorone	1.10E+02		na	na	1.10E+02	na	1.80E+03	na	1.10E+02	3.28E+04	3.36E-03	no	1.10E+02	4.31E+02	2.55E-01	no	1.10E+02
112	2-Methoxynaphthalene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
113	2-Methylphenol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
114	3-Methylphenol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
115	4-Methylphenol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
116	2-Nitroaniline	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
117	3-Nitroaniline	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
118	4-Nitroaniline	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
119	Nitrobenzene	1.00E+02		na	na	3.20E+02	1.00E+02	6.00E+02	na	1.00E+02	4.97E+02	2.01E-01	no	1.00E+02	na	na	na	na
120	2-Nitrophenol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
121	4-Nitrophenol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
122	n-Nitrosodimethylamine	3.40E-01		na	na	3.40E-01	na	3.00E+00	na	3.40E-01	2.21E+02	1.54E-03	no	3.40E-01	1.35E+00	2.51E-01	no	3.40E-01
123	n-Nitrosodiphenylamine	6.90E-01		na	na	6.90E-01	na	6.00E+00	na	6.90E-01	na	na	na	6.90E-01	2.69E+00	2.56E-01	no	6.90E-01
124	n-Nitrosodi-n-propylamine	5.80E-02		na	na	5.80E-02	na	5.10E-01	na	5.80E-02	na	na	na	5.80E-02	2.27E-01	2.56E-01	no	5.80E-02
125	Pentachlorophenol	2.00E-03		7.90E+00	7.90E+00	1.00E-01	2.00E-03	4.00E-02	na	2.00E-03	3.26E+02	6.13E-06	no	2.00E-03	4.08E-01	4.90E-03	no	2.00E-03
126	Phenol	7.00E+04		na	na	2.00E+05	7.00E+04	3.00E+05	na	7.00E+04	1.54E+05	4.55E-01	no	7.00E+04	na	na	na	na
127	Pyridine	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
128	2,3,4,6-Tetrachlorophenol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
129	1,2,4-Trichlorobenzene	3.70E-02		na	na	1.40E-01	3.70E-02	7.60E-02	na	3.70E-02	6.30E+01	5.88E-04	no	3.70E-02	5.43E-01	6.82E-02	no	3.70E-02
130	2,4,5-Trichlorophenol	6.00E+02		na	na	na	na	6.00E+02	na	6.00E+02	na	na	na	6.00E+02	na	na	na	na
131	2,4,6-Trichlorophenol	2.80E-01		na	na	2.80E-01	na	2.80E+00	na	2.80E-01	4.79E+00	5.85E-02	no	2.80E-01	1.09E+00	2.57E-01	no	2.80E-01
132	***Volatile Organic Compounds***																	
133	Acetone	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
134	Acrolein	1.10E+00		na	na	1.10E+00	na	4.00E+02	na	1.10E+00	na	na	na	1.10E+00	na	na	na	na
135	Acrylonitrile	2.80E-02		na	na	2.80E-02	na	7.00E+00	na	2.80E-02	9.57E+02	2.93E-05	no	2.80E-02	1.11E-01	2.53E-01	no	2.80E-02
136	Benzaldehyde	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
137	Benzene	1.60E+00		na	na	1.60E+00	na	1.60E+01	8.00E+01	1.60E+00	5.52E+02	2.90E-03	no	1.60E+00	6.28E+00	2.55E-01	no	1.60E+00
138	Bromobenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
139	Bromochloromethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
140	Bromoethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
141	Bromoform	1.20E+01		na	na	2.70E+01	1.20E+01	1.20E+02	na	1.20E+01	3.83E+03	3.13E-03	no	1.20E+01	6.06E+01	1.98E-01	no	1.20E+01
142	Bromomethane	2.68E+02		na	na	2.40E+03	na	1.00E+04	na	2.40E+03	2.68E+02	8.95E+00	YES	2.68E+02	na	na	na	na
143	2-Butoxyethanol	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
144	n-Butylbenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
145	sec-Butylbenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
146	tert-Butylbenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
147	Carbon disulfide	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
148	Carbon tetrachloride	3.50E-01		na	na	3.50E-01	na	5.00E+00	na	3.50E-01	1.53E+02	2.29E-03	no	3.50E-01	1.36E+00	2.57E-01	no	3.50E-01
149	Chlorobenzene	2.00E+02		na	na	8.90E+02	2.00E+02	8.00E+02	na	2.00E+02	1.39E+03	1.43E-01	no	2.00E+02	na	na	na	na
150	Chloroethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
151	2-Chloroethyl vinyl ether	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
152	Chloroform	1.54E+02		na	na	1.20E+03	6.00E+02	2.00E+03	na	6.00E+02	1.91E+03	3.13E-01	no	6.00E+02	1.54E+01	3.89E+01	YES	1.54E+02
153	Chloromethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
154	3-Chloro-1-propene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
155	2-Chlorotoluene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
156	4-Chlorotoluene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

Table C.4. Stormwater Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Reproduced from LDW PCUL Workbook - Groundwater Detail for Protection of Surface Water (Ecology, 2019) with addition of SPM permit benchmarks

Sort Order	Chemical (All concentrations in ug/L)	RI Screening Level for Stormwater	South Park Marina Stormwater Permit Benchmark	WA State WQC Aquatic Life Marine-Chronic WAC 173-201A-240, Table 240	NRWQC Aquatic Life Marine - Chronic CWA Section 304	WA State WQC Human Health Consumption of Organisms WAC 173-201A-240, Table 240	WA Toxics Rule Human Health Consumption of Organisms 40 CFR 131.45	NRWQC Human Health Consumption of Organisms CWA Section 304	Aquatic Life: Literature Values Ecology (2016) Table 5	Most Stringent ARAR (including literature values)	MTCA-B Surface Water Fish Consumption Noncancer Eq. 730-1 GW-Eq	ARAR Evaluation Column J / Column K	Does ARAR need adjustment for noncancer health effects?	Protection of Surface Water Noncancer	MTCA-B Surface Water Fish Consumption Cancer Eq. 730-2 GW-Eq	ARAR Evaluation Column J / Column O	Does ARAR need adjustment for cancer health effects?	Protection of Surface Water Cancer
157	Dibromochloromethane	2.20E+00		na	na	3.00E+00	2.20E+00	2.10E+01	na	2.20E+00	3.83E+03	5.75E-04	no	2.20E+00	5.70E+00	3.86E-01	no	2.20E+00
158	1,2-Dibromo-3-chloropropane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
159	Dibromomethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
160	Dichlorobromomethane	2.80E+00		na	na	3.60E+00	2.80E+00	2.70E+01	na	2.80E+00	3.83E+03	7.31E-04	no	2.80E+00	7.72E+00	3.63E-01	no	2.80E+00
161	trans-1,4-Dichloro-2-butene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
162	Dichlorodifluoromethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
163	1,1-Dichloroethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
164	1,2-Dichloroethane	7.30E+01		na	na	1.20E+02	7.30E+01	6.50E+02	na	7.30E+01	3.59E+03	2.03E-02	no	7.30E+01	1.64E+01	4.44E+00	no	7.30E+01
165	1,1-Dichloroethylene	4.00E+03		na	na	4.10E+03	4.00E+03	2.00E+04	na	4.00E+03	6.41E+03	6.24E-01	no	4.00E+03	na	na	na	na
166	cis-1,2-Dichloroethylene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
167	trans-1,2-Dichloroethylene	1.00E+03		na	na	5.80E+03	1.00E+03	4.00E+03	na	1.00E+03	9.09E+03	1.10E-01	no	1.00E+03	na	na	na	na
168	1,2-Dichloroethylene (mixed isomers	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
169	1,2-Dichloropropane	3.10E+00		na	na	3.10E+00	na	3.10E+01	na	3.10E+00	6.99E+03	4.44E-04	no	3.10E+00	1.18E+01	2.63E-01	no	3.10E+00
170	1,3-Dichloropropane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
171	2,2-Dichloropropane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
172	1,1-Dichloropropene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
173	cis-1,3-Dichloropropene	2.00E+00		na	na	2.00E+00	na	1.20E+01	na	2.00E+00	1.13E+04	1.77E-04	no	2.00E+00	9.40E+00	2.13E-01	no	2.00E+00
174	trans-1,3-Dichloropropene	2.00E+00		na	na	2.00E+00	na	1.20E+01	na	2.00E+00	1.13E+04	1.77E-04	no	2.00E+00	9.40E+00	2.13E-01	no	2.00E+00
175	Ethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
176	Ethylbenzene	3.10E+01		na	na	2.70E+02	3.10E+01	1.30E+02	na	3.10E+01	1.91E+03	1.62E-02	no	3.10E+01	na	na	na	na
177	Ethylene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
178	Ethyl ether	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
179	Ethylene dibromide	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
180	Formaldehyde	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
181	2-Hexanone	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
182	Isopropylbenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
183	4-Isopropyltoluene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
184	Methane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
185	Methyl ethyl ketone	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
186	Methyl iodide	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
187	Methyl isobutyl ketone	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
188	Methyl tert-butyl ether	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
189	Methylene chloride	1.00E+02		na	na	2.50E+02	1.00E+02	1.00E+03	na	1.00E+02	4.79E+03	2.09E-02	no	1.00E+02	9.97E+02	1.00E-01	no	1.00E+02
190	2-Pentanone	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
191	n-Propylbenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
192	Styrene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
193	1,1,1,2-Tetrachloroethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
194	1,1,2,2-Tetrachloroethane	3.00E-01		na	na	4.60E-01	3.00E-01	3.00E+00	na	3.00E-01	2.87E+03	1.04E-04	no	3.00E-01	1.79E+00	1.67E-01	no	3.00E-01
195	Tetrachloroethylene	2.90E+00		na	na	7.10E+00	2.90E+00	2.90E+01	na	2.90E+00	1.39E+02	2.09E-02	no	2.90E+00	2.76E+01	1.05E-01	no	2.90E+00
196	Toluene	1.30E+02		na	na	4.10E+02	1.30E+02	5.20E+02	na	1.30E+02	5.37E+03	2.42E-02	no	1.30E+02	na	na	na	na
197	1,2,3-Trichlorobenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
198	1,1,1-Trichloroethane	5.00E+04		na	na	1.60E+05	5.00E+04	2.00E+05	na	5.00E+04	2.56E+05	1.95E-01	no	5.00E+04	na	na	na	na
199	1,1,2-Trichloroethane	9.00E-01		na	na	1.80E+00	9.00E-01	8.90E+00	na	9.00E-01	6.38E+02	1.41E-03	no	9.00E-01	7.00E+00	1.29E-01	no	9.00E-01
200	Trichloroethylene	7.00E-01		na	na	8.60E-01	7.00E-01	7.00E+00	1.94E+02	7.00E-01	1.20E+02	5.83E-03	no	7.00E-01	1.30E+01	5.38E-02	no	7.00E-01
201	Trichlorofluoroethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
202	Trichlorofluoromethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
203	1,2,3-Trichloropropane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
204	Trichlorotrifluoroethane	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
205	1,2,3-Trimethylbenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
206	1,2,4-Trimethylbenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
207	1,3,5-Trimethylbenzene	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
208	Vinyl acetate	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
209	Vinyl chloride	1.80E-01		na	na	2.60E-01	1.80E-01	1.60E+00	2.10E+02	1.80E-01	1.84E+03	9.78E-05	no	1.80E-01	1.02E+00	1.76E-01	no	1.80E-01
210	Total xylenes	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
211	***Petroleum Hydrocarbons***																	
212	Gasoline range hydrocarbons	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
213	Diesel range hydrocarbons	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
214	Oil range hydrocarbons	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
215	Total diesel & oil range hydrocarbon	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
216	***Pesticides***																	
217	Aldrin	4.10E-08		1.90E-03	1.30E+00	5.80E-06	4.10E-08	7.70E-07	na	4.10E-08	4.61E-03	8.89E-06	no	4.10E-08	2.26E-05	1.81E-03	no	4.10E-08
218	alpha-BHC	4.80E-05		na	na	5.60E-04	4.80E-05	3.90E-04	na	4.80E-05	4.42E+01	1.09E-06	no	4.80E-05	2.19E-03	2.19E-02	no	4.80E-05
219	beta-BHC	1.40E-03		na	na	2.00E-03	1.40E-03	1.40E-02	na	1.40E-03	na	na	na	1.40E-03	7.67E-03	1.83E-01	no	1.40E-03
220	delta-BHC	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
221	gamma-BHC	1.26E-01		1.60E-01	1.60E-01	1.70E+01	4.30E-01	4.40E+00	na	1.60E-01	1.66E+00	9.66E-02	no	1.60E-01	1.26E-02	1.27E+01	YES	1.26E-01
222	cis-Chlordane	3.64E-04		na	na	na	na	na	na	na	2.55E-02	na	na	2.55E-02	3.64E-04	na	na	3.64E-04
223	trans-Chlordane	3.64E-04		na	na	na	na	na	na	na	2.55E-02	na	na	2.55E-02	3.64E-04	na	na	3.64E-04
224	Chlordane	2.20E-05		4.00E-03	4.00E-03	9.30E-05	2.20E-05	3.20E-04	na	2.20E-05	2.55E-02	8.64E-04	no	2.20E-05	3.64E-04	6.05E-02	no	2.20E-05
225	Chlorpyrifos	5.60E-03		5.60E-03	5.60E-03	na	na	na	na	5.60E-03	na	na	na	5.60E-03	na	na	na	na
226	4,4'-DDD	7.90E-06		1.00E-03	na	3.60E-05	7.90E-06	1.20E-04	na	7.90E-06	4.02E-04	1.97E-02	no	7.90E-06	1.40E-04	5.66E-02	no	7.90E-06
227	4,4'-DDE	8.80E-07		1.00E-03	na	5.10E-05	8.80E-07	1.80E-05	na	8.80E-07	4.02E-03	2.19E-04	no	8.80E-07	9.85E-05	8.93E-03	no	8.80E-07
228	4,4'-DDT	1.20E-06		1.00E-03	1.00E-03	2.50E-05	1.20E-06	3.00E-05	na	1.20E-06	6.70E-03	1.79E-04	no	1.20E-06	9.85E-05	1.22E-02	no	1.20E-06
229	Total DDD	1.00E-03		1.00E-03	na	na	na	na	na	1.00E-03	na	na	na	1.00E-03	na	na	na	na
230	Total DDE	1.00E-03		1.00E-03	na	na	na	na	na	1.00E-03	na	na	na	1.00E-03	na	na	na	na
231	Total DDT	1.00E-03		1.00E-03	na	na	na	na	na	1.00E-03	na	na	na	1.00E-03	na	na	na	na
232	Diazinon	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
233	Dieldrin	1.20E-06		1.90E-03	1.90E-03	6.10E-06	na	1.20E-06	na	1.20E-06	7.69E-03	1.56E-04	no	1.20E-06	2.40E-05	5.00E-02	no	1.20E-06
234	Endosulfan I	8.70E-03		8.70E-03	8.70E-03	na	7.00E+00	3.00E+01	na	8.70E-03	1.60E+01	5.45E-04	no	8.70E-03	na	na	na	na
235	Endosulfan II	8.70E-03		8.70E-03	8.70E-03	1.00E+01	na	4.00E+01	na	8.70E-03	1.60E+01	5.45E-04	no	8.70E-03	na	na	na	na
236	Endosulfan sulfate	1.00E+01		na	na	1.00E+01	na	4.00E+01	na	1.00E+01	na	na	na	1.00E+01	na	na	na	na
237	Endrin	2.00E-03		2.30E-03	2.30E-03	3.50E-02	2.00E-03	3.00E-02	na	2.00E-03	5.43E-02	3.69E-02	no	2.00E-03	na	na	na	na
238	Endrin aldehyde	3.50E-02		na	na	3.50E-02	na	1.00E+00	na	3.50E-02	na	na	na	3.50E-02	na	na	na	na
239	Endrin ketone	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
240	Heptachlor	3.40E-07		3.60E-03	3.60E-03	1.00E-05	3.40E-07	5.90E-06	na	3.40E-07	3.21E-02	1.06E-05	no	3.40E-07	3.56E-05	9.55E-03	no	3.40E-07
241	Heptachlor epoxide	2.40E-06		na	3.60E-03	7.40E-06	2.40E-06	3.20E-05	na	2.40E-06	8.33E-04	2.88E-03	no	2.40E-06	1.76E-05	1.36E-01	no	2.40E-06
242	Malathion	1.00E-01		na	1.00E-01	na	na	na	na	1.00E-01	na	na	na	1.00E-01	na	na	na	na
243	Methoxychlor	2.00E-02		na	3.00E-02	na	na	2.00E-02	na	2.00E-02	2.32E+00	8.64E-03	no	2.00E-02	na	na	na	na
244	Mirex	1.00E-03		na	1.00E-03	na	na	na	na	1.00E-03	na	na	na	1.00E-03	na	na	na	na
245	Nonachlor	na		na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
256	Toxaphene	3.20E-05		2.00E-04	2.00E-04	3.20E-05	na	7.10E-04	na	3.20E-05	4.93E-03	6.49E-03	no	3.20E-05	1.25E-04	2.57E-01	no	3.20E-05

Table C.5. Catch Basin Solids Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Condensed from LDW PCUL Workbook - Target Sediment Concentrations

Sort Order	Chemical (All concentrations are in mg/kg DW, except as noted)	RI Screening Level for Catch Basin Solids	SMS Upper Tier 2nd LAET Marine Benthic SCUM II Table 8-1
1	***PCBs***		
2	Total PCB Aroclors	1.00E+00	1.00E+00
3	Total PCB congeners	1.00E+00	1.00E+00
4	Total PCB TEQ	na	na
5	***Dioxins/Furans***		
6	2,3,7,8-TCDD	na	na
7	Total dioxin/furan TEQ	na	na
8	Total chlorinated dioxins	na	na
9	Total chlorinated furans	na	na
10	***Metals***		
11	Aluminum	na	na
12	Antimony	na	na
13	Arsenic	9.30E+01	9.30E+01
14	Barium	na	na
15	Beryllium	na	na
16	Cadmium	6.70E+00	6.70E+00
17	Chromium, total	2.70E+02	2.70E+02
18	Chromium, trivalent	na	na
19	Chromium, hexavalent	na	na
20	Cobalt	na	na
21	Copper	3.90E+02	3.90E+02
22	Iron	na	na
23	Lead	5.30E+02	5.30E+02
24	Manganese	na	na
25	Mercury, inorganic	5.90E-01	5.90E-01
26	Methylmercury	na	na
27	Molybdenum	na	na
28	Nickel	na	na
29	Selenium	na	na
30	Silver	6.10E+00	6.10E+00
31	Thallium	na	na
32	Tin	na	na
33	Vanadium	na	na
34	Zinc	9.60E+02	9.60E+02
35	***Metals - Butyltins***		
36	Monobutyltin	na	na
37	Dibutyltin	na	na
38	Tributyltin	na	na
39	Tetrabutyltin	na	na
40	***SVOCs - PAHs***		
41	Acenaphthene	5.00E-01	5.00E-01
42	Acenaphthylene	1.30E+00	1.30E+00
43	Anthracene	9.60E-01	9.60E-01
44	Benzo(a)anthracene	1.60E+00	1.60E+00
45	Benzo(b)fluoranthene	na	na
46	Benzo(k)fluoranthene	na	na
47	Total benzofluoranthenes	3.60E+00	3.60E+00
48	Benzo(g,h,i)perylene	7.20E-01	7.20E-01
49	Benzo(a)pyrene	1.60E+00	1.60E+00
50	Chrysene	2.80E+00	2.80E+00
51	Dibenz(a,h)anthracene	2.30E-01	2.30E-01
52	Dibenzofuran	5.40E-01	5.40E-01
53	Fluoranthene	2.50E+00	2.50E+00
54	Fluorene	5.40E-01	5.40E-01
55	Indeno(1,2,3-cd)pyrene	6.90E-01	6.90E-01
56	Methyl isopropyl phenanthrene	na	na
57	1-Methylnaphthalene	na	na
58	2-Methylnaphthalene	6.70E-01	6.70E-01
59	Naphthalene	2.10E+00	2.10E+00
60	Phenanthrene	1.50E+00	1.50E+00
61	Pyrene	3.30E+00	3.30E+00
62	Total LPAHs	5.20E+00	5.20E+00
63	Total HPAHs	1.70E+01	1.70E+01
64	Total PAHs	na	na
65	Total cPAH TEQ	na	na

Table C.5. Catch Basin Solids Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Condensed from LDW PCUL Workbook - Target Sediment Concentrations

Sort Order	Chemical (All concentrations are in mg/kg DW, except as noted)	RI Screening Level for Catch Basin Solids	SMS Upper Tier 2nd LAET Marine Benthic SCUM II Table 8-1
66	***Other SVOCs***		
67	Aniline	na	na
68	Azobenzene	na	na
69	Benzidine	na	na
70	Benzoic acid	6.50E-01	6.50E-01
71	Benzyl alcohol	7.30E-02	7.30E-02
72	Bis(2-chloroethoxy)methane	na	na
73	Bis(2-chloroethyl)ether	na	na
74	Bis(2-chloro-1-methylethyl)ether	na	na
75	2,6-Bis(1,1-dimethylethyl) phenol	na	na
76	Bis(2-ethylhexyl) phthalate	1.90E+00	1.90E+00
77	4-Bromophenyl phenyl ether	na	na
78	Butyl benzyl phthalate	9.00E-01	9.00E-01
79	Butyl diphenyl phosphate	na	na
80	Carbazole	na	na
81	4-Chloroaniline	na	na
82	4-Chloro-3-methylphenol	na	na
83	2-Chloronaphthalene	na	na
84	2-Chlorophenol	na	na
85	4-Chlorophenyl phenyl ether	na	na
86	Dibutyl phthalate	1.40E+00	1.40E+00
87	Dibutyl phenyl phosphate	na	na
88	1,2-Dichlorobenzene	5.00E-02	5.00E-02
89	1,3-Dichlorobenzene	na	na
90	1,4-Dichlorobenzene	1.10E-01	1.10E-01
91	3,3'-Dichlorobenzidine	na	na
92	2,4-Dichlorophenol	na	na
93	Di(2-ethylhexyl)adipate	na	na
94	Diethyl phthalate	1.20E+00	1.20E+00
95	Dimethyl phthalate	1.60E-01	1.60E-01
96	2,4-Dimethylphenol	2.90E-02	2.90E-02
97	1,2-Dinitrobenzene	na	na
98	1,3-Dinitrobenzene	na	na
99	1,4-Dinitrobenzene	na	na
100	4,6-Dinitro-2-methylphenol	na	na
101	2,4-Dinitrophenol	na	na
102	2,4-Dinitrotoluene	na	na
103	2,6-Dinitrotoluene	na	na
104	Di-n-octyl phthalate	6.20E+00	6.20E+00
105	1,4-Dioxane	na	na
106	1,2-Diphenylhydrazine	na	na
107	Hexachlorobenzene	7.00E-02	7.00E-02
108	Hexachlorobutadiene	1.20E-01	1.20E-01
109	Hexachlorocyclopentadiene	na	na
110	Hexachloroethane	na	na
111	Isophorone	na	na
112	2-Methoxynaphthalene	na	na
113	2-Methylphenol	6.30E-02	6.30E-02
114	3-Methylphenol	na	na
115	4-Methylphenol	6.70E-01	6.70E-01
116	2-Nitroaniline	na	na
117	3-Nitroaniline	na	na
118	4-Nitroaniline	na	na
119	Nitrobenzene	na	na
120	2-Nitrophenol	na	na
121	4-Nitrophenol	na	na
122	n-Nitrosodimethylamine	na	na
123	n-Nitrosodiphenylamine	4.00E-02	4.00E-02
124	n-Nitrosodi-n-propylamine	na	na
125	Pentachlorophenol	6.90E-01	6.90E-01
126	Phenol	1.20E+00	1.20E+00
127	Pyridine	na	na
128	2,3,4,6-Tetrachlorophenol	na	na
129	1,2,4-Trichlorobenzene	5.10E-02	5.10E-02
130	2,4,5-Trichlorophenol	na	na
131	2,4,6-Trichlorophenol	na	na

Table C.5. Catch Basin Solids Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Condensed from LDW PCUL Workbook - Target Sediment Concentrations

Sort Order	Chemical (All concentrations are in mg/kg DW, except as noted)	RI Screening Level for Catch Basin Solids	SMS Upper Tier 2nd LAET Marine Benthic SCUM II Table 8-1
132	***Volatile Organic Compounds***		
133	Acetone	na	na
134	Acrolein	na	na
135	Acrylonitrile	na	na
136	Benzaldehyde	na	na
137	Benzene	na	na
138	Bromobenzene	na	na
139	Bromochloromethane	na	na
140	Bromoethane	na	na
141	Bromoform	na	na
142	Bromomethane	na	na
143	2-Butoxyethanol	na	na
144	n-Butylbenzene	na	na
145	sec-Butylbenzene	na	na
146	tert-Butylbenzene	na	na
147	Carbon disulfide	na	na
148	Carbon tetrachloride	na	na
149	Chlorobenzene	na	na
150	Chloroethane	na	na
151	2-Chloroethyl vinyl ether	na	na
152	Chloroform	na	na
153	Chloromethane	na	na
154	3-Chloro-1-propene	na	na
155	2-Chlorotoluene	na	na
156	4-Chlorotoluene	na	na
157	Dibromochloromethane	na	na
158	1,2-Dibromo-3-chloropropane	na	na
159	Dibromomethane	na	na
160	Dichlorobromomethane	na	na
161	trans-1,4-Dichloro-2-butene	na	na
162	Dichlorodifluoromethane	na	na
163	1,1-Dichloroethane	na	na
164	1,2-Dichloroethane	na	na
165	1,1-Dichloroethylene	na	na
166	cis-1,2-Dichloroethylene	na	na
167	trans-1,2-Dichloroethylene	na	na
168	1,2-Dichloroethylene (mixed isomers)	na	na
169	1,2-Dichloropropane	na	na
170	1,3-Dichloropropane	na	na
171	2,2-Dichloropropane	na	na
172	1,1-Dichloropropene	na	na
173	cis-1,3-Dichloropropene	na	na
174	trans-1,3-Dichloropropene	na	na
175	Ethane	na	na
176	Ethylbenzene	na	na
177	Ethylene	na	na
178	Ethyl ether	na	na
179	Ethylene dibromide	na	na
180	Formaldehyde	na	na
181	2-Hexanone	na	na
182	Isopropylbenzene	na	na
183	4-Isopropyltoluene	na	na
184	Methane	na	na
185	Methyl ethyl ketone	na	na
186	Methyl iodide	na	na
187	Methyl isobutyl ketone	na	na
188	Methyl tert-butyl ether	na	na
189	Methylene chloride	na	na
190	2-Pentanone	na	na
191	n-Propylbenzene	na	na
192	Styrene	na	na
193	1,1,1,2-Tetrachloroethane	na	na
194	1,1,2,2-Tetrachloroethane	na	na
195	Tetrachloroethylene	na	na
196	Toluene	na	na
197	1,2,3-Trichlorobenzene	na	na
198	1,1,1-Trichloroethane	na	na
199	1,1,2-Trichloroethane	na	na
200	Trichloroethylene	na	na
201	Trichlorofluoroethane	na	na
202	Trichlorofluoromethane	na	na
203	1,2,3-Trichloropropane	na	na
204	Trichlorotrifluoroethane	na	na
205	1,2,3-Trimethylbenzene	na	na
206	1,2,4-Trimethylbenzene	na	na
207	1,3,5-Trimethylbenzene	na	na
208	Vinyl acetate	na	na
209	Vinyl chloride	na	na
210	Total xylenes	na	na

Table C.5. Catch Basin Solids Screening Level Derivation

Project No. 190293, South Park Marina, Seattle, Washington

Condensed from LDW PCUL Workbook - Target Sediment Concentrations

Sort Order	Chemical (All concentrations are in mg/kg DW, except as noted)	RI Screening Level for Catch Basin Solids	SMS Upper Tier 2nd LAET Marine Benthic SCUM II Table 8-1
211	***Petroleum Hydrocarbons***		
212	Gasoline range hydrocarbons	na	na
213	Diesel range hydrocarbons	na	na
214	Oil range hydrocarbons	na	na
215	Total diesel & oil range hydrocarbons	na	na
216	***Pesticides***		
217	Aldrin	na	na
218	alpha-BHC	na	na
219	beta-BHC	na	na
220	delta-BHC	na	na
221	gamma-BHC	na	na
222	cis-Chlordane	na	na
223	trans-Chlordane	na	na
224	Chlordane	na	na
225	Chlorpyrifos	na	na
226	4,4'-DDD	na	na
227	4,4'-DDE	na	na
228	4,4'-DDT	na	na
229	Total DDD	na	na
230	Total DDE	na	na
231	Total DDT	na	na
232	Diazinon	na	na
233	Dieldrin	na	na
234	Endosulfan I	na	na
235	Endosulfan II	na	na
236	Endosulfan sulfate	na	na
237	Endrin	na	na
238	Endrin aldehyde	na	na
239	Endrin ketone	na	na
240	Heptachlor	na	na
241	Heptachlor epoxide	na	na
242	Malathion	na	na
243	Methoxychlor	na	na
244	Mirex	na	na
245	Nonachlor	na	na
256	Toxaphene	na	na

APPENDIX D

Historical Site Data Evaluation Results

D. Historical Site Data Evaluation Results

As presented in Section 5.1 and on Figure 5.1 of the RI Work Plan, a breadth of data has been collected through previous investigations and cleanup actions at and near the SPM Property. As presented in Section 6 of the RI Work Plan, the purpose for screening and evaluating existing historical data is to identify parameters requiring further evaluation and to identify data gaps to be addressed in the RI. The RI data evaluation process included the following steps:

- Tabulating all analytical data by media and organized by parameter category.
- Identifying the amount, type, and category of parameters detected above laboratory reporting limits.
- Identifying how many parameters had detected concentrations exceeding their respective RI screening level.
- Determining the frequency of RI screening level exceedances for each parameter and the exceedance ratio.
- Mapping the occurrence of select chemicals across the site for each media.

The Lower Duwamish Waterway (LDW) Preliminary Cleanup Levels (PCULs) derived by the Washington State Department of Ecology (Ecology) for the protection of the LDW are sometimes at levels that are below the practical quantification limits (PQLs) of laboratories. Additional LDW PCULs are below background concentrations for the area. As such, this existing data evaluation also includes a discussion of which laboratory reporting limits exceed the LDW PCULs. As discussed in Section 4 of the RI Work Plan, RI screening levels will be adjusted in the RI to account for PQLs and background concentrations.

The following is a summary of the evaluation of existing Site data, presented by media and identification of parameters exceeding RI screening levels.

D.1. Soil Data

For evaluation purposes, the soil data are separated into two depth classifications, vadose and saturated, based on the depth at which the sample was collected in relation to observed groundwater at the time of drilling (if available). In general, samples classified as vadose zone were collected within 8 feet of ground surface, while saturated zone samples were collected below the water table at depths generally greater than 8 feet below ground surface. The depth classification was conducted using subsurface condition data presented on boring logs from the SAIC investigation (2008a), presented in Appendix B. No report or boring logs were prepared for the Farallon investigation.

Table 6.1 in the RI Work Plan presents the summary statistics for vadose zone soil samples, and Table 6.2 presents the summary statistics for saturated zone soil samples. The fully tabulated historical vadose zone soil dataset is presented in Appendix Tables D.1 (all parameters excluding PCBs) and D.2 (PCBs only), while the saturated zone soil dataset is presented in Tables D.3 (all parameters excluding PCBs) and D.4 (PCBs only).

D.1.1. Vadose Zone Soil Data

There were 57 vadose soil samples in the existing dataset; however, not every sample was analyzed for every parameter. As presented in Table 6.1, vadose soil samples were analyzed for 140 parameters including several calculated total values that have RI screening levels. Of those parameters, 73 were detected in samples at concentrations above the laboratory reporting limit. The detected parameters included metals, a suite of volatile organic compounds (VOCs), diesel- and oil-range total petroleum hydrocarbons (TPH), pentachlorophenol, several polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCB) Aroclors 1254 and 1260, PCB congeners, dioxin-like PCBs, several pesticides/herbicides, and conventional soil analytics.

Of the 73 parameters detected, 37 were detected at concentrations above their respective RI screening levels, including:

- Metals – arsenic, cadmium, total chromium, copper, lead, mercury, and zinc
- TPH – diesel- and oil-range
- VOCs – benzene, toluene, ethylbenzene, 1,2-dichlorobenzene, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride
- Semivolatile organic compounds (SVOCs) – pentachlorophenol
- PAHs – 2-methylnaphthalene, benzo(a)anthracene, chrysene, and naphthalene
- PCBs – Total PCBs (sum of Aroclors) and Total PCB congeners
- Pesticides/herbicides – 4,4’-DDD, 4,4’DDT, and aldrin

The frequency of RI screening level exceedances ranged from 16.7 percent up to 100 percent. The parameters that exceeded RI screening levels in all samples are vinyl chloride, total PCB congeners, and total dioxin-like PCBs. The ratio of the maximum exceedance to the RI screening level used to evaluate the magnitude of the exceedances, where a ratio of 1 indicates the maximum exceedance was at the RI screening level and ratio of 10 indicates the exceedance was 10 times higher. The minimum exceedance ratio was 1.2 for fluorene, and the maximum exceedance ratio was for aldrin at 87 million. The frequency of exceedances and exceedance ratios for all parameters are summarized in Table 6.1.

Forty-eight (48) parameters had reporting limits that exceeded their respective RI screening levels in some samples. These included gasoline-range TPH, several VOCs, most SVOCs, select PCB Aroclors, and most of the pesticides/herbicides. Some of these parameters were non-detect in each sample that it was analyzed. The relevance of RI screening levels below laboratory reporting limits will be further evaluated in the RI.

D.1.2. Saturated Zone Soil

There were 23 saturated soil samples in the existing dataset; however, not every sample was analyzed for every parameter. As presented on Table 6.2, saturated soil samples were analyzed for 192 parameters including several calculated total values with RI screening levels, but only 76 of the parameters were detected in any samples at concentrations above the laboratory reporting limit. The detected parameters included metals; a suite of VOCs; gasoline-, diesel- and oil-range TPH; several SVOCs; PAHs; PCB Aroclors 1242, 1254 and 1260; PCB congeners; several pesticides/herbicides; and conventional soil analytics.

Of the 76 parameters detected in more than one sample, 48 parameters were detected at concentrations above their respective RI screening levels, including:

- Metals – arsenic, barium, cadmium, total chromium, copper, lead, mercury, silver, and zinc
- TPH – gasoline-, diesel- and oil-range
- VOCs – PCE and vinyl chloride
- SVOC – bis(2-ethylhexyl)phthalate and pentachlorophenol
- PAHs – 2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene
- PCBs – Total PCB Aroclors and total PCB congeners
- Pesticides/herbicides – 4,4’-DDD, 4,4’DDE, 4,4’DDT, aldrin, dieldrin, and heptachlor

The frequency of RI screening level exceedance ranged from 6.67 percent up to 100 percent. The parameters that exceeded RI screening levels in all samples were barium and total PCB congeners; however, these parameters were only analyzed in one to two soil samples collected. The minimum exceedance ratio was 1.11 for dibenzofuran, while the maximum exceedance ratio was for aldrin was more than 4 billion. The frequency of exceedances and exceedance ratios for all parameters are summarized in Table 6.2.

Eighty-eight (88) parameters had reporting limits that exceeded their respective RI screening levels in some samples. These included select metals, several VOCs, most SVOCs, most PAHs, select PCB Aroclors, and most of the pesticides/herbicides. Some of these parameters were non-detect in each sample that it was analyzed. The relevance of RI screening levels below laboratory reporting limits will be further evaluated in the RI.

D.1.3. Groundwater Data

Groundwater investigations at the SPM Property to date were limited. Three monitoring wells were sampled on two occasions in 2007 and 2008 (SAIC, 2008a) and two grab groundwater samples from soil borings were collected in 2011 by Farallon (Farallon, 2011). A statistical summary of groundwater data is presented in Table 6.3, and the full tabulation of the dataset is presented in Appendix Tables D.5 and D.6.

Groundwater samples were analyzed for a total of 155 parameters, including several calculated total values with RI screening levels. Of those parameters, 26 were detected in samples at concentrations above the laboratory reporting limit. The detected parameters included total and dissolved metals, several VOCs, several SVOCs, PCB Aroclor 1254 and total PCB Aroclors, and several pesticides/herbicides.

Of the 26 parameters detected, nine parameters were detected at concentrations above their respective RI screening levels, including:

- Metals – arsenic and copper (total and dissolved)
- Total PCB Aroclors
- Pesticides/herbicides – 4,4'DDT, aldrin, dieldrin, trans-chlordane

The frequency of RI screening level exceedances ranged from 12.5 percent up to 83.3 percent. The parameter that exceeded RI screening levels in 83.3 percent of samples was total copper. Dissolved copper had a frequency of exceedances at 66.7 percent. The minimum exceedance ratio was 1.01 for arsenic (total and dissolved), while the maximum exceedance ratio was for aldrin more than 200,000. The frequency of exceedances and exceedance ratios for all parameters are summarized in Table 6.3.

Thirty-seven (37) parameters had reporting limits that exceeded their respective RI screening levels in some samples. These included select metals (dissolved and total), a few VOCs, several SVOCs, several PAHs, and most of the pesticides/herbicides. Some of these parameters were non-detect in each sample that it was analyzed for. The relevance of RI screening levels below laboratory reporting limits will be further evaluated in the RI.

D.1.4. Stormwater Data

A total of eight stormwater samples were collected from a total of seven locations (catch basins CB-02 and CB-06 and roof drains SRC-01 through SRC-05) for analysis between 2017 and 2018, but each sampling event targeted only select parameters. A statistical summary of stormwater data is presented in Table 6.4 and the full tabulation of the dataset is presented in Appendix Tables D.7 and D.8.

Stormwater samples were analyzed for a total of 105 parameters including calculated total values that have RI screening levels. Seventeen (17) of the parameters were detected in samples at concentrations above the laboratory reporting limit. The detected parameters included total metals, one SVOC, two PAHs, and total PCB congeners. Additional data reported included water quality parameters alkalinity, hardness, total dissolved solids, total suspended solids, and total organic carbon.

Of the 17 parameters detected, seven parameters were detected at concentrations above their respective RI screening levels, including:

- Metals – arsenic, copper, and zinc (total)
- SVOCs – bis(2-ethylhexyl)phthalate

- PAHs – benzo(b)fluoranthene and chrysene
- Total PCB congeners

The frequency of RI screening level exceedances ranged from 33.3 percent up to 100 percent. The parameters that exceeded RI screening levels in all of the samples were total zinc and bis(2-ethylhexyl)phthalate. The minimum exceedance ratio was 2 for chrysene, while the maximum exceedance ratio was for bis(2-ethylhexyl)phthalate at more than 1,000. The frequency of exceedances and exceedance ratios for all parameters are summarized in Table 6.4.

Twenty-seven (27) parameters had reporting limits that exceeded their respective RI screening levels in some samples. These included select total metals, several VOCs, several SVOCs, several PAHS, and total PCB Aroclors. Some of these parameters (such as PCB Aroclors, VOCs, and most SVOCs and PAHs) were non-detect in each sample that it was analyzed. The relevance of RI screening levels below laboratory reporting limits will be further evaluated in the RI.

D.1.5. Catch Basin Solids Data

A total of 10 solids samples were collected for analysis of select parameters from catch basins CB-01 through CB-09 between 2015 and 2016. A statistical summary of catch basin solids data is presented in Table 6.5, and the full tabulation of the dataset is presented in Appendix Tables D.9 and D.10.

Catch basin solids samples were analyzed for a total of 212 parameters including several total calculated values that have RI screening levels. Of these parameters, 102 were detected in samples at concentrations above the laboratory reporting limit. The detected parameters included metals; gasoline-, diesel- and oil-range TPH; a suite of VOCs; several SVOCs; PAHs; PCB Aroclors 1016, 1254 and 1260; PCB congeners and total dioxin-like PCBs; dioxin/furans; and conventional soil analytics.

Of these, 18 parameters (including total calculations) were detected at concentrations above their respective RI screening levels, including:

- Metals –copper and zinc
- SVOCs –benzyl alcohol, benzyl butyl phthalate, bis(2-ethylhexyl)phthalate, dimethyl phthalate, di-n-butyl phthalate, and phenol
- PAHs – 2-methylnaphthalene and naphthalene
- PCBs – Total PCBs Aroclors, total PCB congeners, total PCB toxic equivalents (TEQ), and total dioxin-like PCBs
- Dioxin/furans – Total dioxin/furans TEQ

The frequency of RI screening level exceedances ranged from 10 percent up to 100 percent. The minimum exceedance ratio was 1.05 for naphthalene, and the maximum exceedance ratio was for total dioxin-like PCBs at approximately 600,000. The frequency of exceedances and exceedance ratios for all parameters are summarized in Table 6.5.

Eleven (11) parameters had reporting limits that exceeded their respective RI screening levels in some samples. These included a few VOCs, several SVOCs, and total PCB Aroclors. The relevance of RI screening levels below laboratory reporting limits will be further evaluated in the RI.

APPENDIX D

TABLES

Notes:

a) Derivation and selection of RI screening levels presented in Table C-2.

Bold - detected

Blue - exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

Total Organic Carbon calculation note: TOC was back calculated using the TOC-normailized historical data. The reporting limits are unknown, and the. reported results assume all constituents were detected.

cPAH and total dixion/furan TEQ calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). A TEQ calculation is made by multiplying the result by its corresponding toxicity equivalency factor and summing the result. For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column.

Diesel- and oil-range TPH calculation note: Results were calculated as the sum of Diesel Range Organic and Motor Oil Range Organics, with non-detects summed at 1/2 the reporting limit. If all components were non-detect, the sum is reported as non-detect at the largest component's reporting limit.

Data Qualifiers:

D - Dilution

J - The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

H - The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.

T - Laboratory blank contamination (e.g., method blank, instrument, etc.)

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

Sources:

SAIC, 2008a, South Park Marina Seattle, Washington, Additional Site Characterization Activities Data Report Final, Prepared for Washington State Department of Ecology, June 2008

Farallon Consulting, LLC, 2011, Analytical Data for Project 289-001, Prepared by OnSite Environmental Inc. August, 2011.

TIG Environmental, 2018b, South Park Marina (Facility/Site ID 44653368) Supplemental PCB Investigation Memorandum, September 11, 2018.

Windward Environmental LLC (Windward), 2005, T-117 Sediment, Soil, and Water Field Sampling, Cruise and Data Report Final, Submitted to US Environmental Protection Agency, March 4, 2005.

Windward, 2006, T-117 Upland Area Soil Investigation Field Sampling and Data Report, Submitted to US Environmental Protection Agency, July 7, 2006.

Windward Environmental LLC (Windward), 2005, T-117 Sediment, Soil, and Water Field Sampling, Cruise and Data Report Final, Submitted to US Environmental Protection Agency, March 4, 2005.

Table D.1. Historical Soil Chemical Analytical Results Excluding PCBs - Vadose Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-02	SB-11	SB-12	SB-14	SB-16	SB-18	SB-20	SB-23	T117 A10	T117 A10 (duplicate)
			Date	10/01/2007	09/28/2007	09/28/2007	10/01/2007	10/01/2007	07/27/2011	07/27/2011	07/28/2011	01/16/2002	01/17/2002
			Sample ID	SB-02-1	SB-11-2.5	SB-12-1.5	SB-14-3	SB-16-3.5	SB18-5.0-072711	SB20-4.0-072711	SB23-1.0-072811	T117-A10-SB-01	T117-A10-SB-206
			Depth	1 - 3 ft	2 - 4 ft	2 - 4 ft	3 - 5 ft	4 - 6 ft	5 - 5 ft	4 - 4 ft	1 - 1 ft	0 - 1.5 ft	0 - 1.5 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**										
Metals													
Arsenic	7440-38-2	mg/kg	7	**1.5**	**6.7**	**7.2**	**2.3**	**9.4**	--	--	--	--	--
Cadmium	7440-43-9	mg/kg	1	**0.087**	**31.4**	**14.6**	**0.501**	**23.5**	--	--	--	--	--
Chromium	7440-47-3	mg/kg	48	**9**	**465**	**212**	**24.2**	**415**	--	--	--	--	--
Copper	7440-50-8	mg/kg	36	**8.9**	**198**	**111**	**9.72**	**132**	--	--	--	--	--
Lead	7439-92-1	mg/kg	50	**4.53**	**3100**	**1000**	**198**	**3180**	--	--	--	--	--
Mercury	7439-97-6	mg/kg	0.07	**0.011 B**	**29.5**	**3.96**	**0.327**	**25.2**	--	--	--	--	--
Silver	7440-22-4	mg/kg	0.323	**0.052**	**0.299**	**0.191**	**0.064**	**0.23**	--	--	--	--	--
Zinc	7440-66-6	mg/kg	86	**20.3**	**1480**	**649**	**118**	**1510**	--	--	--	--	--
Total Petroleum Hydrocarbons													
Gasoline Range Organics	TPH-GRO	mg/kg	30	< 20 U	< 2000 U	< 100 U	< 200 U	--	--	--	--	--	--
Diesel Range Organics	TPH-DRO	mg/kg	260	< 50 U	**9600 J**	**1300 J**	**2100 J**	**12000 J**	**6300 N**	**1400 N**	< 27 U	**94**	**66**
Motor Oil Range Organics	TPH-ORO	mg/kg	2000	< 100 U	**26000 J**	**3700 J**	**8200 J**	**27000 J**	**34000**	**8500**	**81**	**100**	**72**
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	2000	< 100 U	**35600 J**	**5000 J**	**10300 J**	**39000 J**	**40300 J**	**9900 J**	**94.5**	**194**	**138**
Total TPHs	T-TPH	mg/kg		--	--	--	--	--	--	--	--	**190**	**138**
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	38.5	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	371	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	0.00168	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	0.00498	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,1-Dichloroethane	75-34-3	mg/kg	175	--	< 0.071 U	**0.00031 T**	--	< 0.068 U	--	--	--	--	--
1,1-Dichloroethene	75-35-4	mg/kg	25.1	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,1-Dichloropropene	563-58-6	mg/kg		--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	20	--	< 0.29 U	< 0.017 U	--	< 0.27 U	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	0.0333	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.00138	< 0.009 U	< 0.25 U	< 0.017 U	< 0.48 U	< 0.27 U	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	mg/kg	800	--	**10**	**0.00023 T**	--	**17**	--	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	1.25	--	< 0.29 U	< 0.017 U	--	< 0.27 UJ	--	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	0.5	--	< 0.29 U	< 0.017 U	--	< 0.27 U	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	0.036	< 0.009 U	**0.24**	< 0.0041 U	< 0.48 U	**0.31**	--	--	--	--	--
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	0.35	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,2-Dichloropropane	78-87-5	mg/kg	0.0157	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	800	--	**3.3**	< 0.017 U	--	**6.6**	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg		--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,3-Dichloropropane	142-28-9	mg/kg		--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	0.11	< 0.009 U	**0.038 T**	< 0.0041 U	< 0.48 U	**0.038 T**	--	--	--	--	--
2,2-Dichloropropane	594-20-7	mg/kg		--	< 0.071 U	< 0.0041 U	--	< 0.068 UJ	--	--	--	--	--
2-Butanone	78-93-3	mg/kg	48000	--	**0.71 T**	**0.012 T**	--	**0.62 T**	--	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	1600	--	< 0.29 U	< 0.017 U	--	< 0.27 U	--	--	--	--	--
2-Hexanone	591-78-6	mg/kg	400	--	< 2.9 U	< 0.017 U	--	< 2.7 R	--	--	--	--	--
4-Chlorotoluene	106-43-4	mg/kg		--	< 0.29 U	< 0.017 U	--	< 0.27 U	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	6400	--	**1.4 T**	**0.0028 T**	--	**0.66 J**	--	--	--	--	--
Acetone	67-64-1	mg/kg	72000	--	< 0.93 U	**0.048**	--	< 0.58 UJ	--	--	--	--	--
Bromobenzene	108-86-1	mg/kg	640	--	< 0.29 U	< 0.0041 U	--	< 0.27 U	--	--	--	--	--
Bromochloromethane	74-97-5	mg/kg		--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Bromodichloromethane	75-27-4	mg/kg	0.0145	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Bromoform	75-25-2	mg/kg	0.0785	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Bromomethane	74-83-9	mg/kg	1.2	--	< 0.071 U	< 0.0041 U	--	< 0.068 UJ	--	--	--	--	--

Table D.1. Historical Soil Chemical Analytical Results Excluding PCBs - Vadose Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-02	SB-11	SB-12	SB-14	SB-16	SB-18	SB-20	SB-23	T117 A10	T117 A10 (duplicate)
			Date	10/01/2007	09/28/2007	09/28/2007	10/01/2007	10/01/2007	07/27/2011	07/27/2011	07/28/2011	01/16/2002	01/17/2002
			Sample ID	SB-02-1	SB-11-2.5	SB-12-1.5	SB-14-3	SB-16-3.5	SB18-5.0-072711	SB20-4.0-072711	SB23-1.0-072811	T117-A10-SB-01	T117-A10-SB-206
			Depth	1 - 3 ft	2 - 4 ft	2 - 4 ft	3 - 5 ft	4 - 6 ft	5 - 5 ft	4 - 4 ft	1 - 1 ft	0 - 1.5 ft	0 - 1.5 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**										
Carbon Disulfide	75-15-0	mg/kg	8000	--	< 0.071 U	**0.00012 T**	--	< 0.068 U	--	--	--	--	--
Carbon Tetrachloride	56-23-5	mg/kg	0.00291	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Chlorobenzene	108-90-7	mg/kg	1.72	--	< 0.071 U	< 0.0041 U	--	**0.046 T**	--	--	--	--	--
Chloroethane	75-00-3	mg/kg		--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Chloroform	67-66-3	mg/kg	0.806	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Chloromethane	74-87-3	mg/kg		--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
cis-1,2-Dichloroethene (cDCE)	156-59-2	mg/kg	160	--	**8.9**	**0.0078**	--	**11**	--	--	--	--	--
cis-1,3-Dichloropropene	10061-01-5	mg/kg	0.0105	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Dibromochloromethane	124-48-1	mg/kg	0.0117	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Dibromomethane	74-95-3	mg/kg	800	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	16000	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Isopropylbenzene	98-82-8	mg/kg	8000	--	**0.56**	< 0.017 U	--	**1.7**	--	--	--	--	--
m,p-Xylenes	179601-23-1	mg/kg	16000	--	**21**	**0.0013 T**	--	**44**	--	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	0.43	--	**0.034 T**	< 0.00044 U	--	< 0.27 U	--	--	--	--	--
n-Butylbenzene	104-51-8	mg/kg	4000	--	**0.96**	< 0.017 U	--	**2**	--	--	--	--	--
n-Propylbenzene	103-65-1	mg/kg	8000	--	**0.67**	< 0.017 U	--	**1.8**	--	--	--	--	--
o-Xylene	95-47-6	mg/kg	16000	--	**14**	**0.00049 T**	--	**24**	--	--	--	--	--
p-Isopropyltoluene	99-87-6	mg/kg		--	**1.2**	< 0.017 U	--	**2.6**	--	--	--	--	--
sec-Butylbenzene	135-98-8	mg/kg	8000	--	**0.54**	< 0.017 U	--	**1.2**	--	--	--	--	--
Styrene	100-42-5	mg/kg	300	--	**0.037 T**	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
tert-Butylbenzene	98-06-6	mg/kg	8000	--	**0.042 T**	< 0.017 U	--	**0.087 T**	--	--	--	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	0.029	--	**0.16**	**0.0015 T**	--	**0.17**	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	5.18	--	**0.21**	< 0.0041 U	--	**0.098**	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	0.0105	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	0.00441	--	**0.17**	**0.0005 T**	--	**0.15**	--	--	--	--	--
Trichlorofluoromethane	75-69-4	mg/kg	24000	--	< 0.071 U	< 0.0041 U	--	< 0.068 U	--	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	0.00104	--	**0.09**	**0.0014 T**	--	**0.87**	--	--	--	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes													
Benzene	71-43-2	mg/kg	0.00875	--	**0.072**	< 0.0041 U	--	**0.078**	--	--	--	--	--
Toluene	108-88-3	mg/kg	0.917	--	**4.1**	**0.0017 T**	--	**7.2**	--	--	--	--	--
Ethylbenzene	100-41-4	mg/kg	0.259	--	**4.1**	**0.00023 T**	--	**9.3**	--	--	--	--	--
Semivolatile Organic Compounds													
2,4-Dimethylphenol	105-67-9	mg/kg	0.029	< 0.045 R	< 1.3 R	< 0.5 R	< 2.4 R	< 4.6 R	--	--	--	--	--
2-Methylphenol	95-48-7	mg/kg	0.063	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	--	--
4-Methylphenol	106-44-5	mg/kg	0.67	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	--	--
Benzoic acid	65-85-0	mg/kg	0.65	< 0.18 U	< 4.9 U	< 2 U	< 9.6 U	< 19 U	--	--	--	--	--
Benzyl alcohol	100-51-6	mg/kg	0.057	< 0.018 U	< 0.49 U	< 0.2 U	< 0.96 U	< 1.9 U	--	--	--	--	--
Benzyl butyl phthalate	85-68-7	mg/kg	0.00361	< 0.009 U	**2.2 D**	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	0.102	< 0.09 U	< 3.7 U	< 1.1 U	< 4.8 U	**7 JD**	--	--	--	--	--
Dibenzofuran	132-64-9	mg/kg	0.54	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Diethyl phthalate	84-66-2	mg/kg	0.2	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	--	--
Dimethyl phthalate	131-11-3	mg/kg	0.071	< 0.009 U	< 0.25 U	**0.23 D**	< 0.48 U	< 0.92 U	--	--	--	--	--
Di-n-butyl phthalate	84-74-2	mg/kg	0.283	< 0.018 U	< 0.8 U	< 0.42 U	< 0.96 U	**1.1 JD**	--	--	--	--	--
Di-n-octyl phthalate	117-84-0	mg/kg	6.2	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	--	--
Hexachlorobenzene	118-74-1	mg/kg	0.00000802	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	--	--
Hexachlorobutadiene	87-68-3	mg/kg	0.0108	< 0.009 U	< 0.25 U	< 0.017 U	< 0.48 U	< 0.27 U	--	--	--	--	--
N-Nitrosodiphenylamine	86-30-6	mg/kg	0.0206	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	--	--
Pentachlorophenol	87-86-5	mg/kg	0.0000317	< 0.09 U	**2.3 JD**	**2.8 D**	< 4.8 U	< 9.2 U	--	--	--	--	--
Phenol	108-95-2	mg/kg	0.42	< 0.03 U	< 0.74 U	< 0.083 U	< 1.5 U	< 2.8 U	--	--	--	--	--

Table D.1. Historical Soil Chemical Analytical Results Excluding PCBs - Vadose Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-02	SB-11	SB-12	SB-14	SB-16	SB-18	SB-20	SB-23	T117 A10	T117 A10 (duplicate)
			Date	10/01/2007	09/28/2007	09/28/2007	10/01/2007	10/01/2007	07/27/2011	07/27/2011	07/28/2011	01/16/2002	01/17/2002
			Sample ID	SB-02-1	SB-11-2.5	SB-12-1.5	SB-14-3	SB-16-3.5	SB18-5.0-072711	SB20-4.0-072711	SB23-1.0-072811	T117-A10-SB-01	T117-A10-SB-206
			Depth	1 - 3 ft	2 - 4 ft	2 - 4 ft	3 - 5 ft	4 - 6 ft	5 - 5 ft	4 - 4 ft	1 - 1 ft	0 - 1.5 ft	0 - 1.5 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**										
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	90-12-0	mg/kg	29.4	--	--	--	--	--	--	--	--	< 0.066 U	< 0.066 U
2-Methylnaphthalene	91-57-6	mg/kg	0.67	< 0.009 U	**2 D**	**0.26 D**	< 0.48 U	**3 D**	--	--	--	< 0.066 U	< 0.066 U
Acenaphthene	83-32-9	mg/kg	0.5	< 0.009 U	**0.25 JD**	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Acenaphthylene	208-96-8	mg/kg	1.3	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Anthracene	120-12-7	mg/kg	0.96	< 0.009 U	**0.33 D**	**0.065 JD**	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Benz(a)anthracene	56-55-3	mg/kg	0.00114	< 0.009 U	**0.24 JD**	**0.074 JD**	< 0.48 U	**0.22 JD**	--	--	--	< 0.066 U	< 0.066 U
Benzo(a)pyrene	50-32-8	mg/kg	0.00031	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Benzo(b)fluoranthene	205-99-2	mg/kg	0.00394	< 0.009 U	< 0.25 U	**0.13 D**	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Benzo(g,h,i)perylene	191-24-2	mg/kg	0.67	< 0.009 U	< 0.25 U	**0.13 D**	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Benzo(k)fluoranthene	207-08-9	mg/kg	0.0394	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Chrysene	218-01-9	mg/kg	0.127	< 0.009 U	**0.49 D**	**0.17 D**	< 0.48 U	**0.39 JD**	--	--	--	< 0.066 U	< 0.066 U
Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.000573	< 0.009 U	< 0.25 U	< 0.099 U	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Fluoranthene	206-44-0	mg/kg	1.7	< 0.009 U	**0.46 D**	**0.12 D**	< 0.48 U	**0.5 JD**	--	--	--	< 0.066 U	< 0.066 U
Fluorene	86-73-7	mg/kg	0.54	< 0.009 U	< 0.25 U	**0.064 JD**	< 0.48 U	**0.67 JD**	--	--	--	< 0.066 U	< 0.066 U
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0.0111	< 0.009 U	< 0.25 U	**0.1 D**	< 0.48 U	< 0.92 U	--	--	--	< 0.066 U	< 0.066 U
Naphthalene	91-20-3	mg/kg	0.0389	< 0.009 U	**2.5**	**0.36 D**	< 0.48 U	**2.4**	--	--	--	< 0.066 U	< 0.066 U
Phenanthrene	85-01-8	mg/kg	1.5	< 0.009 U	**1.3 D**	**0.16 D**	< 0.48 U	**1.4 D**	--	--	--	< 0.066 U	< 0.066 U
Pyrene	129-00-0	mg/kg	2.6	< 0.009 U	**0.82 D**	**0.17 D**	< 0.48 U	**0.81 JD**	--	--	--	< 0.066 U	< 0.066 U
Total cPAHs TEQ (ND multiplier Unknown)	T-cPAH-UnkU	mg/kg	0.00031	--	--	--	--	--	--	--	--	< 0.06 U	< 0.06 U
Pesticides/Herbicides													
2,4'-DDD	53-19-0	mg/kg		< 0.00099 U	< 0.61 U	< 0.093 U	< 0.5 U	< 0.67 U	--	--	--	--	--
2,4'-DDE	3424-82-6	mg/kg		< 0.00099 U	< 0.55 U	< 0.019 U	< 0.077 U	< 0.59 U	--	--	--	--	--
2,4'-DDT	789-02-6	mg/kg		**0.00051 T**	**3.4 J**	**0.37 D**	**0.77 D**	**3.6 J**	--	--	--	--	--
4,4'-DDD	72-54-8	mg/kg	0.00000727	< 0.00099 U	**0.8 D**	**0.051 D**	**0.58 D**	**0.53 D**	--	--	--	--	--
4,4'-DDE	72-55-9	mg/kg	0.00000152	< 0.00099 U	< 0.26 U	< 0.02 U	**0.37 J**	< 0.3 U	--	--	--	--	--
4,4'-DDT	50-29-3	mg/kg	0.0000163	**0.00087 J**	< 3.2 U	**0.6 D**	**1.1 J**	**4 J**	--	--	--	--	--
Aldrin	309-00-2	mg/kg	0.0000000401	< 0.00099 U	**3.5 D**	< 0.019 U	**0.24 D**	**1.9 D**	--	--	--	--	--
Dieldrin	60-57-1	mg/kg	0.000000617	< 0.00099 U	< 0.14 U	< 0.035 U	**0.92 D**	< 0.1 U	--	--	--	--	--
Heptachlor	76-44-8	mg/kg	0.0000000662	< 0.00099 U	< 0.1 U	< 0.019 U	< 0.01 U	< 0.1 U	--	--	--	--	--
Lindane	58-89-9	mg/kg	0.00389	< 0.00099 U	< 0.1 U	< 0.019 U	< 0.01 U	< 0.1 U	--	--	--	--	--
Total Chlordane	57-74-9	mg/kg	0.0000227	< 0.0099 U	< 3.1 U	< 0.62 U	< 5 U	< 5.2 U	--	--	--	--	--
Conventionals													
Total Organic Carbon	TOC	%		--	--	--	--	--	--	--	--	**0.945**	**0.712**
Total Organic Carbon (Calculated)	TOC-CALC	%		--	--	--	--	--	--	--	--	--	--

Table D.2. Historical Soil PCB Analytical Results – Vadose Zone

FINAL

Project No. 190293, South Park Marina, Seattle, Washington

Notes:

a) Derivation and selection of RI screening levels presented in Table C-2.

b) Total PCB TEQ values are shown as reported in the historical analytical database. Total values for the complete dataset will be calculated and reported in the RI.

Bold - Analyte detected

Blue - Analyte exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

Data Qualifiers:

D - Dilution

T - Laboratory blank contamination (e.g., method blank, instrument, etc.)

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

J - The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.

Sources:

Farallon Consulting, LLC, 2011, Analytical Data for Project 289-001, Prepared by OnSite Environmental Inc. August, 2011.

TIG Environmental, 2018b, South Park Marina (Facility/Site ID 44653368) Supplemental PCB Investigation Memorandum, September 11, 2018.

Table D.2. Historical Soil PCB Analytical Results – Vadose Zone

Project No. 190293, South Park Marina, Seattle, Washington

		Location	B-01	B-01	B-02	B-03	B-03	B-03	B-04	B-04	B-04	SB-02	SB-11	SB-12	SB-14	SB-16
		Date	11/17/2017	11/17/2017	11/17/2017	11/17/2017	11/17/2017	11/17/2017	11/17/2017	11/17/2017	11/17/2017	10/01/2007	09/28/2007	09/28/2007	10/01/2007	10/01/2007
		Sample	B-01-2-3	B-01-3.5-4.5	B-02-2.5-3	B-03-0-1	B-03-2-3	B-03-5-6	B-04-0-1	B-04-2-2.5	B-04-5-6	SB-02-1	SB-11-2.5	SB-12-1.5	SB-14-3	SB-16-3.5
		Depth	2 - 3 ft	3.5 - 4.5 ft	2.5 - 3 ft	0 - 1 ft	2 - 3 ft	5 - 6 ft	0 - 1 ft	2 - 2.5 ft	5 - 6 ft	1 - 3 ft	2 - 4 ft	2 - 4 ft	3 - 5 ft	4 - 6 ft
Analyte	**Unit**	**RI Screening Level[(a)]**														
PCB Aroclors																
Aroclor 1016	mg/kg		< 0.55 U	< 0.054 U	< 0.58 U	< 1.1 U	< 1.1 U	< 1.2 U	< 0.057 U	< 1.1 U	< 6.3 U	< 0.0099 U	< 1 U	< 0.099 U	< 0.1 U	< 1 U
Aroclor 1221	mg/kg		< 0.55 U	< 0.054 U	< 0.58 U	< 1.1 U	< 1.1 U	< 1.2 U	< 0.057 U	< 1.1 U	< 6.3 U	--	--	--	--	--
Aroclor 1232	mg/kg		< 0.55 U	< 0.054 U	< 0.58 U	< 1.1 U	< 1.1 U	< 1.2 U	< 0.057 U	< 1.1 U	< 6.3 U	--	--	--	--	--
Aroclor 1242	mg/kg		< 0.55 U	< 0.054 U	< 0.58 U	< 1.1 U	**3.9**	**5.2**	< 0.057 U	**4**	< 6.3 U	--	--	--	--	--
Aroclor 1248	mg/kg		< 0.55 U	< 0.054 U	< 0.58 U	< 1.1 U	< 1.1 U	< 1.2 U	< 0.057 U	< 1.1 U	< 6.3 U	< 0.0099 U	< 1 U	< 0.099 U	< 0.1 U	< 1 U
Aroclor 1254	mg/kg		**4.7**	**1.7**	**3.5**	**14**	**9.8**	**19**	**0.7**	**19**	**34**	< 0.0099 U	**29 D**	**4.9 D**	**5.5 D**	**36 D**
Aroclor 1260	mg/kg		**2.1**	**1.7**	< 0.58 U	**6.1**	**2.8**	**7.2**	**0.64**	**5.3**	**10**	< 0.0099 U	< 1 U	< 0.099 U	**5.1 D**	< 1 U
Aroclor 1262	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCB Aroclors	mg/kg	0.0000433	**6.8**	**3.4**	**3.5**	**20.1**	**16.5**	**31.4**	**1.34**	**28.3**	**44**	< 0.0099 UT	**29 T**	**4.9 T**	**10.6 T**	**36 T**
PCB Congeners[(b)]																
Total PCB Congeners	mg/kg	0.0000433	**5.91**	--	--	**14.4**	--	--	--	--	**107**	--	--	--	--	--
Total PCB TEQ (ND = 0)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin-like PCBs (TEQ)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.2. Historical Soil PCB Analytical Results – Vadose Zone

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10
		Date	02/09/2016	02/09/2016	02/09/2016	02/10/2016	02/10/2016	02/10/2016	02/09/2016	02/09/2016	02/10/2016	02/10/2016
		Sample	SPM-SS-01-02092016	SPM-SS-02-02092016	SPM-SS-03-02092016	SPM-SS-04-02102016	SPM-SS-05-02102016	SPM-SS-06-02102016	SPM-SS-07-02092016	SPM-SS-08-02092016	SPM-SS-09-02102016	SPM-SS-10-02102016
		Depth	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft
Analyte	**Unit**	**RI Screening Level[(a)]**										
PCB Aroclors												
Aroclor 1016	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.08 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Aroclor 1221	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.08 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Aroclor 1232	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.08 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Aroclor 1242	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.08 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Aroclor 1248	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.08 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Aroclor 1254	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.08 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Aroclor 1260	mg/kg		**0.0075**	**0.014**	**0.094**	**0.21**	**0.82**	< 0.08 U	**0.0048**	**0.0715**	**0.05**	< 0.004 U
Aroclor 1262	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.08 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Aroclor 1268	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.08 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Total PCB Aroclors	mg/kg	0.0000433	**0.0075**	**0.014**	**0.094**	**0.21**	**0.82**	< 0.08 U	**0.0048**	**0.0715**	**0.05**	< 0.004 U
PCB Congeners[(b)]												
Total PCB Congeners	mg/kg	0.0000433	**0.0206**	**0.0308**	**0.124**	**0.221**	**0.596**	**0.0184**	**0.00586**	**0.0818**	**0.0544**	**0.00482**
Total PCB TEQ (ND = 0)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--
Total Dioxin-like PCBs (TEQ)	mg/kg	0.0000000274	**0.0010001**	**0.00153058**	**0.00256306**	**0.00364798**	**0.0074625**	**0.0003561**	**0.00014904**	**0.0051725**	**0.00140835**	**0.00010862**

Table D.2. Historical Soil PCB Analytical Results – Vadose Zone

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SS-11	SS-12	SS-13	SS-14	SS-15	SS-16	SS-17	SS-18	SS-19	SS-20	SS-21	SS-22	SS-23
		Date	02/10/2016	02/09/2016	02/10/2016	02/10/2016	02/09/2016	02/09/2016	02/10/2016	02/10/2016	02/10/2016	02/10/2016	02/08/2016	02/08/2016	02/08/2016
		Sample	SPM-SS-11-02102016	SPM-SS-12-02092016	SPM-SS-13-02102016	SPM-SS-14-02102016	SPM-SS-15-02092016	SPM-SS-16-02092016	SPM-SS-17-02102016	SPM-SS-18-02102016	SPM-SS-19-02102016	SPM-SS-20-02102016	SPM-SS-21-02082016	SPM-SS-22-02082016	SPM-SS-23-02082016
		Depth	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft
Analyte	**Unit**	**RI Screening Level[(a)]**													
PCB Aroclors															
Aroclor 1016	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.04 UJ	< 0.004 U	< 0.004 U
Aroclor 1221	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.04 UJ	< 0.004 U	< 0.004 U
Aroclor 1232	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.04 UJ	< 0.004 U	< 0.004 U
Aroclor 1242	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.04 UJ	< 0.004 U	< 0.004 U
Aroclor 1248	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.04 UJ	< 0.004 U	< 0.004 U
Aroclor 1254	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.04 UJ	< 0.004 U	< 0.004 U
Aroclor 1260	mg/kg		**0.019**	**0.017**	**0.061**	**0.027**	**0.052**	**0.36**	< 0.004 U	**0.25**	**0.77**	< 0.08 U	**16 J**	**0.22**	**0.083**
Aroclor 1262	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.04 UJ	< 0.004 U	< 0.004 U
Aroclor 1268	mg/kg		< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.08 U	< 0.08 U	< 0.04 UJ	< 0.004 U	< 0.004 U
Total PCB Aroclors	mg/kg	0.0000433	**0.019**	**0.017**	**0.061**	**0.027**	**0.052**	**0.36**	< 0.004 U	**0.25**	**0.77**	< 0.08 U	**16**	**0.22**	**0.083**
PCB Congeners[(b)]															
Total PCB Congeners	mg/kg	0.0000433	**0.0257**	**0.00638**	**0.0164**	**0.0275**	**0.0736**	**0.107**	**0.00496**	**0.369**	**0.93**	**0.101**	**22.1**	**0.416**	**0.186**
Total PCB TEQ (ND = 0)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin-like PCBs (TEQ)	mg/kg	0.0000000274	**0.00055176**	**0.00019675**	**0.00037341**	**0.00088894**	**0.00266234**	**0.00422457**	**0.00006187**	**0.00731977**	**0.0195197**	**0.00467611**	**0.340518**	**0.0148542**	**0.01057208**

Table D.2. Historical Soil PCB Analytical Results – Vadose Zone

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SS-24	SS-25	SS-26	SS-27	SS-28	SS-29	SS-30	SS-31	SS-32	SS-33	SS-34	SS-35	SS-36
		Date	02/10/2016	02/08/2016	02/08/2016	02/08/2016	02/11/2016	02/11/2016	02/11/2016	11/17/2017	11/17/2017	11/17/2017	11/17/2017	11/17/2017	11/17/2017
		Sample	SPM-SS-24-02102016	SPM-SS-25-02082016	SPM-SS-26-02082016	SPM-SS-27-02082016	SPM-SS-28-02112016	SPM-SS-29-02112016	SPM-SS-30-02112016	SS-31-0-1.5	SS-32-0-1.5	SS-33-0-1.5	SS-34-0-1.5	SS-35-0-1.5	SS-36-0-1.5
		Depth	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.6 ft	0 - 1.5 ft	0 - 1.5 ft	0 - 1.5 ft	0 - 1.5 ft	0 - 1.5 ft	0 - 1.5 ft
Analyte	**Unit**	**RI Screening Level[(a)]**													
PCB Aroclors															
Aroclor 1016	mg/kg		< 0.004 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.08 U	< 0.054 U	< 0.052 U	< 5.4 U	< 0.053 U	< 0.052 U	< 0.54 U
Aroclor 1221	mg/kg		< 0.004 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.08 U	< 0.054 U	< 0.052 U	< 5.4 U	< 0.053 U	< 0.052 U	< 0.54 U
Aroclor 1232	mg/kg		< 0.004 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.08 U	< 0.054 U	< 0.052 U	< 5.4 U	< 0.053 U	< 0.052 U	< 0.54 U
Aroclor 1242	mg/kg		< 0.004 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.08 U	< 0.054 U	< 0.052 U	< 5.4 U	< 0.053 U	< 0.052 U	< 0.54 U
Aroclor 1248	mg/kg		< 0.004 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.08 U	< 0.054 U	< 0.052 U	< 5.4 U	< 0.053 U	< 0.052 U	< 0.54 U
Aroclor 1254	mg/kg		< 0.004 U	< 0.004 U	**0.11**	< 0.004 U	< 0.04 U	< 0.004 U	< 0.08 U	< 0.054 U	< 0.052 U	< 5.4 U	< 0.053 U	< 0.052 U	**1.8**
Aroclor 1260	mg/kg		**0.074**	**0.6**	**0.5**	**0.041**	**0.28**	**0.16**	**1.9**	**0.064**	**0.2**	**29**	< 0.053 U	< 0.052 U	**3.8**
Aroclor 1262	mg/kg		< 0.004 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.08 U	--	--	--	--	--	--
Aroclor 1268	mg/kg		< 0.004 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.04 U	< 0.004 U	< 0.08 U	--	--	--	--	--	--
Total PCB Aroclors	mg/kg	0.0000433	**0.074**	**0.6**	**0.61**	**0.041**	**0.28**	**0.16**	**1.9**	**0.064**	**0.2**	**29**	< 0.053 U	< 0.052 U	**5.6**
PCB Congeners[(b)]															
Total PCB Congeners	mg/kg	0.0000433	**0.105**	**0.611**	**0.287**	**0.0835**	**0.538**	**0.18**	**2.6**	--	--	**76.5**	--	--	--
Total PCB TEQ (ND = 0)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin-like PCBs (TEQ)	mg/kg	0.0000000274	**0.00312161**	**0.0233321**	**0.0135722**	**0.00472763**	**0.00704465**	**0.005764**	**0.0311896**	--	--	--	--	--	--

Table D.2. Historical Soil PCB Analytical Results – Vadose Zone

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	Unit	RI Screening Level[(a)]	SS-37	SS-38	SS-39	T117 A10	T117 A10 (duplicate)	T117 A11	T117 A12	T117 A12
		Date	11/17/2017	11/17/2017	11/17/2017	01/16/2002	01/17/2002	01/23/2002	01/23/2002	01/23/2002
		Sample	SS-37-0-1.5	SS-38-0-1	SS-39-0-1.25	T117-A10-SB-01	T117-A10-SB-206	T117-A11-SB-0.0-0.5	T117-A12-SB-0.0-0.5	T117-A12-SB-0.5-1.5
		Depth	0 - 1.5 ft	0 - 1 ft	0 - 1.25 ft	0 - 1.5 ft	0 - 1.5 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1.5 ft
PCB Aroclors										
Aroclor 1016	mg/kg		< 0.053 U	< 5.5 U	< 1.1 U	< 0.033 U	< 0.033 U	< 0.033 U	< 0.23 U	< 0.076 U
Aroclor 1221	mg/kg		< 0.053 U	< 5.5 U	< 1.1 U	< 0.033 U	< 0.033 U	< 0.033 U	< 0.23 U	< 0.076 U
Aroclor 1232	mg/kg		< 0.053 U	< 5.5 U	< 1.1 U	< 0.033 U	< 0.033 U	< 0.033 U	< 0.23 U	< 0.076 U
Aroclor 1242	mg/kg		< 0.053 U	< 5.5 U	< 1.1 U	< 0.033 U	< 0.033 U	< 0.033 U	< 0.23 U	< 0.076 U
Aroclor 1248	mg/kg		< 0.053 U	< 5.5 U	< 1.1 U	< 0.033 U	< 0.033 U	< 0.033 U	< 0.23 U	< 0.076 U
Aroclor 1254	mg/kg		< 0.053 U	**12**	**10**	< 0.033 U	< 0.033 U	**0.069**	**2.1**	**0.25**
Aroclor 1260	mg/kg		< 0.053 U	**54**	< 1.1 U	**0.088**	**0.075**	**0.15 J**	**1.1 J**	**0.34**
Aroclor 1262	mg/kg		--	--	--	--	--	--	--	--
Aroclor 1268	mg/kg		--	--	--	--	--	--	--	--
Total PCB Aroclors	mg/kg	0.0000433	< 0.053 U	**66**	**10**	**0.088**	**0.075**	**0.22 J**	**3.2 J**	**0.59**
PCB Congeners[(b)]										
Total PCB Congeners	mg/kg	0.0000433	--	**49.2**	**6.04**	--	--	--	--	--
Total PCB TEQ (ND = 0)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--
Total Dioxin-like PCBs (TEQ)	mg/kg	0.0000000274	--	--	--	--	--	--	--	--

Table D.3. Historical Soil Chemical Analytical Results Excluding PCBs - Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

Notes:

a) Derivation and selection of RI screening levels presented in Table C-2.

Bold - detected

Blue - exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

cPAH and total dixion/furan TEQ calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). A TEQ calculation is made by multiplying the result by its corresponding toxicity equivalency factor and summing the result. For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column.

Total Organic Carbon calculation note: TOC was back calculated using the TOC-normailized historical data. The reporting limits are unknown, and the reported results assume all constituents were detected.

Diesel- and oil-range TPH calculation note: Results were calculated as the sum of Diesel Range Organic and Motor Oil Range Organics, with non-detects summed at 1/2 the reporting limit. If all components were non-detect, the sum is reported as non-detect at the largest component's reporting limit.

Data Qualifiers:

B - This compound was also detected in the method blank.

D - Dilution

J - The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

P - The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.

R - Reporting limits were rejected to indicate potential low bias due to %R values being less than the lower control limits in the laboratory control sample and laboratory control sample duplicate.

T - Laboratory blank contamination (e.g., method blank, instrument, etc.)

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

Sources:

SAIC, 2008a, South Park Marina Seattle, Washington, Additional Site Characterization Activities Data Report Final, Prepared for Washington State Department of Ecology, June 2008

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TIG Environmental, 2018b, South Park Marina (Facility/Site ID 44653368) Supplemental PCB Investigation Memorandum, September 11, 2018.

Windward Environmental LLC (Windward), 2005, T-117 Sediment, Soil, and Water Field Sampling, Cruise and Data Report Final, Submitted to US Environmental Protection Agency, March 4, 2005.

Windward, 2006, T-117 Upland Area Soil Investigation Field Sampling and Data Report, Submitted to US Environmental Protection Agency, July 7, 2006.

Table D.3. Historical Soil Chemical Analytical Results Excluding PCBs - Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-01	SB-02	SB-03	SB-03	SB-04	SB-05	SB-06	SB-07	SB-08	SB-09	SB-10	SB-14
			Date	09/27/2007	09/28/2007	09/27/2007	09/27/2007	09/27/2007	09/27/2007	09/28/2007	09/28/2007	09/27/2007	09/27/2007	09/28/2007	10/01/2007
			Sample ID	SB-01-9	SB-02-9	SB-03-7	SB-03-13.5	SB-04-8	SB-05-8	SB-06-8	SB-07-9	SB-08-9	SB-09-10	SB-10-14	SB-14-7.5
			Depth	9 - 11 ft	9 - 11 ft	7 - 9 ft	14 - 16 ft	8 - 10 ft	8 - 10 ft	8 - 10 ft	9 - 11 ft	9 - 11 ft	10 - 12 ft	14 - 16 ft	8 - 10 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**												
Metals															
Arsenic	7440-38-2	mg/kg	7	**1.5**	**2.2**	**1**	**1.7**	**4.2**	**8.7**	**1.9**	**1.4**	**2.1**	**2**	**1.8**	**1.6**
Barium	7440-39-3	mg/kg	8.26	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440-43-9	mg/kg	1	**0.037**	**0.063**	**0.281**	**0.029**	**0.097**	**0.084**	**0.021 B**	**0.025**	**0.061**	**0.029**	**0.141**	**0.159**
Chromium	7440-47-3	mg/kg	48	**7.98**	**9.47**	**23.1**	**8.4**	**11.8**	**13.4**	**7.51**	**6.37**	**10.6**	**7.66**	**8.6**	**22.1**
Copper	7440-50-8	mg/kg	36	**9.74**	**56**	**10.8**	**7.58**	**19.9**	**21.7**	**7.19**	**7.38**	**13.9**	**10.6**	**10.8**	**9.88**
Lead	7439-92-1	mg/kg	50	**1.29 J**	**13.7**	**31.8**	**2.23**	**3.32**	**4.39**	**1.49 J**	**2.13**	**2.09**	**1.46 J**	**16.3**	**18.2**
Mercury	7439-97-6	mg/kg	0.07	**0.007 B**	**0.009 B**	**0.015 B**	**0.01 B**	**0.048**	**0.064**	**0.004 B**	**0.005 B**	**0.028**	**0.008 B**	**0.007 B**	**0.274**
Selenium	7782-49-2	mg/kg	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Silver	7440-22-4	mg/kg	0.0163	**0.06**	**0.066**	**0.07**	**0.055**	**0.108**	**0.145**	**0.055**	**0.049**	**0.091**	**0.064**	**0.116**	**0.058**
Zinc	7440-66-6	mg/kg	85	**19.1**	**29.3**	**33**	**15**	**26.3**	**28.9**	**15.4**	**14.8**	**22.6**	**17.6**	**28.7**	**26.4**
Total Petroleum Hydrocarbons															
Gasoline Range Organics	TPH-GRO	mg/kg	30	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	**350 J**
Diesel Range Organics	TPH-DRO	mg/kg	260	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	**23 T**	**3.7 T**	< 50 U	< 50 U	< 50 U	< 50 U	**3000 J**
Motor Oil Range Organics	TPH-ORO	mg/kg	2000	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	**220 J**	**21 T**	< 100 U	< 100 U	< 100 U	< 100 U	**8900 J**
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	2000	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	**243 J**	**24.7**	< 100 U	< 100 U	< 100 U	< 100 U	**11900 J**
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	38.5	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,1,1-Trichloroethane	71-55-6	mg/kg	21.1	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	0.00011	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,1,2-Trichloroethane	79-00-5	mg/kg	0.000326	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,1-Dichloroethane	75-34-3	mg/kg	175	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,1-Dichloroethene	75-35-4	mg/kg	1.36	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,1-Dichloropropene	563-58-6	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,2,3-Trichlorobenzene	87-61-6	mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
1,2,3-Trichloropropane	96-18-4	mg/kg	0.0333	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.000072	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 0.025 U
1,2,4-Trimethylbenzene	95-63-6	mg/kg	800	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	1.25	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	0.5	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
1,2-Dichlorobenzene	95-50-1	mg/kg	0.00307	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 0.0063 U
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	0.0237	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,2-Dichloropropane	78-87-5	mg/kg	0.00103	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,3,5-Trimethylbenzene	108-67-8	mg/kg	800	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
1,3-Dichlorobenzene	541-73-1	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,3-Dichloropropane	142-28-9	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
1,4-Dichlorobenzene	106-46-7	mg/kg	0.00807	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 0.0063 U
2,2-Dichloropropane	594-20-7	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
2-Butanone	78-93-3	mg/kg	48000	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
2-Chloroethyl Vinyl Ether	110-75-8	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	1600	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
2-Hexanone	591-78-6	mg/kg	400	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
4-Chlorotoluene	106-43-4	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
4-Methyl-2-pentanone	108-10-1	mg/kg	6400	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
Acetone	67-64-1	mg/kg	72000	--	--	--	--	--	--	--	--	--	--	--	< 0.014 U
Bromobenzene	108-86-1	mg/kg	640	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Bromochloromethane	74-97-5	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Bromodichloromethane	75-27-4	mg/kg	0.000957	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Bromoform	75-25-2	mg/kg	0.00495	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Bromomethane	74-83-9	mg/kg	0.0792	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Carbon Disulfide	75-15-0	mg/kg	8000	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Carbon Tetrachloride	56-23-5	mg/kg	0.000154	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Chlorobenzene	108-90-7	mg/kg	0.102	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U

			Location	SB-01	SB-02	SB-03	SB-03	SB-04	SB-05	SB-06	SB-07	SB-08	SB-09	SB-10	SB-14
			Date	09/27/2007	09/28/2007	09/27/2007	09/27/2007	09/27/2007	09/27/2007	09/28/2007	09/28/2007	09/27/2007	09/27/2007	09/28/2007	10/01/2007
			Sample ID	SB-01-9	SB-02-9	SB-03-7	SB-03-13.5	SB-04-8	SB-05-8	SB-06-8	SB-07-9	SB-08-9	SB-09-10	SB-10-14	SB-14-7.5
			Depth	9 - 11 ft	9 - 11 ft	7 - 9 ft	14 - 16 ft	8 - 10 ft	8 - 10 ft	8 - 10 ft	9 - 11 ft	9 - 11 ft	10 - 12 ft	14 - 16 ft	8 - 10 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**												
Chloroethane	75-00-3	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Chloroform	67-66-3	mg/kg	0.0524	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Chloromethane	74-87-3	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
cis-1,2-Dichloroethene (cDCE)	156-59-2	mg/kg	160	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
cis-1,3-Dichloropropene	10061-01-5	mg/kg	0.000627	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Dibromochloromethane	124-48-1	mg/kg	0.000769	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Dibromomethane	74-95-3	mg/kg	800	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Dichlorodifluoromethane	75-71-8	mg/kg	16000	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Isopropylbenzene	98-82-8	mg/kg	8000	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
m,p-Xylenes	179601-23-1	mg/kg	16000	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	556	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	0.0297	--	--	--	--	--	--	--	--	--	--	--	< 0.001 U
Methyliodide	74-88-4	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	104-51-8	mg/kg	4000	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
n-Propylbenzene	103-65-1	mg/kg	8000	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
o-Xylene	95-47-6	mg/kg	16000	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
p-Isopropyltoluene	99-87-6	mg/kg		--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
sec-Butylbenzene	135-98-8	mg/kg	8000	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
Styrene	100-42-5	mg/kg	300	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
tert-Butylbenzene	98-06-6	mg/kg	8000	--	--	--	--	--	--	--	--	--	--	--	< 0.025 U
Tetrachloroethene (PCE)	127-18-4	mg/kg	0.0016	--	--	--	--	--	--	--	--	--	--	--	**0.002 T**
trans-1,2-Dichloroethene	156-60-5	mg/kg	0.325	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
trans-1,3-Dichloropropene	10061-02-6	mg/kg	0.000627	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Trichloroethene (TCE)	79-01-6	mg/kg	0.000266	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Trichlorofluoromethane	75-69-4	mg/kg	24000	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Vinyl Acetate	108-05-4	mg/kg	80000	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	0.0000549	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Benzene, Toluene, Ethylbenzene, and Total Xylenes															
Benzene	71-43-2	mg/kg	0.000558	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Toluene	108-88-3	mg/kg	0.0555	--	--	--	--	--	--	--	--	--	--	--	**0.00089 J**
Ethylbenzene	100-41-4	mg/kg	0.0152	--	--	--	--	--	--	--	--	--	--	--	< 0.0063 U
Semivolatile Organic Compounds															
1,2-Dinitrobenzene	528-29-0	mg/kg	8	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Diphenylhydrazine	122-66-7	mg/kg	1.07	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dinitrobenzene	99-65-0	mg/kg	8	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dinitrobenzene	100-25-4	mg/kg	8	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	485	--	--	--	--	--	--	--	--	--	--	--	--
2,3,5,6-Tetrachlorophenol	935-95-5	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
2,3-Dichloroaniline	608-27-5	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	mg/kg	1.13	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	mg/kg	0.000187	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	mg/kg	0.00434	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	mg/kg	0.00314	< 0.05 R	< 0.05 R	< 0.05 R	< 0.05 R	< 0.05 R	< 0.05 R	< 0.049 R	< 0.05 R	< 0.05 R	< 0.049 R	< 0.05 R	< 5 R
2,4-Dinitrophenol	51-28-5	mg/kg	0.0287	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0000688	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	mg/kg	0.106	--	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	mg/kg	6400	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	mg/kg	0.0115	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	95-48-7	mg/kg	0.0102	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 1 U
2-Nitroaniline	88-74-4	mg/kg	800	--	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	88-75-5	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
3 & 4 Methylphenol	65794-96-9	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	mg/kg	0.00000334	--	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--

Table D.3. Historical Soil Chemical Analytical Results Excluding PCBs - Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-01	SB-02	SB-03	SB-03	SB-04	SB-05	SB-06	SB-07	SB-08	SB-09	SB-10	SB-14
			Date	09/27/2007	09/28/2007	09/27/2007	09/27/2007	09/27/2007	09/27/2007	09/28/2007	09/28/2007	09/27/2007	09/27/2007	09/28/2007	10/01/2007
			Sample ID	SB-01-9	SB-02-9	SB-03-7	SB-03-13.5	SB-04-8	SB-05-8	SB-06-8	SB-07-9	SB-08-9	SB-09-10	SB-10-14	SB-14-7.5
			Depth	9 - 11 ft	9 - 11 ft	7 - 9 ft	14 - 16 ft	8 - 10 ft	8 - 10 ft	8 - 10 ft	9 - 11 ft	9 - 11 ft	10 - 12 ft	14 - 16 ft	8 - 10 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**												
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	mg/kg	0.81	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	106-44-5	mg/kg	0.67	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	**0.0022 T**	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 1 U
4-Nitroaniline	100-01-6	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	mg/kg	7	--	--	--	--	--	--	--	--	--	--	--	--
Aniline	62-53-3	mg/kg	150	--	--	--	--	--	--	--	--	--	--	--	--
Benzidine	92-87-5	mg/kg	0.00371	--	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	65-85-0	mg/kg	0.169	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	**0.19 T**	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 20 U
Benzyl alcohol	100-51-6	mg/kg	0.057	< 0.02 U	**0.0077 T**	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U	< 0.02 U	**0.0041 T**	< 0.02 U	< 0.02 U	< 2 U
Benzyl butyl phthalate	85-68-7	mg/kg	0.000182	< 0.01 U	**0.0052 T**	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 1 U
Bis(2-chloroethoxy)methane	111-91-1	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethyl) ether	111-44-4	mg/kg	0.0000218	--	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) adipate	103-23-1	mg/kg	711	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	0.00512	< 0.0095 U	< 0.035 U	< 0.014 U	< 0.012 U	< 0.1 U	< 0.1 U	< 0.018 U	< 0.099 U	< 0.012 U	< 0.011 U	< 0.021 U	**2 JD**
Carbazole	86-74-8	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	mg/kg	0.54	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	**0.6 JD**
Diethyl phthalate	84-66-2	mg/kg	0.0341	< 0.01 U	< 0.0021 U	< 0.01 U	< 0.0019 U	< 0.0023 U	< 0.01 U	< 0.0036 U	< 0.0019 U	< 0.003 U	< 0.0023 U	< 0.0021 U	< 1 U
Dimethyl phthalate	131-11-3	mg/kg	0.071	< 0.01 U	**0.026**	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	**0.0067 T**	< 1 U
Di-n-butyl phthalate	84-74-2	mg/kg	0.0149	< 0.011 U	< 0.017 U	< 0.016 U	< 0.019 U	< 0.019 U	< 0.02 U	< 0.011 U	< 0.0095 U	< 0.012 U	< 0.02 U	< 0.11 U	< 2 U
Di-n-octyl phthalate	117-84-0	mg/kg	0.326	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 1 U
Hexachlorobenzene	118-74-1	mg/kg	0.000000401	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 1 U
Hexachlorobutadiene	87-68-3	mg/kg	0.00054	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 0.025 U
Hexachlorocyclopentadiene	77-47-4	mg/kg	0.2	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	mg/kg	0.0000413	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	mg/kg	0.0367	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	mg/kg	0.0406	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodimethylamine	62-75-9	mg/kg	0.0167	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	0.000018	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	86-30-6	mg/kg	0.00109	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 1 U
Pentachlorophenol	87-86-5	mg/kg	0.00000176	< 0.1 U	**0.041 T**	**0.028 T**	< 0.099 U	< 0.1 U	< 0.1 U	< 0.098 U	< 0.099 U	< 0.099 U	< 0.098 U	**0.079 T**	< 10 U
Phenol	108-95-2	mg/kg	0.115	< 0.031 U	< 0.02 U	< 0.031 U	< 0.026 U	< 0.035 U	< 0.045 U	< 0.021 U	< 0.016 U	< 0.024 U	< 0.021 U	< 0.014 U	< 3 U
Pyridine	110-86-1	mg/kg	80	--	--	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons															
1-Methylnaphthalene	90-12-0	mg/kg	29.4	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	91-57-6	mg/kg	0.67	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	**4.5 D**
Acenaphthene	83-32-9	mg/kg	0.0277	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	**0.51 JD**
Acenaphthylene	208-96-8	mg/kg	1.3	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 1 U
Anthracene	120-12-7	mg/kg	0.0511	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	**1.2 D**
Benz(a)anthracene	56-55-3	mg/kg	0.0000573	< 0.01 U	**0.0052 T**	< 0.01 U	< 0.0099 U	**0.0063 T**	**0.0048 T**	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	**0.0022 T**	< 1 U
Benzo(a)pyrene	50-32-8	mg/kg	0.0000155	< 0.01 U	**0.006 T**	< 0.01 U	< 0.0099 U	**0.0075 T**	**0.0061 T**	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	**0.0044 T**	< 1 U
Benzo(b)fluoranthene	205-99-2	mg/kg	0.000197	< 0.01 U	**0.01**	< 0.01 U	< 0.0099 U	**0.0079 T**	**0.0072 T**	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	**0.0084 T**	< 1 U
Benzo(g,h,i)perylene	191-24-2	mg/kg	0.67	< 0.01 U	**0.0064 T**	< 0.01 U	< 0.0099 U	**0.0065 T**	**0.0058 T**	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	**0.0058 T**	< 1 U
Benzo(j,k)fluoranthene	Benz-jk-fluor	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	mg/kg	0.00197	< 0.01 U	**0.0036 T**	< 0.01 U	< 0.0099 U	**0.0023 T**	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	**0.0019 T**	< 1 U
Chrysene	218-01-9	mg/kg	0.00637	< 0.01 U	**0.0071 T**	< 0.01 U	< 0.0099 U	**0.0071 T**	**0.0064 T**	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	**0.0063 T**	**0.53 JD**
Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.0000286	< 0.01 U	**0.0022 T**	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	< 1 U
Fluoranthene	206-44-0	mg/kg	0.0899	< 0.01 U	**0.0091 T**	**0.0046 T**	**0.003 T**	**0.013**	**0.011**	< 0.0098 U	< 0.0099 U	**0.0024 T**	**0.0021 T**	**0.003 T**	**0.88 JD**
Fluorene	86-73-7	mg/kg	0.0294	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	**1 D**
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0.000555	< 0.01 U	**0.006 T**	< 0.01 U	< 0.0099 U	**0.0061 T**	**0.0066 T**	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	**0.0057 T**	< 1 U
Naphthalene	91-20-3	mg/kg	0.00207	< 0.01 U	< 0.01 U	**0.0037 T**	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.0098 U	< 0.0099 U	< 0.0099 U	< 0.0098 U	< 0.01 U	**0.51 JD**
Phenanthrene	85-01-8	mg/kg	1.5	< 0.01 U	**0.0029 T**	**0.0081 T**	**0.0038 T**	**0.0062 T**	**0.0054 T**	**0.0025 T**	< 0.0099 U	**0.0031 T**	**0.0024 T**	**0.0024 T**	**2.4 D**

Table D.3. Historical Soil Chemical Analytical Results Excluding PCBs - Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-01	SB-02	SB-03	SB-03	SB-04	SB-05	SB-06	SB-07	SB-08	SB-09	SB-10	SB-14
			Date	09/27/2007	09/28/2007	09/27/2007	09/27/2007	09/27/2007	09/27/2007	09/28/2007	09/28/2007	09/27/2007	09/27/2007	09/28/2007	10/01/2007
			Sample ID	SB-01-9	SB-02-9	SB-03-7	SB-03-13.5	SB-04-8	SB-05-8	SB-06-8	SB-07-9	SB-08-9	SB-09-10	SB-10-14	SB-14-7.5
			Depth	9 - 11 ft	9 - 11 ft	7 - 9 ft	14 - 16 ft	8 - 10 ft	8 - 10 ft	8 - 10 ft	9 - 11 ft	9 - 11 ft	10 - 12 ft	14 - 16 ft	8 - 10 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**												
Pyrene	129-00-0	mg/kg	0.137	< 0.01 U	**0.0083 T**	**0.0051 T**	**0.0033 T**	**0.017**	**0.014**	< 0.0098 U	< 0.0099 U	**0.0025 T**	**0.0026 T**	**0.0043 T**	**0.99 JD**
Pesticides/Herbicides															
2,4'-DDD	53-19-0	mg/kg		< 0.00099 U	**0.0023 J**	< 0.0019 U	< 0.00099 U	< 0.001 U	< 0.00099 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.00099 U	< 0.00099 U	< 0.098 U
2,4'-DDE	3424-82-6	mg/kg		< 0.00099 U	< 0.001 U	< 0.00099 U	< 0.00099 U	< 0.001 U	< 0.00099 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.00099 U	< 0.00099 U	< 0.074 U
2,4'-DDT	789-02-6	mg/kg		< 0.00099 U	**0.0012 J**	< 0.00099 U	< 0.00099 U	< 0.001 U	< 0.00099 U	**0.0011**	**0.0017**	< 0.001 U	< 0.00099 U	**0.0019**	**0.9 D**
4,4'-DDD	72-54-8	mg/kg	0.000000364	< 0.00099 U	**0.0013**	**0.00035 J**	< 0.00099 U	**0.00022 T**	< 0.00099 U	< 0.001 U	**0.00026 T**	< 0.001 U	< 0.00099 U	< 0.00099 U	**0.13 D**
4,4'-DDE	72-55-9	mg/kg	0.0000000763	< 0.00099 U	**0.00045 T**	**0.0029 J**	< 0.00099 U	< 0.001 U	< 0.00099 U	**0.0016**	**0.0021**	**0.00049 T**	< 0.00099 U	< 0.00099 U	**0.39 J**
4,4'-DDT	50-29-3	mg/kg	0.000000814	< 0.00099 U	**0.0018**	**0.01**	< 0.00099 U	< 0.001 U	< 0.00099 U	**0.0018**	**0.0033**	< 0.001 U	< 0.00099 U	**0.0036**	**1.2 J**
Aldrin	309-00-2	mg/kg	0.0000000020	< 0.00099 U	< 0.001 U	**0.0061**	< 0.00099 U	< 0.001 U	< 0.00099 U	< 0.001 U	**0.002**	< 0.001 U	< 0.00099 U	< 0.00099 U	**9.4 D**
Alpha-BHC	319-84-6	mg/kg	0.0000000982	--	--	--	--	--	--	--	--	--	--	--	--
Beta-BHC	319-85-7	mg/kg	0.0000034	--	--	--	--	--	--	--	--	--	--	--	--
cis-Chlordane	5103-71-9	mg/kg	0.00000529	--	--	--	--	--	--	--	--	--	--	--	--
Delta-BHC	319-86-8	mg/kg	6	--	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	mg/kg	0.0000000309	< 0.00099 U	**0.00058 J**	**0.027**	< 0.00099 U	< 0.001 U	< 0.00099 U	< 0.001 U	**0.0017**	< 0.001 U	< 0.00099 U	< 0.0017 U	< 0.071 U
Endosulfan I	959-98-8	mg/kg	0.0000202	--	--	--	--	--	--	--	--	--	--	--	--
Endosulfan II	33213-65-9	mg/kg	0.0000202	--	--	--	--	--	--	--	--	--	--	--	--
Endosulfan Sulfate	1031-07-8	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
Endrin	72-20-8	mg/kg	0.0000222	--	--	--	--	--	--	--	--	--	--	--	--
Endrin Aldehyde	7421-93-4	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
Endrin ketone	53494-70-5	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	mg/kg	0.00000000334	< 0.00099 U	< 0.001 U	< 0.00099 U	< 0.00099 U	< 0.001 U	**0.00056 T**	< 0.001 U	< 0.001 U	< 0.001 U	< 0.00099 U	< 0.00099 U	< 0.0099 U
Heptachlor Epoxide	1024-57-3	mg/kg	0.0000002	--	--	--	--	--	--	--	--	--	--	--	--
Lindane	58-89-9	mg/kg	0.000205	< 0.00099 U	< 0.001 U	< 0.00099 U	< 0.00099 U	< 0.001 U	< 0.00099 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.00099 U	< 0.00099 U	< 0.0099 U
Methoxychlor	72-43-5	mg/kg	0.00161	--	--	--	--	--	--	--	--	--	--	--	--
Total Chlordane	57-74-9	mg/kg	0.00000113	< 0.0099 U	< 0.01 U	< 0.0099 U	< 0.0099 U	< 0.01 U	< 0.0099 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.0099 U	< 0.0099 U	< 5 U
Toxaphene	8001-35-2	mg/kg	0.00000307	--	--	--	--	--	--	--	--	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	0.00000529	--	--	--	--	--	--	--	--	--	--	--	--

Table D.3. Historical Soil Chemical Analytical Results Excluding PCBs - Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-15	SB-17	SB-18A	SB-19	SB-20A	SB-21	SB-22	SB-22	SB-23	SB-24	SB-25
			Date	10/01/2007	07/27/2011	07/27/2011	07/28/2011	07/27/2011	07/27/2011	07/27/2011	07/27/2011	07/28/2011	07/28/2011	07/28/2011
			Sample ID	SB-15-3.5	SB17-10.0-072711	SB18A-9.0-072711	SB19-8.0-072811	SB20A-8.5-072711	SB21-9.0-072711	SB22-10.0-072711	SB22-14.0-072711	SB23-8.0-072811	SB24-7.0-072811	SB25-10.0-072811
			Depth	4 - 6 ft	10 - 10 ft	9 - 9 ft	8 - 8 ft	8.5 - 8.5 ft	9 - 9 ft	10 - 10 ft	14 - 14 ft	8 - 8 ft	7 - 7 ft	10 - 10 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**											
Metals														
Arsenic	7440-38-2	mg/kg	7	**4.5**	--	--	--	--	< 12 U	< 13 U	--	--	--	--
Barium	7440-39-3	mg/kg	8.26	--	--	--	--	--	**31**	**35**	--	--	--	--
Cadmium	7440-43-9	mg/kg	1	**4.97**	--	--	--	--	**0.61**	< 0.65 U	--	--	--	--
Chromium	7440-47-3	mg/kg	48	**192**	--	--	--	--	**27**	**25**	--	--	--	--
Copper	7440-50-8	mg/kg	36	**69.6**	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	mg/kg	50	**1030**	--	--	--	--	**46**	**23**	--	--	--	--
Mercury	7439-97-6	mg/kg	0.07	**5.81**	--	--	--	--	< 0.3 U	< 0.32 U	--	--	--	--
Selenium	7782-49-2	mg/kg	0.3	--	--	--	--	--	< 12 U	< 13 U	--	--	--	--
Silver	7440-22-4	mg/kg	0.0163	**0.136**	--	--	--	--	< 0.59 U	< 0.65 U	--	--	--	--
Zinc	7440-66-6	mg/kg	85	**515**	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons														
Gasoline Range Organics	TPH-GRO	mg/kg	30	**150 J**	--	--	--	< 6 U	< 6.6 U	< 7.2 U	--	--	--	--
Diesel Range Organics	TPH-DRO	mg/kg	260	**4100 J**	**34 N**	< 29 U	< 170 U	**170 N**	**400 N**	**1600 N**	< 32 U	< 27 U	< 28 U	< 28 U
Motor Oil Range Organics	TPH-ORO	mg/kg	2000	**10000 J**	**220**	**82**	**780**	**1200**	**2900**	**6700**	< 63 U	< 54 U	< 55 U	< 56 U
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	2000	**14100 J**	**254 J**	**96.5**	**865**	**1370 J**	**3300 J**	**8300 J**	< 63 U	< 54 U	< 55 U	< 56 U
Volatile Organic Compounds														
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	38.5	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	21.1	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	0.00011	< 0.0075 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	0.000326	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,1-Dichloroethane	75-34-3	mg/kg	175	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,1-Dichloroethene	75-35-4	mg/kg	1.36	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,1-Dichloropropene	563-58-6	mg/kg		< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	20	< 0.03 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	0.0333	< 0.0075 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.000072	< 0.03 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	mg/kg	800	< 0.03 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	1.25	< 0.03 U	--	--	--	--	< 0.33 U	< 0.38 U	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	0.5	< 0.03 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	0.00307	< 0.0075 U	--	--	--	--	< 0.066 U	**0.11**	--	--	--	--
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	0.0237	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,2-Dichloropropane	78-87-5	mg/kg	0.00103	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	800	**0.058**	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg		< 0.0075 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
1,3-Dichloropropane	142-28-9	mg/kg		< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	0.00807	< 0.0075 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
2,2-Dichloropropane	594-20-7	mg/kg		< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
2-Butanone	78-93-3	mg/kg	48000	**0.0061 J**	--	--	--	--	**0.017**	< 0.38 U	--	--	--	--
2-Chloroethyl Vinyl Ether	110-75-8	mg/kg		--	--	--	--	--	< 0.0057 U	< 0.38 U	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	1600	< 0.03 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
2-Hexanone	591-78-6	mg/kg	400	< 0.03 U	--	--	--	--	< 0.0057 U	< 0.38 U	--	--	--	--
4-Chlorotoluene	106-43-4	mg/kg		< 0.03 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	6400	< 0.03 U	--	--	--	--	< 0.0057 U	< 0.38 U	--	--	--	--
Acetone	67-64-1	mg/kg	72000	**0.044**	--	--	--	--	**0.11**	< 0.38 U	--	--	--	--
Bromobenzene	108-86-1	mg/kg	640	< 0.0075 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
Bromochloromethane	74-97-5	mg/kg		< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Bromodichloromethane	75-27-4	mg/kg	0.000957	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Bromoform	75-25-2	mg/kg	0.00495	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Bromomethane	74-83-9	mg/kg	0.0792	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Carbon Disulfide	75-15-0	mg/kg	8000	**0.00067 J**	--	--	--	--	**0.0093**	< 0.076 U	--	--	--	--
Carbon Tetrachloride	56-23-5	mg/kg	0.000154	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Chlorobenzene	108-90-7	mg/kg	0.102	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--

Table D.3. Historical Soil Chemical Analytical Results Excluding PCBs - Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-15	SB-17	SB-18A	SB-19	SB-20A	SB-21	SB-22	SB-22	SB-23	SB-24	SB-25
			Date	10/01/2007	07/27/2011	07/27/2011	07/28/2011	07/27/2011	07/27/2011	07/27/2011	07/27/2011	07/28/2011	07/28/2011	07/28/2011
			Sample ID	SB-15-3.5	SB17-10.0-072711	SB18A-9.0-072711	SB19-8.0-072811	SB20A-8.5-072711	SB21-9.0-072711	SB22-10.0-072711	SB22-14.0-072711	SB23-8.0-072811	SB24-7.0-072811	SB25-10.0-072811
			Depth	4 - 6 ft	10 - 10 ft	9 - 9 ft	8 - 8 ft	8.5 - 8.5 ft	9 - 9 ft	10 - 10 ft	14 - 14 ft	8 - 8 ft	7 - 7 ft	10 - 10 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**											
Chloroethane	75-00-3	mg/kg		< 0.0075 U	--	--	--	--	< 0.0057 U	< 0.38 U	--	--	--	--
Chloroform	67-66-3	mg/kg	0.0524	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Chloromethane	74-87-3	mg/kg		< 0.0075 U	--	--	--	--	< 0.0057 U	< 0.38 U	--	--	--	--
cis-1,2-Dichloroethene (cDCE)	156-59-2	mg/kg	160	**0.00054 J**	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
cis-1,3-Dichloropropene	10061-01-5	mg/kg	0.000627	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Dibromochloromethane	124-48-1	mg/kg	0.000769	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Dibromomethane	74-95-3	mg/kg	800	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	16000	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Isopropylbenzene	98-82-8	mg/kg	8000	**0.01 J**	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
m,p-Xylenes	179601-23-1	mg/kg	16000	**0.0046 J**	--	--	--	< 0.06 U	< 0.0023 U	< 0.15 U	--	--	--	--
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	556	--	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	0.0297	< 0.00097 UJ	--	--	--	--	< 0.011 U	< 0.76 U	--	--	--	--
Methyliodide	74-88-4	mg/kg		--	--	--	--	--	< 0.0057 U	< 0.38 U	--	--	--	--
n-Butylbenzene	104-51-8	mg/kg	4000	< 0.03 U	--	--	--	--	< 0.066 U	**0.17**	--	--	--	--
n-Propylbenzene	103-65-1	mg/kg	8000	< 0.03 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
o-Xylene	95-47-6	mg/kg	16000	**0.0013 J**	--	--	--	< 0.06 U	< 0.0011 U	< 0.076 U	--	--	--	--
p-Isopropyltoluene	99-87-6	mg/kg		**0.039**	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
sec-Butylbenzene	135-98-8	mg/kg	8000	< 0.03 U	--	--	--	--	< 0.066 U	**0.14**	--	--	--	--
Styrene	100-42-5	mg/kg	300	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
tert-Butylbenzene	98-06-6	mg/kg	8000	< 0.03 U	--	--	--	--	< 0.066 U	< 0.076 U	--	--	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	0.0016	**0.00073 J**	--	--	--	--	**0.002**	< 0.076 U	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	0.325	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	0.000627	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	0.000266	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Trichlorofluoromethane	75-69-4	mg/kg	24000	< 0.0075 U	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Vinyl Acetate	108-05-4	mg/kg	80000	--	--	--	--	--	< 0.0057 U	< 0.38 U	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	0.0000549	**0.0027 J**	--	--	--	--	< 0.0011 U	< 0.076 U	--	--	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes														
Benzene	71-43-2	mg/kg	0.000558	< 0.0075 U	--	--	--	< 0.02 U	< 0.0011 U	< 0.076 U	--	--	--	--
Toluene	108-88-3	mg/kg	0.0555	**0.0023 J**	--	--	--	< 0.06 U	< 0.0057 U	< 0.38 U	--	--	--	--
Ethylbenzene	100-41-4	mg/kg	0.0152	**0.0078**	--	--	--	< 0.06 U	< 0.0011 U	< 0.076 U	--	--	--	--
Semivolatile Organic Compounds														
1,2-Dinitrobenzene	528-29-0	mg/kg	8	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
1,2-Diphenylhydrazine	122-66-7	mg/kg	1.07	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
1,3-Dinitrobenzene	99-65-0	mg/kg	8	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
1,4-Dinitrobenzene	100-25-4	mg/kg	8	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	485	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2,3,5,6-Tetrachlorophenol	935-95-5	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2,3-Dichloroaniline	608-27-5	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	mg/kg	1.13	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	mg/kg	0.000187	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2,4-Dichlorophenol	120-83-2	mg/kg	0.00434	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2,4-Dimethylphenol	105-67-9	mg/kg	0.00314	< 5 R	--	--	--	--	< 4 U	< 4.3 U	--	--	--	--
2,4-Dinitrophenol	51-28-5	mg/kg	0.0287	--	--	--	--	--	**2.3**	< 2.2 U	--	--	--	--
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0000688	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2,6-Dinitrotoluene	606-20-2	mg/kg	0.106	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2-Chloronaphthalene	91-58-7	mg/kg	6400	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2-Chlorophenol	95-57-8	mg/kg	0.0115	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2-Methylphenol	95-48-7	mg/kg	0.0102	< 0.99 U	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2-Nitroaniline	88-74-4	mg/kg	800	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
2-Nitrophenol	88-75-5	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
3 & 4 Methylphenol	65794-96-9	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	mg/kg	0.00000334	--	--	--	--	--	< 4 U	< 4.3 U	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--

Table D.3. Historical Soil Chemical Analytical Results Excluding PCBs - Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-15	SB-17	SB-18A	SB-19	SB-20A	SB-21	SB-22	SB-22	SB-23	SB-24	SB-25
			Date	10/01/2007	07/27/2011	07/27/2011	07/28/2011	07/27/2011	07/27/2011	07/27/2011	07/27/2011	07/28/2011	07/28/2011	07/28/2011
			Sample ID	SB-15-3.5	SB17-10.0-072711	SB18A-9.0-072711	SB19-8.0-072811	SB20A-8.5-072711	SB21-9.0-072711	SB22-10.0-072711	SB22-14.0-072711	SB23-8.0-072811	SB24-7.0-072811	SB25-10.0-072811
			Depth	4 - 6 ft	10 - 10 ft	9 - 9 ft	8 - 8 ft	8.5 - 8.5 ft	9 - 9 ft	10 - 10 ft	14 - 14 ft	8 - 8 ft	7 - 7 ft	10 - 10 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**											
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg		--	--	--	--	--	< 2 U	< 2.2 U	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
4-Chloroaniline	106-47-8	mg/kg	0.81	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
4-Methylphenol	106-44-5	mg/kg	0.67	< 0.99 U	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
4-Nitrophenol	100-02-7	mg/kg	7	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Aniline	62-53-3	mg/kg	150	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Benzidine	92-87-5	mg/kg	0.00371	--	--	--	--	--	< 4 U	< 4.3 U	--	--	--	--
Benzoic acid	65-85-0	mg/kg	0.169	< 20 U	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	100-51-6	mg/kg	0.057	< 2 U	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Benzyl butyl phthalate	85-68-7	mg/kg	0.000182	< 0.99 U	--	--	--	--	< 4 U	< 4.3 U	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Bis(2-chloroethyl) ether	111-44-4	mg/kg	0.0000218	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Bis(2-ethylhexyl) adipate	103-23-1	mg/kg	711	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	0.00512	**2.8 JD**	--	--	--	--	< 0.4 U	**0.74**	--	--	--	--
Carbazole	86-74-8	mg/kg		--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Dibenzofuran	132-64-9	mg/kg	0.54	< 0.99 U	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Diethyl phthalate	84-66-2	mg/kg	0.0341	< 0.99 U	--	--	--	--	< 2 U	< 2.2 U	--	--	--	--
Dimethyl phthalate	131-11-3	mg/kg	0.071	< 0.99 U	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Di-n-butyl phthalate	84-74-2	mg/kg	0.0149	**1.3 JD**	--	--	--	--	< 4 U	< 4.3 U	--	--	--	--
Di-n-octyl phthalate	117-84-0	mg/kg	0.326	< 0.99 U	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Hexachlorobenzene	118-74-1	mg/kg	0.000000401	< 0.99 U	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Hexachlorobutadiene	87-68-3	mg/kg	0.00054	< 0.03 U	--	--	--	--	< 0.33 U	< 0.38 U	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	mg/kg	0.2	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Hexachloroethane	67-72-1	mg/kg	0.0000413	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Isophorone	78-59-1	mg/kg	0.0367	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Nitrobenzene	98-95-3	mg/kg	0.0406	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
N-Nitrosodimethylamine	62-75-9	mg/kg	0.0167	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	0.000018	--	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
N-Nitrosodiphenylamine	86-30-6	mg/kg	0.00109	< 0.99 U	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Pentachlorophenol	87-86-5	mg/kg	0.00000176	< 9.9 U	--	--	--	--	< 2 U	< 2.2 U	--	--	--	--
Phenol	108-95-2	mg/kg	0.115	< 3 U	--	--	--	--	< 0.4 U	< 0.43 U	--	--	--	--
Pyridine	110-86-1	mg/kg	80	--	--	--	--	--	< 4 U	< 4.3 U	--	--	--	--
Polycyclic Aromatic Hydrocarbons														
1-Methylnaphthalene	90-12-0	mg/kg	29.4	--	--	--	--	--	< 0.016 U	**0.13**	--	--	--	--
2-Methylnaphthalene	91-57-6	mg/kg	0.67	**1.1 D**	--	--	--	--	< 0.016 U	< 0.015 U	--	--	--	--
Acenaphthene	83-32-9	mg/kg	0.0277	< 0.99 U	--	--	--	--	< 0.016 U	**0.21**	--	--	--	--
Acenaphthylene	208-96-8	mg/kg	1.3	< 0.99 U	--	--	--	--	< 0.016 U	**0.052**	--	--	--	--
Anthracene	120-12-7	mg/kg	0.0511	< 0.99 U	--	--	--	--	**0.016**	**0.51**	--	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	0.0000573	< 0.99 U	--	--	--	--	< 0.016 U	**0.12**	--	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	0.0000155	< 0.99 U	--	--	--	--	< 0.016 U	**0.17**	--	--	--	--
Benzo(b)fluoranthene	205-99-2	mg/kg	0.000197	< 0.99 U	--	--	--	--	< 0.016 U	**0.081**	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	mg/kg	0.67	< 0.99 U	--	--	--	--	< 0.016 U	**0.035**	--	--	--	--
Benzo(j,k)fluoranthene	Benz-jk-fluor	mg/kg		--	--	--	--	--	< 0.016 U	**0.066**	--	--	--	--
Benzo(k)fluoranthene	207-08-9	mg/kg	0.00197	< 0.99 U	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	mg/kg	0.00637	< 0.99 U	--	--	--	--	**0.022**	**0.19**	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.0000286	< 0.99 U	--	--	--	--	< 0.016 U	**0.017**	--	--	--	--
Fluoranthene	206-44-0	mg/kg	0.0899	**0.3 JD**	--	--	--	--	**0.023**	**0.46**	--	--	--	--
Fluorene	86-73-7	mg/kg	0.0294	**0.39 JD**	--	--	--	--	< 0.016 U	**0.45**	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0.000555	< 0.99 U	--	--	--	--	< 0.016 U	**0.029**	--	--	--	--
Naphthalene	91-20-3	mg/kg	0.00207	**0.36 JD**	--	--	--	--	< 0.016 U	**0.12**	--	--	--	--
Phenanthrene	85-01-8	mg/kg	1.5	**0.98 JD**	--	--	--	--	< 0.016 U	**0.045**	--	--	--	--

Table D.3. Historical Soil Chemical Analytical Results Excluding PCBs - Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-15	SB-17	SB-18A	SB-19	SB-20A	SB-21	SB-22	SB-22	SB-23	SB-24	SB-25
			Date	10/01/2007	07/27/2011	07/27/2011	07/28/2011	07/27/2011	07/27/2011	07/27/2011	07/27/2011	07/28/2011	07/28/2011	07/28/2011
			Sample ID	SB-15-3.5	SB17-10.0-072711	SB18A-9.0-072711	SB19-8.0-072811	SB20A-8.5-072711	SB21-9.0-072711	SB22-10.0-072711	SB22-14.0-072711	SB23-8.0-072811	SB24-7.0-072811	SB25-10.0-072811
			Depth	4 - 6 ft	10 - 10 ft	9 - 9 ft	8 - 8 ft	8.5 - 8.5 ft	9 - 9 ft	10 - 10 ft	14 - 14 ft	8 - 8 ft	7 - 7 ft	10 - 10 ft
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**											
Pyrene	129-00-0	mg/kg	0.137	**0.5 JD**	--	--	--	--	**0.031**	**0.45**	--	--	--	--
Pesticides/Herbicides														
2,4'-DDD	53-19-0	mg/kg		< 0.28 U	--	--	--	--	--	--	--	--	--	--
2,4'-DDE	3424-82-6	mg/kg		< 0.24 U	--	--	--	--	--	--	--	--	--	--
2,4'-DDT	789-02-6	mg/kg		**1.3 D**	--	--	--	--	--	--	--	--	--	--
4,4'-DDD	72-54-8	mg/kg	0.000000364	**0.2 D**	--	--	--	--	< 0.012 U	< 0.013 U	--	--	--	--
4,4'-DDE	72-55-9	mg/kg	0.0000000763	< 0.18 U	--	--	--	--	**0.32**	**0.19**	--	--	--	--
4,4'-DDT	50-29-3	mg/kg	0.000000814	**1.5 J**	--	--	--	--	< 0.012 U	< 0.013 U	--	--	--	--
Aldrin	309-00-2	mg/kg	0.0000000020	**0.76 D**	--	--	--	--	**0.018 P**	**3.5**	--	--	--	--
Alpha-BHC	319-84-6	mg/kg	0.0000000982	--	--	--	--	--	< 0.0059 U	< 0.0065 U	--	--	--	--
Beta-BHC	319-85-7	mg/kg	0.0000034	--	--	--	--	--	< 0.0059 U	< 0.0065 U	--	--	--	--
cis-Chlordane	5103-71-9	mg/kg	0.00000529	--	--	--	--	--	**0.047**	< 0.013 U	--	--	--	--
Delta-BHC	319-86-8	mg/kg	6	--	--	--	--	--	< 0.0059 U	**0.056 P**	--	--	--	--
Dieldrin	60-57-1	mg/kg	0.0000000309	< 0.1 U	--	--	--	--	**0.18 P**	**0.082 P**	--	--	--	--
Endosulfan I	959-98-8	mg/kg	0.0000202	--	--	--	--	--	< 0.0059 U	< 0.0065 U	--	--	--	--
Endosulfan II	33213-65-9	mg/kg	0.0000202	--	--	--	--	--	< 0.012 U	< 0.013 U	--	--	--	--
Endosulfan Sulfate	1031-07-8	mg/kg		--	--	--	--	--	< 0.012 U	< 0.013 U	--	--	--	--
Endrin	72-20-8	mg/kg	0.0000222	--	--	--	--	--	< 0.012 U	< 0.013 U	--	--	--	--
Endrin Aldehyde	7421-93-4	mg/kg		--	--	--	--	--	**0.16**	**0.036 P**	--	--	--	--
Endrin ketone	53494-70-5	mg/kg		--	--	--	--	--	< 0.012 U	< 0.013 U	--	--	--	--
Heptachlor	76-44-8	mg/kg	0.00000000334	< 0.1 U	--	--	--	--	**0.0076**	**0.017**	--	--	--	--
Heptachlor Epoxide	1024-57-3	mg/kg	0.0000002	--	--	--	--	--	< 0.0059 U	< 0.0065 U	--	--	--	--
Lindane	58-89-9	mg/kg	0.000205	< 0.1 U	--	--	--	--	< 0.0059 U	< 0.0065 U	--	--	--	--
Methoxychlor	72-43-5	mg/kg	0.00161	--	--	--	--	--	< 0.012 U	< 0.013 U	--	--	--	--
Total Chlordane	57-74-9	mg/kg	0.00000113	< 2.7 U	--	--	--	--	--	--	--	--	--	--
Toxaphene	8001-35-2	mg/kg	0.00000307	--	--	--	--	--	< 0.059 U	< 0.065 U	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	0.00000529	--	--	--	--	--	**0.18 P**	< 0.013 U	--	--	--	--

Table D.4. Historical Soil PCBs Analytical Results – Saturated Zone

FINAL

Project No. 190293, South Park Marina, Seattle, Washington

Notes:

a) Derivation and selection of RI screening levels presented in Table C-2.

b) Total PCB TEQ values are shown as reported in the historical analytical database. Total values for the complete dataset will be calculated and reported in the RI.

Bold - Analyte detected

Blue - Analyte exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

Data Qualifiers:

D - Dilution

J - The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

Sources:

Farallon Consulting, LLC, 2011, Analytical Data for Project 289-001, Prepared by OnSite Environmental Inc. August, 2011.

TIG Environmental, 2018b, South Park Marina (Facility/Site ID 44653368) Supplemental PCB Investigation Memorandum, September 11, 2018.

Table D.4. Historical Soil PCBs Analytical Results – Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	B-01	B-02	B-03	B-04	SB-01	SB-02	SB-03	SB-03	SB-04	SB-05	SB-06
			Date	11/17/2017	11/17/2017	11/17/2017	11/17/2017	09/27/2007	09/28/2007	09/27/2007	09/27/2007	09/27/2007	09/27/2007	09/28/2007
			Sample ID	B-01-8.5-9.5	B-02-6.5-7	B-03-6.5-7	B-04-6.5-7	SB-01-9	SB-02-9	SB-03-7	SB-03-13.5	SB-04-8	SB-05-8	SB-06-8
			Depth	8.5 - 9.5 ft	6.5 - 7 ft	6.5 - 7 ft	6.5 - 7 ft	9 - 11 ft	9 - 11 ft	7 - 9 ft	14 - 16 ft	8 - 10 ft	8 - 10 ft	8 - 10 ft
Analyte	**CASRN**	**Unit**	**RI Screening Level[(a)]**											
PCB Aroclors														
Aroclor 1016	12674-11-2	mg/kg		< 0.064 U	< 6.3 U	< 1.3 U	< 1.2 U	< 0.0099 U	< 0.01 U	< 0.0099 U	< 0.0099 U	< 0.01 U	< 0.0099 U	< 0.01 U
Aroclor 1221	11104-28-2	mg/kg		< 0.064 U	< 6.3 U	< 1.3 U	< 1.2 U	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	mg/kg		< 0.064 U	< 6.3 U	< 1.3 U	< 1.2 U	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	mg/kg		< 0.064 U	**15**	**3.6**	**2.3**	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	mg/kg		< 0.064 U	< 6.3 U	< 1.3 U	< 1.2 U	< 0.0099 U	< 0.01 U	< 0.0099 U	< 0.0099 U	< 0.01 U	< 0.0099 U	< 0.01 U
Aroclor 1254	11097-69-1	mg/kg		< 0.064 U	**93**	**7**	**6**	< 0.0099 U	< 0.01 U	**0.092**	**0.039**	< 0.01 U	< 0.0099 U	**0.023**
Aroclor 1260	11096-82-5	mg/kg		< 0.064 U	**23**	**3**	**2.4**	< 0.0099 U	**0.021**	**0.088**	< 0.0099 U	< 0.01 U	< 0.0099 U	< 0.01 U
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	0.00000217	< 0.064 UT	**131**	**13.6**	**10.7**	< 0.0099 U	**0.021**	**0.18**	**0.039**	< 0.01 UT	< 0.0099 UT	**0.023**
PCB Congeners[(b)]														
Total PCB Congeners	T-PCBCong	mg/kg	0.00000217	--	**99.1**	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 0)	PCB-TEQ-0U	mg/kg	0.0000000014	--	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	PCB-TEQ-1U	mg/kg	0.0000000014	--	--	--	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	PCB-TEQ-1/2U	mg/kg	0.0000000014	--	--	--	--	--	--	--	--	--	--	--
Total Dioxin-like PCBs (TEQ)	T-DLPCBs	mg/kg	0.0000000014	--	--	--	--	--	--	--	--	--	--	--

Table D.4. Historical Soil PCBs Analytical Results – Saturated Zone

Project No. 190293, South Park Marina, Seattle, Washington

			Location	SB-07	SB-08	SB-09	SB-10	SB-14	SB-15	SB-21	SB-22
			Date	09/28/2007	09/27/2007	09/27/2007	09/28/2007	10/01/2007	10/01/2007	07/27/2011	07/27/2011
			Sample ID	SB-07-9	SB-08-9	SB-09-10	SB-10-14	SB-14-7.5	SB-15-3.5	SB21-9.0-072711	SB22-10.0-072711
			Depth	9 - 11 ft	9 - 11 ft	10 - 12 ft	14 - 16 ft	8 - 10 ft	4 - 6 ft	9 - 9 ft	10 - 10 ft
Analyte	**CASRN**	**Unit**	**RI Screening Level[(a)]**								
PCB Aroclors											
Aroclor 1016	12674-11-2	mg/kg		< 0.01 U	< 0.01 U	< 0.0099 U	< 0.0099 U	< 0.099 U	< 1 U	< 1.2 U	< 0.65 U
Aroclor 1221	11104-28-2	mg/kg		--	--	--	--	--	--	< 1.2 U	< 0.65 U
Aroclor 1232	11141-16-5	mg/kg		--	--	--	--	--	--	< 1.2 U	< 0.65 U
Aroclor 1242	53469-21-9	mg/kg		--	--	--	--	--	--	< 1.2 U	< 0.65 U
Aroclor 1248	12672-29-6	mg/kg		< 0.01 U	< 0.01 U	< 0.0099 U	< 0.0099 U	< 0.099 U	< 1 U	< 1.2 U	< 0.65 U
Aroclor 1254	11097-69-1	mg/kg		**0.0059 J**	< 0.01 U	< 0.0099 U	**0.022**	**7 D**	**12 D**	**8.9**	**3.1**
Aroclor 1260	11096-82-5	mg/kg		< 0.01 U	< 0.01 U	< 0.0099 U	**0.024**	**4.9 D**	< 1 U	< 1.2 U	< 0.65 U
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	0.00000217	**0.0059**	< 0.01 U	< 0.0099 U	**0.046**	**11.9**	**12**	**8.9**	**3.1**
PCB Congeners[(b)]											
Total PCB Congeners	T-PCBCong	mg/kg	0.00000217	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 0)	PCB-TEQ-0U	mg/kg	0.0000000014	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	PCB-TEQ-1U	mg/kg	0.0000000014	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	PCB-TEQ-1/2U	mg/kg	0.0000000014	--	--	--	--	--	--	--	--
Total Dioxin-like PCBs (TEQ)	T-DLPCBs	mg/kg	0.0000000014	--	--	--	--	--	--	--	--

Table D.5. Historical Groundwater Chemical Analytical Results Excluding PCBs

FINAL

Project No. 190293, South Park Marina, Seattle, Washington

Notes:

a) Derivation and selection of RI screening levels presented in Table C-1.

Bold - Analyte detected

Blue shading - Analyte exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

cPAH and total dixion/furan TEQ calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). A TEQ calculation is made by multiplying the result by its corresponding toxicity equivalency factor and summing the result. For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column.

Diesel- and oil-range TPH calculation note: Results were calculated as the sum of Diesel Range Organic and Motor Oil Range Organics, with non-detects summed at 1/2 the reporting limit. If all components were non-detect, the sum is reported as non-detect at the largest component's reporting limit.

Data Qualifiers:

B - This compound was also detected in the method blank.

D - Dilution

i - The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference

J - The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.

P - The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.

T - Laboratory blank contamination (e.g., method blank, instrument, etc.)

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

Sources:

SAIC, 2008a, South Park Marina Seattle, Washington, Additional Site Characterization Activities Data Report Final, Prepared for Washington State Department of Ecology, June 2008

SAIC, 2008b, Final Technical Memorandum Subject: Transmittal of Low-Level Mercury Results, July 2008 Groundwater Sampling Round, South Park Marina Site, Seattle, Washington, Prepared for Mark Edens Washington State Department of Ecology, December 31, 2008.

Farallon Consulting, LLC, 2011, Analytical Data for Project 289-001, Prepared by OnSite Environmental Inc. August, 2011.

Table D.5. Historical Groundwater Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Fraction	Unit	Location / Date / Sample ID RI Screening Level[a]	MW-1 10/09/2007 MW-1-100907	MW-1 03/12/2008 MW-1-031208	MW-2 10/09/2007 MW-2-100907	MW-2 03/12/2008 MW-2-031208	MW-3 10/08/2007 MW-3-100807	MW-3 (duplicate) 10/08/2007 MW-3-FD-100807	MW-3 03/12/2008 MW-3-031208	SB-21 07/27/2011 SB21-WATER-072711	SB-22 07/27/2011 SB22-WATER-072711
Metals													
Arsenic	7440-38-2	D	ug/L	8	**4.46**	--	**8.08**	--	**3.26**	**2.78**	--	--	--
Arsenic	7440-38-2	T	ug/L	8	**4.68**	**2.91**	**8.07**	**1.56**	**3.13**	**2.79**	**1.59**	< 3.3 U	< 3.3 U
Barium	7440-39-3	T	ug/L	200	--	--	--	--	--	--	--	**47**	< 28 U
Cadmium	7440-43-9	D	ug/L	1.19	**0.026**	--	**0.105**	--	**0.032**	**0.035**	--	--	--
Cadmium	7440-43-9	T	ug/L	1.19	**0.022**	**0.013 B**	**0.091**	**0.015 B**	**0.04**	**0.033**	**0.017 B**	< 4.4 U	< 4.4 U
Chromium	7440-47-3	D	ug/L		**1.61**	--	**25.2**	--	**1.25**	**3.98**	--	--	--
Chromium	7440-47-3	T	ug/L		**2.03**	**27.3**	**40.4**	**15.7**	**1.52**	**1.31**	**19.4**	< 11 U	< 11 U
Copper	7440-50-8	D	ug/L	3.1	**2.77**	--	**6.27**	--	**5.11**	**5.04**	--	--	--
Copper	7440-50-8	T	ug/L	3.1	**2.83**	**6.63**	**9.7**	**5.81**	**5.23**	**5.81**	**9.83**	--	--
Lead	7439-92-1	D	ug/L	8.1	**0.057**	--	**0.021**	--	**0.055**	**0.047**	--	--	--
Lead	7439-92-1	T	ug/L	8.1	**0.07**	**0.128**	**0.046**	**0.189**	**0.191**	**0.192**	**0.519**	< 1.1 U	< 1.1 U
Mercury	7439-97-6	D	ug/L	0.025	< 0.2 U	--	< 0.2 U	--	< 0.2 U	< 0.2 U	--	--	--
Mercury	7439-97-6	T	ug/L	0.025	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.5 U	< 0.5 U
Selenium	7782-49-2	T	ug/L	71	--	--	--	--	--	--	--	< 5.6 U	< 5.6 U
Silver	7440-22-4	D	ug/L	1.9	< 0.02 U	--	< 0.02 U	--	< 0.02 U	< 0.02 U	--	--	--
Silver	7440-22-4	T	ug/L	1.9	< 0.02 U	< 0.012 U	**0.005 B**	< 0.005 U	**0.01 B**	< 0.02 U	< 0.011 U	< 11 U	< 11 U
Zinc	7440-66-6	D	ug/L	81	**2.1**	--	**4.1**	--	**5.2**	**4.2**	--	--	--
Zinc	7440-66-6	T	ug/L	81	**4.7**	**2.93**	**4.9**	**3.5**	**4.5**	**5.2**	**3.84**	--	--
Total Petroleum Hydrocarbons													
Gasoline Range Organics	TPH-GRO	N	ug/L		< 250 U	--	< 250 U	--	< 250 U	< 250 U	--	< 100 U	< 100 U
Diesel Range Organics	TPH-DRO	N	ug/L		< 630 U	--	< 630 U	--	< 630 U	< 630 U	--	< 270 U	< 270 U
Motor Oil Range Organics	TPH-ORO	N	ug/L		< 630 U	--	< 630 U	--	< 630 U	< 630 U	--	< 440 U	< 430 U
Diesel and Oil Extended Range Organics	TPH-EXT	N	ug/L		< 630 U	--	< 630 U	--	< 630 U	< 630 U	--	< 440 U	< 430 U
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	630-20-6	N	ug/L	7.36	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,1,1-Trichloroethane	71-55-6	N	ug/L	5460	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	**0.13 T**	< 0.5 U	--	--
1,1,2,2-Tetrachloroethane	79-34-5	N	ug/L	0.3	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,1,2-Trichloroethane	79-00-5	N	ug/L	0.9	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,1-Dichloroethane	75-34-3	N	ug/L	11.1	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,1-Dichloroethene	75-35-4	N	ug/L	129	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,1-Dichloropropene	563-58-6	N	ug/L		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,2,3-Trichlorobenzene	87-61-6	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
1,2,3-Trichloropropane	96-18-4	N	ug/L		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,2,4-Trichlorobenzene	120-82-1	N	ug/L	0.037	< 0.21 U	< 2 U	< 0.21 U	< 2 U	< 0.21 U	< 0.21 U	< 2 U	--	--
1,2,4-Trimethylbenzene	95-63-6	N	ug/L	239	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
1,2-Dibromo-3-chloropropane	96-12-8	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
1,2-Dibromoethane (EDB)	106-93-4	N	ug/L	0.271	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
1,2-Dichlorobenzene	95-50-1	N	ug/L	4.61	< 0.21 U	< 0.5 U	< 0.21 U	< 0.5 U	< 0.21 U	< 0.21 U	< 0.5 U	< 0.2 U	< 0.2 U
1,2-Dichloroethane (EDC)	107-06-2	N	ug/L	4.22	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,2-Dichloropropane	78-87-5	N	ug/L	3.1	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,3,5-Trimethylbenzene	108-67-8	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
1,3-Dichlorobenzene	541-73-1	N	ug/L	2	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
1,3-Dichloropropane	142-28-9	N	ug/L		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--

Table D.5. Historical Groundwater Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

				Location Date Sample ID	MW-1 10/09/2007 MW-1-100907	MW-1 03/12/2008 MW-1-031208	MW-2 10/09/2007 MW-2-100907	MW-2 03/12/2008 MW-2-031208	MW-3 10/08/2007 MW-3-100807	MW-3 (duplicate) 10/08/2007 MW-3-FD-100807	MW-3 03/12/2008 MW-3-031208	SB-21 07/27/2011 SB21-WATER-072711	SB-22 07/27/2011 SB22-WATER-072711
Analyte	**CAS_RN**	**Fraction**	**Unit**	**RI Screening Level[a]**									
1,4-Dichlorobenzene	106-46-7	N	ug/L	4.93	< 0.21 U	< 0.5 U	< 0.21 U	< 0.5 U	< 0.21 U	< 0.21 U	< 0.5 U	--	--
2,2-Dichloropropane	594-20-7	N	ug/L		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
2-Butanone	78-93-3	N	ug/L	1750000	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 5 U	< 5 U
2-Chlorotoluene	95-49-8	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
2-Hexanone	591-78-6	N	ug/L		< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	--	--
4-Chlorotoluene	106-43-4	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
4-Methyl-2-pentanone	108-10-1	N	ug/L	470000	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	--	--
Acetone	67-64-1	N	ug/L		< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	--	--
Bromobenzene	108-86-1	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
Bromochloromethane	74-97-5	N	ug/L		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Bromodichloromethane	75-27-4	N	ug/L	1.82	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Bromoform	75-25-2	N	ug/L	12	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Bromomethane	74-83-9	N	ug/L	12.9	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Carbon Disulfide	75-15-0	N	ug/L	399	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.2 U	< 0.2 U
Carbon Tetrachloride	56-23-5	N	ug/L	0.35	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Chlorobenzene	108-90-7	N	ug/L	200	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Chloroethane	75-00-3	N	ug/L	18500	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Chloroform	67-66-3	N	ug/L	1.19	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Chloromethane	74-87-3	N	ug/L	153	< 0.5 U	**0.82**	< 0.5 U	**0.36 T**	**0.46 T**	**0.4 T**	**0.9**	--	--
cis-1,2-Dichloroethene (DCE)	156-59-2	N	ug/L		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
cis-1,3-Dichloropropene	10061-01-5	N	ug/L	2	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Dibromochloromethane	124-48-1	N	ug/L	2.2	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Dibromomethane	74-95-3	N	ug/L		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Dichlorodifluoromethane	75-71-8	N	ug/L	5.65	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Isopropylbenzene	98-82-8	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
m,p-Xylenes	179601-23-1	N	ug/L		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Methylene Chloride	75-09-2	N	ug/L	100	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
n-Butylbenzene	104-51-8	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 0.2 U	< 0.2 U
n-Propylbenzene	103-65-1	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
o-Xylene	95-47-6	N	ug/L	432	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
p-Isopropyltoluene	99-87-6	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
sec-Butylbenzene	135-98-8	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 0.2 U	< 0.2 U
Styrene	100-42-5	N	ug/L	8190	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
tert-Butylbenzene	98-06-6	N	ug/L		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	--	--
Tetrachloroethene (PCE)	127-18-4	N	ug/L	2.9	< 0.5 U	< 0.5 U	< 0.5 U	**0.2 T**	**0.16 T**	**0.18 T**	**0.18 T**	< 0.2 U	< 0.2 U
trans-1,2-Dichloroethene	156-60-5	N	ug/L	1000	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
trans-1,3-Dichloropropene	10061-02-6	N	ug/L	2	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Trichloroethene (TCE)	79-01-6	N	ug/L	0.7	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Trichlorofluoromethane	75-69-4	N	ug/L	120	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Vinyl Chloride	75-01-4	N	ug/L	0.18	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes													
Benzene	71-43-2	N	ug/L	1.6	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.2 U	< 0.2 U
Toluene	108-88-3	N	ug/L	130	< 0.5 U	< 0.5 U	**0.11 T**	< 0.5 U	**0.12 T**	**0.18 T**	< 0.5 U	< 1 U	< 1 U
Ethylbenzene	100-41-4	N	ug/L	31	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.2 U	< 0.2 U
Total Xylenes	1330-20-7	N	ug/L	332	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.6 U	< 0.6 U

Table D.5. Historical Groundwater Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

				Location Date Sample ID	MW-1 10/09/2007 MW-1-100907	MW-1 03/12/2008 MW-1-031208	MW-2 10/09/2007 MW-2-100907	MW-2 03/12/2008 MW-2-031208	MW-3 10/08/2007 MW-3-100807	MW-3 (duplicate) 10/08/2007 MW-3-FD-100807	MW-3 03/12/2008 MW-3-031208	SB-21 07/27/2011 SB21-WATER-072711	SB-22 07/27/2011 SB22-WATER-072711
Analyte	CAS_RN	Fraction	Unit	RI Screening Level[a]									
Semivolatile Organic Compounds													
2,4-Dimethylphenol	105-67-9	N	ug/L	6.34	< 4.1 U	--	< 4.1 U	--	< 4.1 U	< 4.1 U	--	--	--
2,4-Dinitrophenol	51-28-5	N	ug/L	100	--	--	--	--	--	--	--	< 5 U	< 5.2 U
2-Methylphenol	95-48-7	N	ug/L	27	< 0.51 U	--	< 0.51 U	--	< 0.51 U	< 0.51 U	--	--	--
4-Methylphenol	106-44-5	N	ug/L		< 0.51 U	--	< 0.51 U	--	< 0.51 U	< 0.51 U	--	--	--
Benzoic acid	65-85-0	N	ug/L	589	< 5.1 U	--	< 5.1 U	--	< 5.1 U	< 5.1 U	--	--	--
Benzyl alcohol	100-51-6	N	ug/L		< 5.1 U	--	< 5.1 U	--	< 5.1 U	< 5.1 U	--	--	--
Benzyl butyl phthalate	85-68-7	N	ug/L	0.013	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	N	ug/L	0.046	< 1.1 U	--	< 1.1 U	--	< 1.1 U	< 1.1 U	--	< 1 U	< 1 U
Dibenzofuran	132-64-9	N	ug/L		< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	--	--
Diethyl phthalate	84-66-2	N	ug/L	92.6	**0.036 T**	--	**0.059 T**	--	**0.047 T**	**0.041 T**	--	--	--
Dimethyl phthalate	131-11-3	N	ug/L	600	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	--	--
Di-n-butyl phthalate	84-74-2	N	ug/L	8	**0.065 T**	--	**0.08 T**	--	**0.08 T**	**0.094 T**	--	--	--
Di-n-octyl phthalate	117-84-0	N	ug/L	0.00392	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	--	--
Hexachlorobenzene	118-74-1	N	ug/L	0.000005	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	--	--
Hexachlorobutadiene	87-68-3	N	ug/L	0.01	< 0.21 U	< 2 U	< 0.21 U	< 2 U	< 0.21 U	< 0.21 U	< 2 U	--	--
N-Nitrosodiphenylamine	86-30-6	N	ug/L	0.69	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	--	--
Pentachlorophenol	87-86-5	N	ug/L	0.002	< 1.1 U	--	< 1.1 U	--	< 1.1 U	< 1.1 U	--	--	--
Phenol	108-95-2	N	ug/L	365	< 0.51 U	--	< 0.51 U	--	< 0.51 U	< 0.51 U	--	--	--
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	90-12-0	N	ug/L		--	--	--	--	--	--	--	< 0.1 U	< 0.1 U
2-Methylnaphthalene	91-57-6	N	ug/L		< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	--	--
Acenaphthene	83-32-9	N	ug/L	5.34	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.1 U	< 0.1 U
Acenaphthylene	208-96-8	N	ug/L		< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.1 U	< 0.1 U
Anthracene	120-12-7	N	ug/L	2.15	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.1 U	< 0.1 U
Benz(a)anthracene	56-55-3	N	ug/L	0.00016	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.01 U	< 0.01 U
Benzo(a)pyrene	50-32-8	N	ug/L	0.000016	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.01 U	< 0.01 U
Benzo(b)fluoranthene	205-99-2	N	ug/L	0.00016	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.01 U	< 0.01 U
Benzo(g,h,i)perylene	191-24-2	N	ug/L		< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.01 U	< 0.01 U
Benzo(j,k)fluoranthene	Benz-jk-fluor	N	ug/L		--	--	--	--	--	--	--	< 0.01 U	< 0.01 U
Benzo(k)fluoranthene	207-08-9	N	ug/L	0.0016	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	--	--
Chrysene	218-01-9	N	ug/L	0.016	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.01 U	< 0.01 U
Dibenzo(a,h)anthracene	53-70-3	N	ug/L	0.000016	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.01 U	< 0.01 U
Fluoranthene	206-44-0	N	ug/L	1.82	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.1 U	< 0.1 U
Fluorene	86-73-7	N	ug/L	3.67	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.1 U	< 0.1 U
Indeno(1,2,3-cd)pyrene	193-39-5	N	ug/L	0.00016	< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.01 U	< 0.01 U
Naphthalene	91-20-3	N	ug/L	1.4	< 0.21 U	< 2 U	< 0.21 U	< 2 U	< 0.21 U	< 0.21 U	< 2 U	< 0.1 U	< 0.1 U
Phenanthrene	85-01-8	N	ug/L		< 0.21 U	--	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.1 U	< 0.1 U
Pyrene	129-00-0	N	ug/L	2.01	< 0.21 U	--	< 0.21 U	--	< 0.21 U	**0.021 T**	--	< 0.1 U	< 0.1 U
Total cPAHs TEQ (ND = 0)	T-cPAH-0U	N	ug/L	0.000016	--	--	--	--	--	--	--	--	--

Table D.5. Historical Groundwater Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Fraction	Unit	Location Date Sample ID RI Screening Level[a]	MW-1 10/09/2007 MW-1-100907	MW-1 03/12/2008 MW-1-031208	MW-2 10/09/2007 MW-2-100907	MW-2 03/12/2008 MW-2-031208	MW-3 10/08/2007 MW-3-100807	MW-3 (duplicate) 10/08/2007 MW-3-FD-100807	MW-3 03/12/2008 MW-3-031208	SB-21 07/27/2011 SB21-WATER-072711	SB-22 07/27/2011 SB22-WATER-072711
Pesticides/Herbicides													
2,4'-DDD	53-19-0	N	ug/L		< 0.011 U	< 0.0005 U	< 0.011 U	< 0.00049 Ui	< 0.01 U	< 0.011 U	< 0.0005 U	--	--
2,4'-DDE	3424-82-6	N	ug/L		< 0.011 U	< 0.0005 U	< 0.011 U	< 0.00049 U	< 0.01 U	< 0.011 U	< 0.0005 U	--	--
2,4'-DDT	789-02-6	N	ug/L		< 0.011 U	< 0.0005 U	< 0.011 U	< 0.00049 U	**0.001 T**	**0.0013 T**	< 0.0005 Ui	--	--
4,4'-DDD	72-54-8	N	ug/L	0.0000079	< 0.011 U	< 0.0005 U	< 0.011 U	< 0.00049 Ui	< 0.01 U	< 0.011 U	< 0.00097 Ui	< 0.0052 U	< 0.005 U
4,4'-DDE	72-55-9	N	ug/L	0.00000088	< 0.011 U	< 0.0005 U	< 0.011 U	< 0.00049 U	< 0.01 Ui	< 0.011 U	< 0.0005 U	< 0.0052 U	< 0.005 U
4,4'-DDT	50-29-3	N	ug/L	0.0000012	< 0.011 Ui	< 0.0005 Ui	**0.0022 JP**	**0.00082 P**	< 0.01 Ui	< 0.011 Ui	**0.0014**	< 0.0052 U	< 0.005 U
Aldrin	309-00-2	N	ug/L	0.000000041	< 0.011 U	< 0.0005 U	< 0.011 U	< 0.00049 U	**0.0012 T**	**0.0015 T**	**0.0012 J**	< 0.0052 U	**0.01**
Alpha-BHC	319-84-6	N	ug/L	0.000048	--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Beta-BHC	319-85-7	N	ug/L	0.0014	--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Chlordane	57-74-9	N	ug/L	0.000022	< 0.21 U	< 0.0099 Ui	< 0.21 U	< 0.0097 Ui	< 0.2 U	< 0.21 U	< 0.01 Ui	--	--
cis-Chlordane	5103-71-9	N	ug/L	0.000103	--	< 0.0005 U	--	< 0.00049 U	--	--	< 0.0005 U	< 0.0052 U	< 0.005 U
Delta-BHC	319-86-8	N	ug/L		--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Dieldrin	60-57-1	N	ug/L	0.0000012	< 0.011 U	< 0.0005 U	**0.0015 T**	**0.00071**	**0.021**	**0.063**	**0.041 D**	< 0.082 U	< 0.005 U
Endosulfan I	959-98-8	N	ug/L	0.0087	--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Endosulfan II	33213-65-9	N	ug/L	0.0087	--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Endosulfan Sulfate	1031-07-8	N	ug/L	10	--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Endrin	72-20-8	N	ug/L	0.002	--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Endrin Aldehyde	7421-93-4	N	ug/L	0.035	--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Endrin ketone	53494-70-5	N	ug/L		--	--	--	--	--	--	--	< 0.021 U	< 0.02 U
Heptachlor	76-44-8	N	ug/L	0.00000034	< 0.011 U	< 0.0005 Ui	< 0.011 U	< 0.00049 Ui	< 0.01 U	< 0.01 U	< 0.0005 U	< 0.0052 U	< 0.005 U
Heptachlor Epoxide	1024-57-3	N	ug/L	0.0000024	--	--	--	--	--	--	--	< 0.0052 U	< 0.005 U
Lindane	58-89-9	N	ug/L	0.126	< 0.011 U	< 0.0005 U	< 0.011 U	< 0.00049 U	< 0.01 U	< 0.01 U	< 0.0005 U	< 0.0052 U	< 0.005 U
Methoxychlor	72-43-5	N	ug/L	0.02	--	--	--	--	--	--	--	< 0.01 U	< 0.01 U
Toxaphene	8001-35-2	N	ug/L	0.000032	--	--	--	--	--	--	--	< 0.052 U	< 0.05 U
trans-Chlordane	5103-74-2	N	ug/L	0.000103	--	< 0.0005 U	--	< 0.00049 U	--	--	< 0.0005 U	**0.015**	< 0.005 U

Table D.6. Historical Groundwater PCBs Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location Date Sample ID	MW-1 10/09/2007 MW-1-100907	MW-2 10/09/2007 MW-2-100907	MW-3 10/08/2007 MW-3-100807	SB-21 07/27/2011 SB21-WATER-072711	SB-22 07/27/2011 SB22-WATER-072711
Analyte	**Unit**	**RI Screening Level[(a)]**					
PCB Aroclors							
Aroclor 1016	ug/L		< 0.21 U	< 0.21 U	< 0.2 U	< 0.053 U	< 0.05 U
Aroclor 1221	ug/L		--	--	--	< 0.053 U	< 0.05 U
Aroclor 1232	ug/L		--	--	--	< 0.053 U	< 0.05 U
Aroclor 1242	ug/L		--	--	--	< 0.053 U	< 0.05 U
Aroclor 1248	ug/L		< 0.21 U	< 0.21 U	< 0.2 U	< 0.053 U	< 0.05 U
Aroclor 1254	ug/L		< 0.21 U	< 0.21 U	< 0.2 U	**0.059**	**0.1**
Aroclor 1260	ug/L		< 0.21 U	< 0.21 U	< 0.2 U	< 0.053 U	< 0.05 U
Total PCBs Aroclors	ug/L	0.000007	<0.21 UJ	<0.21 UJ	<0.2 UJ	**0.059**	**0.1**

Notes:

a) Derivation and selection of RI screening levels presented in Table C-1.

Bold - Analyte detected

Blue shading - Analyte exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the

Data Qualifiers:

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

J - Sum calculated with in complete component list

Sources:

SAIC, 2008a, South Park Marina Seattle, Washington, Additional Site Characterization Activities Data Report Final, Prepared for Washington State Department of Ecology, June 2008

SAIC, 2008b, Final Technical Memorandum Subject: Transmittal of Low-Level Mercury Results, July 2008 Groundwater Sampling Round, South Park Marina Site, Seattle, Washington, Prepared for Mark Edens Washington State Department of Ecology, December 31, 2008.

Farallon Consulting, LLC, 2011, Analytical Data for Project 289-001, Prepared by OnSite Environmental Inc. August, 2011.

Table D.7. Historical Stormwater and Wash Water Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

Notes:

a) Derivation and selection of RI screening levels presented in Table C-4.

Bold - detected

Blue - exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

cPAH and total dixion/furan TEQ calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). A TEQ calculation is made by multiplying the result by its corresponding toxicity equivalency factor and summing the result. For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column.

Total Organic Carbon calculation note: TOC was back calculated using the TOC-normailized historical data. The reporting limits are unknown, and the reported results assume all constituents were detected.

Diesel- and oil-range TPH calculation note: Results were calculated as the sum of Diesel Range Organic and Motor Oil Range Organics, with non-detects summed at 1/2 the reporting limit. If all components were non-detect, the sum is reported as non-detect at the largest component's reporting limit.

Data Qualifiers:

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

J - The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.

<0 na - sample was listed as having a concentration of < 0.0 in the existing project database.

Sources:

TIG Environmental, 2018a, Stormwater and Boat Wash Water Systems Evaluation South Park Marina, Prepared for South Park Marina Limited Partnership, February 2018.

TIG Environmental, 2019, Results of Drainage Pathway Investigation, January 16, 2019.

Leidos, 2015, NPDES Inspection Sampling Support 2014/2015, Prepared for Washington State Department of Ecology, June 2015.

Table D.7. Historical Stormwater and Wash Water Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

				Catch Basins		Roof Drains							Boat Wash				StormwateRx System					
			Location	CB-02	CB-06	SRC-01	SRC-01	SRC-02	SRC-02 (Duplicate)	SRC-03	SRC-04	SRC-05	BOAT-PRE	BOAT-MID	BOAT-MID (Duplicate)	BOAT-POST	SWRX-PRE	SWRX-PRE	SWRX-MID	SWRX-POST	SWRX-POST	SWRX-POST
			Date	06/08/2017	06/08/2017	06/08/2017	10/25/2018	10/25/2018	10/25/2018	10/25/2018	10/25/2018	10/25/2018	06/01/2017	06/01/2017	06/01/2017	06/01/2017	10/08/2014	06/08/2017	06/08/2017	04/12/2017	05/16/2017	06/08/2017
			Sample ID	SPM-CB-02-SW-20170608	SPM-CB-06-SW 20170608	SPM-SRC-01-SW-20170608	SPM-SRC-01-SW-20181025	SPM-SRC-02-SW-20181025	SPM-SRC2-02-SW-20181025	SPM-SRC-03-SW-20181025	SPM-SRC-04-SW-20181025	SPM-SRC-05-SW-20181025	SPM-BOAT-PRE-WW-20170601	SPM-BOAT-MID-WW-20170601	SPM-BOAT-MI	SPM-BOAT-POST-WW-20170601	SP-OWS-01 (WATER)	SPM-SWRX-PRE-SW-20170608	SPM-SWRX-MID-SW-20170608	SPM-SWRX-POST-SW-20170412	SPM-SWRX-POST-SW-20170516	SPM-SWRX-POST-SW-20170608
Analyte	CAS_RN	Unit	RI Screening Level[a]																			
Conventionals																						
Alkalinity as Bicarbonate	ALKHCO3	mg/L as CaCO3		--	--	--	--	--	--	--	--	--	--	--	--	--	25	--	--	--	--	--
Alkalinity as Carbonate	ALKCO3	mg/L as CaCO3		--	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--	--	--	--
Alkalinity, Total	ALKT	mg/L		11	9	--	--	--	--	--	--	--	< 2 U	< 2 U	--	< 2 U	25	11	13	--	--	17
Chloride	16887-00-6	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	5100	--	--	--	--	--
Dissolved Organic Carbon	DOC	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	2100	--	--	--	--	--
Hardness	Hard	mg/L		12	9.1	--	--	--	--	--	--	--	160	58	--	60	--	14	20	--	--	22
Nitrate as Nitrogen	14797-55-8	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 900 U	--	--	--	--	--
Sulfate	14808-79-8	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	2000	--	--	--	--	--
Total Dissolved Solids	TDS	mg/L		60	52	--	--	--	--	--	--	--	840	740	--	780	--	21	45	--	--	31
Total Organic Carbon	TOC	ug/L		16000	15000	--	--	--	--	--	--	--	23000	12000	--	12000	1700	16000	21000	--	--	1500
Total Suspended Solids	TSS	mg/L		8	18	--	--	--	--	--	--	--	74	20	--	16	< 3.3 U	13	14	--	--	< 4 U
Field Parameters																						
Temperature	Temp	deg C		16.41	19.1	--	--	--	--	--	--	--	21.17	21.09	--	21.45	--	18.58	18.81	--	--	17.72
Specific Conductance	Cond	umhos/cm		38	19	--	--	--	--	--	--	--	865	689	--	692	81	48	78	--	--	74
Dissolved Oxygen	DO	mg/L		3.22	4.09	--	--	--	--	--	--	--	3.19	< 0 U	--	< 0 U	--	8.15	3.35	--	--	0.46
pH	pH	pH units		6.75	6.91	--	--	--	--	--	--	--	4.05	3.82	--	3.89	7.25	6.68	6.68	--	--	6.12
Oxidation Reduction Potential	ORP	mV		159	135	--	--	--	--	--	--	--	258	351	--	348	--	120	108	--	--	123
Turbidity	Turb	NTU		7.6	31.2	--	--	--	--	--	--	--	128	37	--	31.3	1.5	24	19.7	--	--	3.4
Metals (Total)																						
Antimony	7440-36-0	ug/L	90	< 5.6 U	< 5.6 U	< 5.6 U	--	--	--	--	--	--	< 5.6 U	< 5.6 U	< 5.6 U	< 5.6 U	0.31 J	< 5.6 U	< 5.6 U	--	--	< 5.6 U
Arsenic	7440-38-2	ug/L	0.14	3.9	< 3.3 U	< 3.3 U	--	--	--	--	--	--	14	< 3.3 U	< 3.3 U	< 3.3 U	2	< 3.3 U	< 3.3 U	--	--	< 3.3 U
Beryllium	7440-41-7	ug/L	75.6	< 11 U	< 11 U	< 11 U	--	--	--	--	--	--	< 11 U	< 11 U	< 11 U	< 11 U	< 0.4 U	< 11 U	< 11 U	--	--	< 11 U
Cadmium	7440-43-9	ug/L	7.9	< 4.4 U	< 4.4 U	< 4.4 U	--	--	--	--	--	--	24	7.6	7.7	8.1	0.27 J	< 4.4 U	< 4.4 U	--	--	< 4.4 U
Chromium	7440-47-3	ug/L		< 11 U	< 11 U	11	--	--	--	--	--	--	13	< 11 U	< 11 U	< 11 U	0.52	< 11 U	< 11 U	--	--	< 11 U
Copper	7440-50-8	ug/L	50	130	120	< 11 U	18	22	12	30	88	56	18000	4800	4700	4700	88	970	1400	3.5	17	42
Lead	7439-92-1	ug/L	8.1	5.7	5.9	2.9	--	--	--	--	--	--	88	44	45	55	3.6	18	26	--	--	2.4
Mercury	7439-97-6	ug/L	0.025	< 0.5 U	< 0.5 U	< 0.5 U	--	--	--	--	--	--	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.2 U	< 0.5 U	< 0.5 U	--	--	< 0.5 U
Nickel	7440-02-0	ug/L	8.2	< 22 U	< 22 U	< 22 U	--	--	--	--	--	--	64	32	31	38	1.3 J	< 22 U	< 22 U	--	--	< 22 U
Selenium	7782-49-2	ug/L	71	< 5.6 U	< 5.6 U	< 5.6 U	--	--	--	--	--	--	< 5.6 U	< 5.6 U	< 5.6 U	< 5.6 U	< 1 U	< 5.6 U	< 5.6 U	--	--	< 5.6 U
Silver	7440-22-4	ug/L	1.9	< 11 U	< 11 U	< 11 U	--	--	--	--	--	--	< 11 U	< 11 U	< 11 U	< 11 U	< 0.4 U	< 11 U	< 11 U	--	--	< 11 U
Thallium	7440-28-0	ug/L	0.0619	< 5.6 U	< 5.6 U	< 5.6 U	--	--	--	--	--	--	< 5.6 U	< 5.6 U	< 5.6 U	< 5.6 U	< 1 U	< 5.6 U	< 5.6 U	--	--	< 5.6 U
Zinc	7440-66-6	ug/L	85	1800	92	1700	3300	8700	8000	1700	670	110	15000	5600	6000	6300	92	650	870	20	53	72
Volatile Organic Compounds																						
1,2,4-Trichlorobenzene	120-82-1	ug/L	0.037	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
1,2-Dichlorobenzene	95-50-1	ug/L	800	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
1,3-Dichlorobenzene	541-73-1	ug/L	2	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
1,4-Dichlorobenzene	106-46-7	ug/L	59.8	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Semivolatile Organic Compounds																						
1,2-Dinitrobenzene	528-29-0	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
1,2-Diphenylhydrazine	122-66-7	ug/L	0.02	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
1,3-Dinitrobenzene	99-65-0	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
1,4-Dinitrobenzene	100-25-4	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,3,4,6-Tetrachlorophenol	58-90-2	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0 na	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,3,5,6-Tetrachlorophenol	935-95-5	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,3-Dichloroaniline	608-27-5	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,4,5-Trichlorophenol	95-95-4	ug/L	600	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,4,6-Trichlorophenol	88-06-2	ug/L	0.28	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.57 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,4-Dichlorophenol	120-83-2	ug/L	10	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,4-Dimethylphenol	105-67-9	ug/L	97	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 1.9 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,4-Dinitrophenol	51-28-5	ug/L	100	< 4.8 U	< 4.7 U	--	--	--	--	--	--	--	< 5.6 U	< 5.1 U	< 5.6 U	< 5.1 U	< 4.7 U	< 4.8 U	< 4.9 U	--	--	< 4.7 U
2,4-Dinitrotoluene	121-14-2	ug/L	0.18	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2,6-Dinitrotoluene	606-20-2	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2-Chloronaphthalene	91-58-7	ug/L	100	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.057 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2-Chlorophenol	95-57-8	ug/L	17	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2-Methylphenol	95-48-7	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2-Nitroaniline	88-74-4	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
2-Nitrophenol	88-75-5	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
3 & 4 Methylphenol	65794-96-9	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	1.5	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
3,3'-Dichlorobenzidine	91-94-1	ug/L	0.0033	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 1.9 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
3-Nitroaniline	99-09-2	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
4,6-Dinitro-2-methylphenol	534-52-1	ug/L	7	< 4.8 U	< 4.7 U	--	--	--	--	--	--	--	< 5.6 U	< 5.1 U	< 5.6 U	< 5.1 U	< 3.8 U	< 4.8 U	< 4.9 U	--	--	< 4.7 U

Table D.7. Historical Stormwater and Wash Water Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

				Catch Basins		Roof Drains							Boat Wash				StormwateRx System					
			Location	CB-02	CB-06	SRC-01	SRC-01	SRC-02	SRC-02 (Duplicate)	SRC-03	SRC-04	SRC-05	BOAT-PRE	BOAT-MID	BOAT-MID (Duplicate)	BOAT-POST	SWRX-PRE	SWRX-PRE	SWRX-MID	SWRX-POST	SWRX-POST	SWRX-POST
			Date	06/08/2017	06/08/2017	06/08/2017	10/25/2018	10/25/2018	10/25/2018	10/25/2018	10/25/2018	10/25/2018	06/01/2017	06/01/2017	06/01/2017	06/01/2017	10/08/2014	06/08/2017	06/08/2017	04/12/2017	05/16/2017	06/08/2017
			Sample ID	SPM-CB-02-SW-20170608	SPM-CB-06-SW-20170608	SPM-SRC-01-SW-20170608	SPM-SRC-01-SW-20181025	SPM-SRC-02-SW-20181025	SPM-SRC2-02-SW-20181025	SPM-SRC-03-SW-20181025	SPM-SRC-04-SW-20181025	SPM-SRC-05-SW-20181025	SPM-BOAT-PRE-WW-20170601	SPM-BOAT-MID-WW-20170601	SPM-BOAT-MI	SPM-BOAT-POST-WW-20170601	SP-OWS-01 (WATER)	SPM-SWRX-PRE-SW-20170608	SPM-SWRX-MID-SW-20170608	SPM-SWRX-POST-SW-20170412	SPM-SWRX-POST-SW-20170516	SPM-SWRX-POST-SW-20170608
Analyte	CAS_RN	Unit	RI Screening Level[a]																			
4-Bromophenyl phenyl ether	101-55-3	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
4-Chloro-3-methylphenol	59-50-7	ug/L	36	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
4-Chloroaniline	106-47-8	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
4-Chlorophenyl phenyl ether	7005-72-3	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
4-Methylphenol	106-44-5	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**3.4**	--	--	--	--	--
4-Nitroaniline	100-01-6	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.57 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
4-Nitrophenol	100-02-7	ug/L		< 4.8 U	< 4.7 U	--	--	--	--	--	--	--	< 5.6 U	< 5.1 U	< 5.6 U	< 5.1 U	< 2.8 U	< 4.8 U	< 4.9 U	--	--	< 4.7 U
Aniline	62-53-3	ug/L		< 4.8 U	< 4.7 U	--	--	--	--	--	--	--	< 5.6 U	< 5.1 U	< 5.6 U	< 5.1 U	--	< 4.8 U	< 4.9 U	--	--	< 4.7 U
Benzidine	92-87-5	ug/L	0.000023	< 4.8 U	< 4.7 U	--	--	--	--	--	--	--	< 5.6 U	< 5.1 U	< 5.6 U	< 5.1 U	--	< 4.8 U	< 4.9 U	--	--	< 4.7 U
Benzoic acid	65-85-0	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**3.6**	--	--	--	--	--
Benzyl alcohol	100-51-6	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	**3.1**	**9.8**	**9**	**7.6**	< 0.38 U	< 0.96 U	**1.1**	--	--	< 0.94 U
Benzyl butyl phthalate	85-68-7	ug/L	0.013	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	**0.25 J**	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Bis(2-chloroethoxy)methane	111-91-1	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Bis(2-chloroethyl) ether	111-44-4	ug/L	0.06	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
bis(2-Chloroisopropyl)ether	39638-32-9	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Bis(2-ethylhexyl) adipate	103-23-1	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Bis(2-ethylhexyl) phthalate	117-81-7	ug/L	0.046	**59**	**1.9**	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 2.8 U	**2.5**	**2.9**	--	--	< 0.94 U
Carbazole	86-74-8	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	**1.6**	**1.4**	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Dibenzofuran	132-64-9	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Diethyl phthalate	84-66-2	ug/L	200	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Dimethyl phthalate	131-11-3	ug/L	600	< 0.96 U	**17**	--	--	--	--	--	--	--	< 1.1 U	**4.3**	**4.1**	**4**	**0.31 J**	< 0.96 U	**1**	--	--	< 0.94 U
Di-n-butyl phthalate	84-74-2	ug/L	8	**1.9**	< 0.94 U	--	--	--	--	--	--	--	**2.1**	< 1 U	< 1.1 U	< 1 U	**0.15 J**	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Di-n-octyl phthalate	117-84-0	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Hexachlorobenzene	118-74-1	ug/L	0.000005	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Hexachlorobutadiene	87-68-3	ug/L	0.01	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.57 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Hexachlorocyclopentadiene	77-47-4	ug/L	1	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 1.9 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Hexachloroethane	67-72-1	ug/L	0.02	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.57 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Isophorone	78-59-1	ug/L	110	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Nitrobenzene	98-95-3	ug/L	100	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
N-Nitrosodimethylamine	62-75-9	ug/L	0.34	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 1.9 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
N-Nitroso-di-n-propylamine	621-64-7	ug/L	0.058	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
N-Nitrosodiphenylamine	86-30-6	ug/L	0.69	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	< 0.38 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Pentachlorophenol	87-86-5	ug/L	0.002	< 4.8 U	< 4.7 U	--	--	--	--	--	--	--	< 5.6 U	< 5.1 U	< 5.6 U	< 5.1 U	< 0.66 U	< 4.8 U	< 4.9 U	--	--	< 4.7 U
Phenol	108-95-2	ug/L	70000	< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	**42**	< 1 U	< 1.1 U	< 1 U	< 0.57 U	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Pyridine	110-86-1	ug/L		< 0.96 U	< 0.94 U	--	--	--	--	--	--	--	< 1.1 U	< 1 U	< 1.1 U	< 1 U	--	< 0.96 U	< 0.99 U	--	--	< 0.94 U
Polycyclic Aromatic Hydrocarbons																						
1-Methylnaphthalene	90-12-0	ug/L		< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	**0.12**	**0.18**	**0.18**	**0.17**	< 0.057 U	< 0.096 U	< 0.099 U	--	--	< 0.094 U
2-Methylnaphthalene	91-57-6	ug/L		< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	< 0.11 U	< 0.1 U	< 0.1 U	< 0.1 U	**0.042 J**	< 0.096 U	< 0.099 U	--	--	**0.17**
Acenaphthene	83-32-9	ug/L	30	< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	**0.35**	**1.8**	**1.1**	< 0.51 U	< 0.095 U	< 0.096 U	< 0.099 U	--	--	< 0.094 U
Acenaphthylene	208-96-8	ug/L		< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	**1.4**	**19**	**15**	**16**	< 0.076 U	< 0.096 U	< 0.099 U	--	--	< 0.094 U
Anthracene	120-12-7	ug/L	100	< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	**4**	**8.3**	**7.5**	**6.8**	< 0.038 U	< 0.096 U	< 0.099 U	--	--	< 0.094 U
Benz(a)anthracene	56-55-3	ug/L	0.00016	< 0.0096 U	< 0.0094 U	--	--	--	--	--	--	--	**0.4**	**2.7**	**2.1**	**1.8**	< 0.057 U	**0.029**	**0.017**	--	--	< 0.0094 U
Benzo(a)pyrene	50-32-8	ug/L	0.000016	< 0.0096 U	< 0.0094 U	--	--	--	--	--	--	--	**0.014**	**0.12**	**0.13**	**0.12**	< 0.038 U	**0.017**	**0.016**	--	--	< 0.0094 U
Benzo(b)fluoranthene	205-99-2	ug/L	0.00016	< 0.0096 U	**0.015**	--	--	--	--	--	--	--	**0.031**	**0.2**	**0.17**	**0.17**	**0.033 J**	**0.052**	**0.042**	--	--	< 0.0094 U
Benzo(g,h,i)perylene	191-24-2	ug/L		< 0.0096 U	**0.014**	--	--	--	--	--	--	--	< 0.011 U	**0.018**	**0.015**	**0.017**	< 0.057 UJ	**0.02**	**0.021**	--	--	< 0.0094 U
Benzo(j,k)fluoranthene	Benz-jk-fluor	ug/L		< 0.0096 U	< 0.0094 U	--	--	--	--	--	--	--	< 0.011 U	**0.11**	**0.084**	**0.08**	--	**0.01**	**0.011**	--	--	< 0.0094 U
Benzo(k)fluoranthene	207-08-9	ug/L	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.057 U	--	--	--	--	--
Chrysene	218-01-9	ug/L	0.016	< 0.0096 U	**0.032**	--	--	--	--	--	--	--	**0.048**	**0.59**	**0.53**	**0.42**	**0.039**	**0.072**	**0.05**	--	--	< 0.0094 U
Dibenzo(a,h)anthracene	53-70-3	ug/L	0.000016	< 0.0096 U	< 0.0094 U	--	--	--	--	--	--	--	< 0.011 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.057 U	< 0.0096 U	< 0.0099 U	--	--	< 0.0094 U
Fluoranthene	206-44-0	ug/L	6	< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	**0.32**	**6.9**	**6.5**	**3**	**0.1**	**0.13**	**0.1**	--	--	< 0.094 U
Fluorene	86-73-7	ug/L	10	< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	< 0.11 U	**0.15**	**0.14**	**0.12**	**0.033 J**	< 0.096 U	< 0.099 U	--	--	< 0.094 U
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	0.00016	< 0.0096 U	< 0.0094 U	--	--	--	--	--	--	--	**0.012**	**0.024**	**0.019**	**0.022**	< 0.057 UJ	**0.019**	**0.02**	--	--	< 0.0094 U
Naphthalene	91-20-3	ug/L	1.4	< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	< 0.11 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.38 U	< 0.096 U	< 0.099 U	--	--	< 0.094 U
Phenanthrene	85-01-8	ug/L		< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	< 0.11 U	< 0.1 U	< 0.1 U	< 0.1 U	**0.11**	< 0.096 U	< 0.099 U	--	--	< 0.094 U
Pyrene	129-00-0	ug/L	8	< 0.096 U	< 0.094 U	--	--	--	--	--	--	--	**0.21**	**6**	**5.8**	**3.6**	**0.061**	< 0.096 U	< 0.099 U	--	--	< 0.094 U
Total Benzofluoranthenes	TOTBFA	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.033 J**	--	--	--	--	--

Table D.7. Historical Stormwater and Wash Water Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

				Catch Basins		Roof Drains							Boat Wash				StormwateRx System					
			Location	CB-02	CB-06	SRC-01	SRC-01	SRC-02	SRC-02 (Duplicate)	SRC-03	SRC-04	SRC-05	BOAT-PRE	BOAT-MID	BOAT-MID (Duplicate)	BOAT-POST	SWRX-PRE	SWRX-PRE	SWRX-MID	SWRX-POST	SWRX-POST	SWRX-POST
			Date	06/08/2017	06/08/2017	06/08/2017	10/25/2018	10/25/2018	10/25/2018	10/25/2018	10/25/2018	10/25/2018	06/01/2017	06/01/2017	06/01/2017	06/01/2017	10/08/2014	06/08/2017	06/08/2017	04/12/2017	05/16/2017	06/08/2017
			Sample ID	SPM-CB-02-SW-20170608	SPM-CB-06-SW-20170608	SPM-SRC-01-SW-20170608	SPM-SRC-01-SW-20181025	SPM-SRC-02-SW-20181025	SPM-SRC2-02-SW-20181025	SPM-SRC-03-SW-20181025	SPM-SRC-04-SW-20181025	SPM-SRC-05-SW-20181025	SPM-BOAT-PRE-WW-20170601	SPM-BOAT-MID-WW-20170601	SPM-BOAT-MI	SPM-BOAT-POST-WW-20170601	SP-OWS-01 (WATER)	SPM-SWRX-PRE-SW-20170608	SPM-SWRX-MID-SW-20170608	SPM-SWRX-POST-SW-20170412	SPM-SWRX-POST-SW-20170516	SPM-SWRX-POST-SW-20170608
Analyte	CAS_RN	Unit	RI Screening Level[a]																			
Total HPAHs	T-HPAH	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.23**	--	--	--	--	--
Total LPAHs	T-LPAH	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.14**	--	--	--	--	--
Total PAHs	T-PAH	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.38**	--	--	--	--	--
Total cPAHs TEQ (ND = 0)	T-cPAH-0U	ug/L	0.000016	< 0 U	**0.00182**	--	--	--	--	--	--	--	**0.05878**	**0.4293**	**0.3642**	**0.3314**	**0.0037 J**	**0.02872**	**0.0255**	--	--	< 0 U
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	ug/L	0.000016	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.034 J**	--	--	--	--	--
Total cPAHs TEQ (ND=1)	T-cPAH-1U	ug/L	0.000016	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.064 J**	--	--	--	--	--
Dioxins/Furans																						
Total Dioxin/Furan TEQ (ND = 0)	DF-TEQ-0U	ng/L	0.0000051	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00414 J**	--	--	--	--	--
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/L	0.0000000051	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00000703 J**	--	--	--	--	--
Total Dioxin/Furan TEQ (ND = 1x RDL)	DF-TEQ-1U	ng/L	0.0000051	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00992 J**	--	--	--	--	--
2,3,7,8-TCDD	1746-01-6	ug/L	0.0000000051	--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000163 U	--	--	--	--	--
1,2,3,7,8-PeCDD	40321-76-4	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000255 U	--	--	--	--	--
1,2,3,4,7,8-HxCDD	39227-28-6	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000323 U	--	--	--	--	--
1,2,3,6,7,8-HxCDD	57653-85-7	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0000109 J**	--	--	--	--	--
1,2,3,7,8,9-HxCDD	19408-74-3	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000412 U	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	35822-46-9	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.000206**	--	--	--	--	--
OCDD	3268-87-9	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00128**	--	--	--	--	--
Total TCDD	41903-57-5	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000163 U	--	--	--	--	--
Total PeCDD	36088-22-9	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000255 U	--	--	--	--	--
Total HxCDD	34465-46-8	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0000279 J**	--	--	--	--	--
Total HpCDD	37871-00-4	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.000352**	--	--	--	--	--
2,3,7,8-TCDF	51207-31-9	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000117 U	--	--	--	--	--
1,2,3,7,8-PeCDF	57117-41-6	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000179 U	--	--	--	--	--
2,3,4,7,8-PeCDF	57117-31-4	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000109 U	--	--	--	--	--
1,2,3,4,7,8-HxCDF	70648-26-9	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.0000012 U	--	--	--	--	--
1,2,3,6,7,8-HxCDF	57117-44-9	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000123 U	--	--	--	--	--
1,2,3,7,8,9-HxCDF	72918-21-9	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.0000012 U	--	--	--	--	--
2,3,4,6,7,8-HxCDF	60851-34-5	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00000235 J**	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	67562-39-4	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0000331**	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	55673-89-7	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00000171 J**	--	--	--	--	--
OCDF	39001-02-0	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0000751**	--	--	--	--	--
Total TCDF	30402-14-3	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.00000117 U	--	--	--	--	--
Total PeCDF	30402-15-4	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0000065**	--	--	--	--	--
Total HxCDF	55684-94-1	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0000454 J**	--	--	--	--	--
Total HpCDF	38998-75-3	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0000896**	--	--	--	--	--
Alkyl Halides																						
1-Chloropropane	540-54-5	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	**0.38**	--	--	--	--	--
Fats, Oils, and Grease																						
Fats/Oils/Grease (Non-Polar)	FOG-NP	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 4700 U	--	--	--	--	--
Fats/Oils/Grease (Polar)	FOG-P	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 4700 U	--	--	--	--	--
Fats/Oils/Grease (Total)	FOG-TOT	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	< 4700 U	--	--	--	--	--

Table D.8. Historical Stormwater and Wash Water PCBs Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

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Notes:

a) Derivation and selection of RI screening levels presented in Table C-4.

b) Total PCB TEQ values are shown as reported in the historical analytical database. Total values for the complete dataset will be calculated and reported in the RI.

c) Total PCB congeners represents the sum of detected concentrations of the 209 PCB congeners as reported by Vista Analytical Laboratory.

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

Bold - detected

Blue - exceeds Remedial Investigation Screening Level

Data Qualifiers:

J - Result is a calculated value.

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

Sources:

TIG Environmental, 2018a, Stormwater and Boat Wash Water Systems Evaluation South Park Marina, Prepared for South Park Marina Limited Partnership, February 2018.

TIG Environmental, 2019, Results of Drainage Pathway Investigation, January 16, 2019.

Table D.8. Historical Stormwater and Wash Water PCBs Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

			Catch Basins					
		Location	CB-01	CB-02	CB-02	CB-05	CB-06	CB-06
		Date	09/19/2017	06/08/2017	09/19/2017	09/19/2017	06/08/2017	09/19/2017
		Sample ID	SPM-CB-01-SW-20170919	SPM-CB-02-SW-20170608	SPM-CB-02-SW-20170919	SPM-CB-05-SW-20170919	SPM-CB-06-SW-20170608	SPM-CB-06-SW-20170919
Analyte	Unit	RI Screening Level(a)						
PCB Aroclors								
Aroclor 1016	ug/L		< 0.047 U	< 0.047 U	< 0.048 U	< 0.047 U	< 0.047 U	< 0.048 U
Aroclor 1221	ug/L		< 0.047 U	< 0.047 U	< 0.048 U	< 0.047 U	< 0.047 U	< 0.048 U
Aroclor 1232	ug/L		< 0.047 U	< 0.047 U	< 0.048 U	< 0.047 U	< 0.047 U	< 0.048 U
Aroclor 1242	ug/L		< 0.047 U	< 0.047 U	< 0.048 U	< 0.047 U	< 0.047 U	< 0.048 U
Aroclor 1248	ug/L		< 0.047 U	< 0.047 U	< 0.048 U	< 0.047 U	< 0.047 U	< 0.048 U
Aroclor 1254	ug/L		< 0.047 U	< 0.047 U	< 0.048 U	< 0.047 U	< 0.047 U	< 0.048 U
Aroclor 1260	ug/L		< 0.047 U	< 0.047 U	< 0.048 U	< 0.047 U	< 0.047 U	< 0.048 U
Total PCBs Aroclors	ug/L	0.000007	< 0.047 U	< 0.047 U	< 0.048 U	< 0.047 U	< 0.047 U	< 0.048 U
PCB Congeners(b)								
Total PCB Congeners(c)	ug/L	0.000007	**0.00417**	**0.00682**	**0.0038**	**0.0221**	**0.0574**	**0.0267**
Total PCB TEQ (ND = 0)	ug/L	0.00000000443	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	ug/L	0.00000000443	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	ug/L	0.00000000443	--	--	--	--	--	--
Total Dioxin-like PCBs	ug/L	0.00000000443	--	--	--	--	--	--

Table D.8. Historical Stormwater and Wash Water PCBs Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

			Boat Wash Water					
		Location	BOAT-PRE	BOAT-PRE	BOAT-MID	BOAT-MID	BOAT-POST	BOAT-POST
		Date	06/01/2017	12/13/2017	06/01/2017	12/13/2017	06/01/2017	12/13/2017
		Sample ID	SPM-BOAT-PRE-WW-20170601	SPM-BOAT-PRE-WW-20171213	SPM-BOAT-MID-WW-20170601	SPM-BOAT-MID-WW-20171213	SPM-BOAT-POST-WW-20170601	SPM-BOAT-POST-WW-20171213
Analyte	**Unit**	**RI Screening Level[(a)]**						
PCB Aroclors								
Aroclor 1016	ug/L		< 0.054 U	< 0.096 U	< 0.05 U	< 0.055 U	< 0.053 U	< 0.073 U
Aroclor 1221	ug/L		< 0.054 U	< 0.096 U	< 0.05 U	< 0.055 U	< 0.053 U	< 0.073 U
Aroclor 1232	ug/L		< 0.054 U	< 0.096 U	< 0.05 U	< 0.055 U	< 0.053 U	< 0.073 U
Aroclor 1242	ug/L		< 0.054 U	< 0.096 U	< 0.05 U	< 0.055 U	< 0.053 U	< 0.073 U
Aroclor 1248	ug/L		< 0.054 U	< 0.096 U	< 0.05 U	< 0.055 U	< 0.053 U	< 0.073 U
Aroclor 1254	ug/L		< 0.054 U	< 0.096 U	< 0.05 U	< 0.055 U	< 0.053 U	< 0.073 U
Aroclor 1260	ug/L		< 0.054 U	< 0.096 U	< 0.05 U	< 0.055 U	< 0.053 U	< 0.073 U
Total PCBs Aroclors	ug/L	0.000007	< 0.054 U	< 0.096 U	< 0.05 U	< 0.055 U	< 0.053 U	< 0.073 U
PCB Congeners[(b)]								
Total PCB Congeners[(c)]	ug/L	0.000007	**0.044**	**0.0974**	**0.000484**	**0.00311**	**0.000924**	**0.00356**
Total PCB TEQ (ND = 0)	ug/L	0.00000000443	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	ug/L	0.00000000443	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	ug/L	0.00000000443	--	--	--	--	--	--
Total Dioxin-like PCBs	ug/L	0.00000000443	--	--	--	--	--	--

Table D.8. Historical Stormwater and Wash Water PCBs Analytical Results

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Project No. 190293, South Park Marina, Seattle, Washington

		Location	SWRX-PRE	StormwateRx Treatment System: SWRX-PRE	SWRX-PRE	SWRX-PRE	SWRX-PRE	SWRX-MID	SWRX-MID	SWRX-MID	SWRX-MID
		Date	10/08/2014	04/12/2017	05/16/2017	06/08/2017	09/19/2017	04/12/2017	05/16/2017	06/08/2017	09/19/2017
		Sample ID	SP-OWS-01 (WATER)	SPM-SWRX-PRE-SW-20170412	SPM-SWRX-PRE-SW-20170516	SPM-SWRX-PRE-SW-20170608	SPM-SWRX-PRE-SW-20170919	SPM-SWRX-MID-SW-20170412	SPM-SWRX-MID-SW-20170516	SPM-SWRX-MID-SW-20170608	SPM-SWRX-MID-SW-20170919
Analyte	**Unit**	**RI Screening Level[(a)]**									
PCB Aroclors											
Aroclor 1016	ug/L		--	< 0.054 U	< 0.047 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.051 U	< 0.049 U
Aroclor 1221	ug/L		--	< 0.054 U	< 0.047 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.051 U	< 0.049 U
Aroclor 1232	ug/L		--	< 0.054 U	< 0.047 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.051 U	< 0.049 U
Aroclor 1242	ug/L		--	< 0.054 U	< 0.047 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.051 U	< 0.049 U
Aroclor 1248	ug/L		--	< 0.054 U	< 0.047 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.051 U	< 0.049 U
Aroclor 1254	ug/L		--	< 0.054 U	< 0.047 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.051 U	< 0.049 U
Aroclor 1260	ug/L		--	< 0.054 U	< 0.047 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.051 U	< 0.049 U
Total PCBs Aroclors	ug/L	0.000007	--	< 0.054 U	< 0.047 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.048 U	< 0.051 U	< 0.049 U
PCB Congeners[(b)]											
Total PCB Congeners[(c)]	ug/L	0.000007	**0.014 J**	**0.0137**	**0.00556**	**0.0226**	**0.00849**	**0.00635**	**0.00556**	**0.0284**	**0.0106**
Total PCB TEQ (ND = 0)	ug/L	0.00000000443	**0.00000066 J**	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	ug/L	0.00000000443	**0.00000075 J**	--	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	ug/L	0.00000000443	**0.00000071 J**	--	--	--	--	--	--	--	--
Total Dioxin-like PCBs	ug/L	0.00000000443	--	--	--	--	--	--	--	--	--

Table D.8. Historical Stormwater and Wash Water PCBs Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

			StormwateRx Treatment System						
		Location	SWRX-POST	SWRX-POST	SWRX-POST	SWRX-POST	SWRX-POST	SWRX-POST	SWRX-POST
		Date	12/01/2016	04/12/2017	05/16/2017	06/08/2017	09/19/2017	10/18/2017	11/03/2017
		Sample ID	SPM-SWRX-POST-SW-20161201	SPM-SWRX-POST-SW-20170412	SPM-SWRX-POST-SW-20170516	SPM-SWRX-POST-SW-20170608	SPM-SWRX-POST-SW-20170919	SPM-SWRX-POST-SW-20171018	SPM-SWRX-POST-SW-20171103
Analyte	**Unit**	**RI Screening Level[(a)]**							
PCB Aroclors									
Aroclor 1016	ug/L		< 0.0994 U	< 0.05 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.047 U	< 0.048 U
Aroclor 1221	ug/L		< 0.0994 U	< 0.05 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.047 U	< 0.048 U
Aroclor 1232	ug/L		< 0.0994 U	< 0.05 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.047 U	< 0.048 U
Aroclor 1242	ug/L		< 0.0994 U	< 0.05 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.047 U	< 0.048 U
Aroclor 1248	ug/L		< 0.0994 U	< 0.05 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.047 U	< 0.048 U
Aroclor 1254	ug/L		< 0.0994 U	< 0.05 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.047 U	< 0.048 U
Aroclor 1260	ug/L		< 0.0994 U	< 0.05 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.047 U	< 0.048 U
Total PCBs Aroclors	ug/L	0.000007	< 0.0994 U	< 0.05 U	< 0.047 U	< 0.048 U	< 0.048 U	< 0.047 U	< 0.048 U
PCB Congeners[(b)]									
Total PCB Congeners[(c)]	ug/L	0.000007	**0.000323**	**0.000814**	**0.00105**	**0.00179**	**0.00154**	**0.00362**	**0.000924**
Total PCB TEQ (ND = 0)	ug/L	0.00000000443	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1 RDL)	ug/L	0.00000000443	--	--	--	--	--	--	--
Total PCB TEQ (ND = 1/2 RDL)	ug/L	0.00000000443	--	--	--	--	--	--	--
Total Dioxin-like PCBs	ug/L	0.00000000443	--	--	--	--	--	--	--

Table D.9. Historical Catch Basin Solids and Sludge Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

Notes:

a) Derivation and selection of RI screening levels presented in Table C-5.

Bold - Analyte detected

Blue shading - Analyte exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology, 2017). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

cPAH and total dixion/furan TEQ calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2017). A TEQ calculation is made by multiplying the result by its corresponding toxicity equivalency factor and summing the result. For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column.

Total Organic Carbon calculation note: TOC was back calculated using the TOC-normailized historical data. The reporting limits are unknown, and the reported results assume all constituents were detected.

Diesel- and oil-range TPH calculation note: Results were calculated as the sum of Diesel Range Organic and Motor Oil Range Organics, with non-detects summed at 1/2 the reporting limit. If all components were non-detect, the sum is reported as non-detect at the largest component's reporting limit.

Data Qualifiers:

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

J - The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.

Sources:

Leidos, 2015, NPDES Inspection Sampling Support 2014/2015, Prepared for Washington State Department of Ecology, June 2015.

TIG Environmental, 2018a, Stormwater and Boat Wash Water Systems Evaluation South Park Marina, Prepared for South Park Marina Limited Partnership, February 2018.

Table D.9. Historical Catch Basin Solids and Sludge Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

				Catch Basins	StormwateRx
			Location	CB-09	SWRX-PRE
			Date	10/08/2015	10/08/2014
			Sample Name	SP-CB-09	SP-OWS-01 (SOLID)
Analyte	CAS_RN	Unit	RI Screening Level[a]		
Metals					
Antimony	7440-36-0	mg/kg		**20**	**16**
Arsenic	7440-38-2	mg/kg	93	**22**	**69**
Beryllium	7440-41-7	mg/kg		**0.23 J**	**0.21 J**
Cadmium	7440-43-9	mg/kg	6.7	**6.5**	**16**
Chromium	7440-47-3	mg/kg	270	**160**	**330**
Copper	7440-50-8	mg/kg	390	**1800**	**14000**
Lead	7439-92-1	mg/kg	530	**430**	**940**
Mercury	7439-97-6	mg/kg	0.59	**0.19**	**1.7**
Nickel	7440-02-0	mg/kg		**180**	**230**
Selenium	7782-49-2	mg/kg		**1.2**	**1.6**
Silver	7440-22-4	mg/kg	6.1	**2.1**	**1.2**
Thallium	7440-28-0	mg/kg		**0.3 J**	< 1.1 U
Zinc	7440-66-6	mg/kg	960	**5600**	**2900**
Total Petroleum Hydrocarbons					
Gasoline Range Organics	TPH-GRO	mg/kg		**480**	**340**
Diesel Range Organics	TPH-DRO	mg/kg		**5300**	**6600**
Motor Oil Range Organics	TPH-ORO	mg/kg		**14000**	**16000**
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg		**19300**	**22600**
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	630-20-6	ug/kg		< 220 U	< 270 U
1,1,1-Trichloroethane	71-55-6	ug/kg		< 220 U	< 270 U
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg		< 56 U	< 66 U
1,1,2-Trichloroethane	79-00-5	ug/kg		< 67 U	< 80 U
1,1,2-Trichlorotrifluoroethane	76-13-1	ug/kg		< 220 U	< 270 U
1,1-Dichloroethane	75-34-3	ug/kg		< 220 U	< 270 U
1,1-Dichloroethene	75-35-4	ug/kg		< 110 U	< 130 U
1,1-Dichloropropene	563-58-6	ug/kg		< 220 U	< 270 U
1,2,3-Trichlorobenzene	87-61-6	ug/kg		< 220 U	< 270 U
1,2,3-Trichloropropane	96-18-4	ug/kg		< 220 U	< 270 U
1,2,4-Trichlorobenzene	120-82-1	ug/kg	51	< 220 UJ	< 140 U
1,2,4-Trimethylbenzene	95-63-6	ug/kg		**3300**	**4600**
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg		< 1100 U	< 1300 U
1,2-Dibromoethane (EDB)	106-93-4	ug/kg		< 89 U	< 110 U
1,2-Dichlorobenzene	95-50-1	ug/kg	50	< 240 UJ	< 160 U
1,2-Dichloroethane (EDC)	107-06-2	ug/kg		< 89 U	< 110 U
1,2-Dichloropropane	78-87-5	ug/kg		< 67 U	< 80 U
1,3,5-Trimethylbenzene	108-67-8	ug/kg		**610**	**2000**
1,3-Dichlorobenzene	541-73-1	ug/kg		< 220 UJ	< 140 U
1,3-Dichloropropane	142-28-9	ug/kg		< 220 U	< 270 U
1,4-Dichloro-2-Butene	110-57-6	ug/kg		< 1100 U	< 1300 U
1,4-Dichlorobenzene	106-46-7	ug/kg	110	< 220 UJ	< 140 U
2,2-Dichloropropane	594-20-7	ug/kg		< 220 U	< 270 U
2-Butanone	78-93-3	ug/kg		< 2200 U	< 2700 U
2-Chloroethyl Vinyl Ether	110-75-8	ug/kg		< 1100 U	< 1300 U
2-Chlorotoluene	95-49-8	ug/kg		< 220 U	**67 J**
2-Hexanone	591-78-6	ug/kg		< 1100 U	< 1300 U
4-Chlorotoluene	106-43-4	ug/kg		< 220 U	< 270 U
4-Methyl-2-pentanone	108-10-1	ug/kg		< 1100 U	**900 J**
Acetone	67-64-1	ug/kg		< 2200 U	< 2700 U
Acrolein	107-02-8	ug/kg		< 6700 U	< 8000 U
Acrylonitrile	107-13-1	ug/kg		< 1100 U	< 1300 U
Bromobenzene	108-86-1	ug/kg		< 220 U	< 270 U
Bromochloromethane	74-97-5	ug/kg		< 220 U	< 270 U
Bromodichloromethane	75-27-4	ug/kg		< 220 U	< 270 U
Bromoform	75-25-2	ug/kg		< 220 U	< 270 U
Bromomethane	74-83-9	ug/kg		< 780 U	< 930 U
Carbon Disulfide	75-15-0	ug/kg		< 220 U	< 270 U
Carbon Tetrachloride	56-23-5	ug/kg		< 110 U	< 130 U
Chlorobenzene	108-90-7	ug/kg		< 220 U	< 270 U
Chloroethane	75-00-3	ug/kg		< 2200 U	< 2700 U
Chloroform	67-66-3	ug/kg		< 220 U	< 270 U
Chloromethane	74-87-3	ug/kg		< 560 U	< 660 U
cis-1,2-Dichloroethene (cDCE)	156-59-2	ug/kg		< 220 U	< 270 U
cis-1,3-Dichloropropene	10061-01-5	ug/kg		< 89 U	< 110 U
Dibromochloromethane	124-48-1	ug/kg		< 220 U	< 270 U
Dibromomethane	74-95-3	ug/kg		< 220 U	< 270 U
Dichlorodifluoromethane	75-71-8	ug/kg		< 220 U	< 270 U
Isopropylbenzene	98-82-8	ug/kg		**50 J**	**830**
m,p-Xylenes	179601-23-1	ug/kg		**430**	**5200**
Methyl tert-butyl ether (MTBE)	1634-04-4	ug/kg		< 220 U	< 270 U
Methylene Chloride	75-09-2	ug/kg		< 140 U	< 170 U
Methyliodide	74-88-4	ug/kg		< 1100 U	< 1300 U
n-Butylbenzene	104-51-8	ug/kg		**1800**	**1200**
n-Propylbenzene	103-65-1	ug/kg		**180 J**	**1100**

Table D.9. Historical Catch Basin Solids and Sludge Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

				Catch Basins	StormwateRx
			Location	CB-09	SWRX-PRE
			Date	10/08/2015	10/08/2014
			Sample Name	SP-CB-09	SP-OWS-01 (SOLID)
Analyte	CAS_RN	Unit	RI Screening Level[a]		
o-Xylene	95-47-6	ug/kg		**230**	**2300**
p-Isopropyltoluene	99-87-6	ug/kg		**290**	**400**
sec-Butylbenzene	135-98-8	ug/kg		**160 J**	**370**
Styrene	100-42-5	ug/kg		**220**	**9300**
tert-Butylbenzene	98-06-6	ug/kg		< 220 U	< 270 U
Tetrachloroethene (PCE)	127-18-4	ug/kg		< 110 U	**810**
trans-1,2-Dichloroethene	156-60-5	ug/kg		< 220 U	< 270 U
trans-1,3-Dichloropropene	10061-02-6	ug/kg		< 89 U	< 110 U
Trichloroethene (TCE)	79-01-6	ug/kg		< 89 U	**570**
Trichlorofluoromethane	75-69-4	ug/kg		< 220 U	< 270 U
Vinyl Acetate	108-05-4	ug/kg		< 1100 U	< 1300 U
Vinyl Chloride	75-01-4	ug/kg		< 89 U	< 110 U
Benzene, Toluene, Ethylbenzene, and Total Xylenes					
Benzene	71-43-2	ug/kg		< 89 U	< 110 U
Toluene	108-88-3	ug/kg		**380**	**8800**
Ethylbenzene	100-41-4	ug/kg		**240**	**12000**
Total Xylenes	1330-20-7	ug/kg		**660**	**7500**
Semivolatile Organic Compounds					
1,2-Dinitrobenzene	528-29-0	ug/kg		--	--
1,2-Diphenylhydrazine	122-66-7	ug/kg		--	--
1,3-Dinitrobenzene	99-65-0	ug/kg		--	--
1,4-Dinitrobenzene	100-25-4	ug/kg		--	--
2,3,4,6-Tetrachlorophenol	58-90-2	ug/kg		--	--
2,3,5,6-Tetrachlorophenol	935-95-5	ug/kg		--	--
2,3-Dichloroaniline	608-27-5	ug/kg		--	--
2,4,5-Trichlorophenol	95-95-4	ug/kg		< 440 U	< 290 U
2,4,6-Trichlorophenol	88-06-2	ug/kg		< 660 U	< 430 U
2,4-Dichlorophenol	120-83-2	ug/kg		< 440 U	< 290 U
2,4-Dimethylphenol	105-67-9	ug/kg	29	< 440 U	< 290 U
2,4-Dinitrophenol	51-28-5	ug/kg		< 4400 U	< 2900 U
2,4-Dinitrotoluene	121-14-2	ug/kg		< 440 U	< 290 U
2,6-Dinitrotoluene	606-20-2	ug/kg		< 440 U	< 290 U
2-Chloronaphthalene	91-58-7	ug/kg		< 88 UJ	< 57 U
2-Chlorophenol	95-57-8	ug/kg		< 440 UJ	< 290 U
2-Methylphenol	95-48-7	ug/kg	63	< 440 UJ	< 290 U
2-Nitroaniline	88-74-4	ug/kg		< 440 U	< 290 U
2-Nitrophenol	88-75-5	ug/kg		< 440 U	< 290 U
3 & 4 Methylphenol	65794-96-9	ug/kg		--	--
3,3'-Dichlorobenzidine	91-94-1	ug/kg		< 880 U	< 570 U
3-Nitroaniline	99-09-2	ug/kg		< 440 U	< 290 U
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg		< 4400 U	< 2900 U
4-Bromophenyl phenyl ether	101-55-3	ug/kg		< 440 U	< 290 U
4-Chloro-3-methylphenol	59-50-7	ug/kg		< 440 U	**17000**
4-Chloroaniline	106-47-8	ug/kg		< 440 U	< 290 U
4-Chlorophenyl phenyl ether	7005-72-3	ug/kg		< 440 UJ	< 290 U
4-Methylphenol	106-44-5	ug/kg	670	**330 J**	**6400**
4-Nitroaniline	100-01-6	ug/kg		< 440 U	< 290 U
4-Nitrophenol	100-02-7	ug/kg		< 4400 U	< 2900 U
Aniline	62-53-3	ug/kg		--	--
Benzidine	92-87-5	ug/kg		--	--
Benzoic acid	65-85-0	ug/kg	650	< 11000 U	**9700**
Benzyl alcohol	100-51-6	ug/kg	73	**3600 J**	**63000**
Benzyl butyl phthalate	85-68-7	ug/kg	900	**1800**	**4300**
Bis(2-chloroethoxy)methane	111-91-1	ug/kg		< 440 UJ	< 290 U
Bis(2-chloroethyl) ether	111-44-4	ug/kg		< 440 UJ	< 290 U
bis(2-Chloroisopropyl)ether	39638-32-9	ug/kg		--	--
Bis(2-ethylhexyl) adipate	103-23-1	ug/kg		--	--
Bis(2-ethylhexyl) phthalate	117-81-7	ug/kg	1900	**37000**	**110000**
Carbazole	86-74-8	ug/kg		< 440 UJ	**850**
Dibenzofuran	132-64-9	ug/kg	540	< 440 UJ	< 290 U
Diethyl phthalate	84-66-2	ug/kg	1200	< 880 U	< 570 U
Dimethyl phthalate	131-11-3	ug/kg	160	**3900 J**	**70000**
Di-n-butyl phthalate	84-74-2	ug/kg	1400	**3700**	**6600**
Di-n-octyl phthalate	117-84-0	ug/kg	6200	**1200 J**	**4400**
Hexachlorobenzene	118-74-1	ug/kg	70	< 220 U	< 140 U
Hexachlorobutadiene	87-68-3	ug/kg	120	< 220 U	< 140 U
Hexachlorocyclopentadiene	77-47-4	ug/kg		< 440 U	< 290 U
Hexachloroethane	67-72-1	ug/kg		< 440 UJ	< 290 U
Isophorone	78-59-1	ug/kg		< 440 U	< 290 U
Nitrobenzene	98-95-3	ug/kg		< 440 U	< 290 U
N-Nitrosodimethylamine	62-75-9	ug/kg		< 4400 U	< 2900 U
N-Nitroso-di-n-propylamine	621-64-7	ug/kg		< 440 U	< 290 U
N-Nitrosodiphenylamine	86-30-6	ug/kg	40	< 220 UJ	< 140 U

Table D.9. Historical Catch Basin Solids and Sludge Chemical Analytical Results Excluding PCBs

Project No. 190293, South Park Marina, Seattle, Washington

				Catch Basins	StormwateRx
			Location	CB-09	SWRX-PRE
			Date	10/08/2015	10/08/2014
			Sample Name	SP-CB-09	SP-OWS-01 (SOLID)
Analyte	CAS_RN	Unit	RI Screening Level[a]		
Pentachlorophenol	87-86-5	ug/kg	690	< 880 U	**1500**
Phenol	108-95-2	ug/kg	1200	**370 J**	**2200**
Pyridine	110-86-1	ug/kg		--	--
Polycyclic Aromatic Hydrocarbons					
1-Methylnaphthalene	90-12-0	ug/kg		**3100**	**2800**
2-Methylnaphthalene	91-57-6	ug/kg	670	**4600**	**4700**
Acenaphthene	83-32-9	ug/kg	500	**170 J**	< 57 U
Acenaphthylene	208-96-8	ug/kg	1300	< 88 U	< 57 U
Anthracene	120-12-7	ug/kg	960	**190 J**	**800**
Benz(a)anthracene	56-55-3	ug/kg	1600	**270 J**	**3400**
Benzo(a)pyrene	50-32-8	ug/kg	1600	**370 J**	**3800**
Benzo(b)fluoranthene	205-99-2	ug/kg	3600	--	--
Benzo(g,h,i)perylene	191-24-2	ug/kg	720	**360**	**1400**
Benzo(j,k)fluoranthene	Benz-jk-fluor	ug/kg		--	--
Chrysene	218-01-9	ug/kg	2800	**960 J**	**5900**
Dibenzo(a,h)anthracene	53-70-3	ug/kg	230	< 180 U	**440**
Fluoranthene	206-44-0	ug/kg	2500	**1600 J**	**12000**
Fluorene	86-73-7	ug/kg	540	**510**	**950**
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	690	**250**	**1800**
Naphthalene	91-20-3	ug/kg	2100	**2200**	**2000**
Phenanthrene	85-01-8	ug/kg	1500	**880 J**	**6300**
Pyrene	129-00-0	ug/kg	3300	**2200 J**	**11000**
Total Benzofluoranthenes	TOTBFA	ug/kg	3600	**1000 J**	**11000**
Total HPAHs	T-HPAH	ug/kg	17000	**7000**	**50000**
Total LPAHs	T-LPAH	ug/kg	5200	**4000**	**10000**
Total cPAHs TEQ (ND = 0)	T-cPAH-0U	ug/kg		**530 J**	**5500**
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	ug/kg		**540 J**	**5500**
Total cPAHs TEQ (ND=1)	T-cPAH-1U	ug/kg		**550 J**	**5500**
Dioxins/Furans					
Total Dioxin/Furan TEQ (ND = 0)	DF-TEQ-0U	ng/kg	2	**59 J**	**890 J**
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/kg	2	**59 J**	**890 J**
Total Dioxin/Furan TEQ (ND = 1x RDL)	DF-TEQ-1U	ng/kg	2	**59 J**	**890 J**
2,3,7,8-TCDD	1746-01-6	ng/kg		**2.03**	**19.3**
1,2,3,7,8-PeCDD	40321-76-4	ng/kg		**11.7**	**134**
1,2,3,4,7,8-HxCDD	39227-28-6	ng/kg		**20.9**	**245**
1,2,3,6,7,8-HxCDD	57653-85-7	ng/kg		**51.8**	**871**
1,2,3,7,8,9-HxCDD	19408-74-3	ng/kg		**37.4**	**609**
1,2,3,4,6,7,8-HpCDD	35822-46-9	ng/kg		**1650**	**30400 J**
OCDD	3268-87-9	ng/kg		**19800 J**	**484000 J**
Total TCDD	41903-57-5	ng/kg		**31.4**	**126**
Total PeCDD	36088-22-9	ng/kg		**86.1**	**589**
Total HxCDD	34465-46-8	ng/kg		**479**	**5220**
Total HpCDD	37871-00-4	ng/kg		**3620**	**56000**
2,3,7,8-TCDF	51207-31-9	ng/kg		**7.9**	**29.1**
1,2,3,7,8-PeCDF	57117-41-6	ng/kg		**4.66**	**35.3**
2,3,4,7,8-PeCDF	57117-31-4	ng/kg		**10.5**	**54.5**
1,2,3,4,7,8-HxCDF	70648-26-9	ng/kg		**14.8**	**166**
1,2,3,6,7,8-HxCDF	57117-44-9	ng/kg		**13.8**	**118**
1,2,3,7,8,9-HxCDF	72918-21-9	ng/kg		**1.18 J**	**17.1**
2,3,4,6,7,8-HxCDF	60851-34-5	ng/kg		**18.5**	**167**
1,2,3,4,6,7,8-HpCDF	67562-39-4	ng/kg		**256**	**3830 J**
1,2,3,4,7,8,9-HpCDF	55673-89-7	ng/kg		**15.7**	**180**
OCDF	39001-02-0	ng/kg		**876**	**14000 J**
Total TCDF	30402-14-3	ng/kg		**127 J**	**339 J**
Total PeCDF	30402-15-4	ng/kg		**230**	**1180 J**
Total HxCDF	55684-94-1	ng/kg		**360**	**4670**
Total HpCDF	38998-75-3	ng/kg		**718**	**12700**
Alkyl Halides					
1-Chloropropane	540-54-5	ug/kg		< 1100 U	< 710 U
Field Parameters					
pH	pH	pH units		--	--
Conventionals					
Moisture Content	Moisture	%		--	--
Total Organic Carbon	TOC	%		**11**	**23**
Total Organic Carbon (Calculated)	TOC-CALC	%		--	--
Total Solids	TS	%		**44.7**	**34.4**

Table D.10. Historical Catch Basin Solids and Sludge PCB Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

				Catch Basins										StormwateRx
			Location	CB-01	CB-02	CB-03	CB-04	CB-05	CB-06	CB-07	CB-08	CB-09	CB-09	SWRX-PRE
			Date	02/11/2016	02/11/2016	02/11/2016	02/11/2016	02/11/2016	02/09/2016	02/11/2016	02/11/2016	10/08/2015	02/11/2016	10/08/2014
			Sample ID	SPM-CB-01-02112016	SPM-CB-02-02112016	SPM-CB-03-02112016	SPM-CB-04-02112016	SPM-CB-05-02112016	SPM-CB-06-02092016	SPM-CB-07-02112016	SPM-CB-08-02112016	SP-CB-09	SPM-CB-09-02112016	SP-OWS-01 (SOLID)
Analyte	**CAS_RN**	**Unit**	**RI Screening Level[a]**											
PCB Aroclors														
Aroclor 1016	12674-11-2	mg/kg		< 4 U	< 0.04 U	< 20 U	< 0.8 U	< 0.08 UJ	< 10 U	< 0.08 UJ	< 0.04 UJ	< 0.022 U	< 0.4 U	**0.21 J**
Aroclor 1221	11104-28-2	mg/kg		< 4 U	< 0.04 U	< 20 U	< 0.8 U	< 0.08 UJ	< 10 U	< 0.08 UJ	< 0.04 UJ	< 0.024 U	< 0.4 U	< 0.031 U
Aroclor 1232	11141-16-5	mg/kg		< 4 U	< 0.04 U	< 20 U	< 0.8 U	< 0.08 UJ	< 10 U	< 0.08 UJ	< 0.04 UJ	< 0.024 U	< 0.4 U	< 0.031 U
Aroclor 1242	53469-21-9	mg/kg		< 4 U	< 0.04 U	< 20 U	< 0.8 U	< 0.08 UJ	< 10 U	< 0.08 UJ	< 0.04 UJ	< 0.022 U	< 0.4 U	< 0.028 U
Aroclor 1248	12672-29-6	mg/kg		< 4 U	< 0.04 U	< 20 U	< 0.8 U	< 0.08 UJ	< 10 U	< 0.08 UJ	< 0.04 UJ	< 0.022 U	< 0.4 U	< 0.028 U
Aroclor 1254	11097-69-1	mg/kg		< 4 U	< 0.04 U	< 20 U	< 0.8 U	**0.35 J**	< 10 U	**0.34 J**	< 0.04 UJ	< 0.022 U	**1.5**	**2.2**
Aroclor 1260	11096-82-5	mg/kg		< 4 U	**0.57**	< 20 U	< 0.8 U	**0.43 J**	< 10 U	< 0.08 UJ	**0.48 J**	**0.54**	< 0.4 U	**1.7 J**
Aroclor 1262	37324-23-5	mg/kg		< 4 U	< 0.04 U	< 20 U	< 0.8 U	< 0.08 UJ	< 10 U	< 0.08 UJ	< 0.04 UJ	--	< 0.4 U	--
Aroclor 1268	11100-14-4	mg/kg		< 4 U	< 0.04 U	< 20 U	< 0.8 U	< 0.08 UJ	< 10 U	< 0.08 UJ	< 0.04 UJ	--	< 0.4 U	--
Total PCBs Aroclors	T-PCBs	mg/kg	1.0	< 4 U	**0.57**	< 20 U	< 0.8 U	**0.78**	< 10 U	**0.34**	**0.48**	**0.54**	**1.5**	**4.11**
PCB Congeners[b]														
Total PCB Congeners	T-PCBCong	mg/kg	1.0	**0.158**	**0.403**	**0.0507**	**0.0634**	**0.453**	**1.19**	**0.289**	**0.138**	**0.896**	**0.735**	**3.96**
Total PCB TEQ (ND = 0)	PCB-TEQ-0U	mg/kg		--	--	--	--	--	--	--	--	**0.000017**	--	**0.00023**
Total PCB TEQ (ND = 1 RDL)	PCB-TEQ-1U	mg/kg		--	--	--	--	--	--	--	--	**0.00017**	--	**0.00026**
Total PCB TEQ (ND = 1/2 RD	PCB-TEQ-1/2U	mg/kg		--	--	--	--	--	--	--	--	**0.0000852**	--	**0.00024**
Total Dioxin-like PCBs	T-DLPCBs	mg/kg		**0.0100205**	**0.0126296**	**0.00334333**	**0.00291216**	**0.0453181**	**0.1245205**	**0.0242733**	**0.01037525**	--	**0.0639378**	--

Notes:

a) Derivation and selection of RI screening levels presented in Table C-5.

b) Total PCB TEQ values are shown as reported in the historical analytical database. Total values for the complete dataset will be calculated and reported in the RI.

Bold - Analyte detected

Blue shading - Analyte exceeds Remedial Investigation Screening Level

Total calculation note: Calculations were made in accordance with Ecology's Sediment Cleanup User's Manual II (Ecology 2015). For non-detect results a "0" value was used in the calculation, unless otherwise noted in the analyte column. If all Aroclor results were non-detect, the total was reported as the largest RL of any single Aroclor.

Data Qualifiers:

U - The analyte was analyzed for but was not detected at the reporting limit or reported value.

J - The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value (2016-2017 data).

Sources:

Leidos, 2015, NPDES Inspection Sampling Support 2014/2015, Prepared for Washington State Department of Ecology, June 2015.

TIG Environmental, 2018a, Stormwater and Boat Wash Water Systems Evaluation South Park Marina, Prepared for South Park Marina Limited Partnership, February 2018.

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location Date Sample Depth	SC-01 02/25/2016 SPM-SC-01-02252016-0-0.1 0 - 10 cm	SC-01 02/25/2016 SPM-SC-01-02252016-0.1-1 10 - 100 cm	SC-01 02/25/2016 SPM-SC-01-02252016-1-2 100 - 200 cm	SC-02 02/24/2016 SPM-SC-02-02242016-0-0.1 0 - 10 cm	SC-02 02/24/2016 SPM-SC-02-02242016-0.1-1 10 - 100 cm	SC-02 02/24/2016 SPM-SC-02-02242016-1-2 100 - 200 cm	SC-03 02/25/2016 SPM-SC-03-02252016-0-0.1 0 - 10 cm	SC-03 02/25/2016 SPM-SC-03-02252016-0.1-1 10 - 100 cm	SC-03 02/25/2016 SPM-SC-03-02252016-1-2 100 - 200 cm	SC-04 02/26/2016 SPM-SC-04-02262016-0-0.1 0 - 10 cm	SC-04 02/26/2016 SPM-SC-04-02262016-0.1-1 10 - 100 cm
Analyte	**CAS_RN**	**Unit**											
Metals													
Arsenic	7440-38-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440-43-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Selenium	7782-49-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silver	7440-22-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons													
Gasoline Range Organics	TPH-GRO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diesel Range Organics	TPH-DRO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Motor Oil Range Organics	TPH-ORO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	563-58-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	142-28-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	594-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	106-43-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	108-86-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene (DCE)	156-59-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	SC-01 02/25/2016 SPM-SC-01-02252016-0-0.1 0 - 10 cm	SC-01 02/25/2016 SPM-SC-01-02252016-0.1-1 10 - 100 cm	SC-01 02/25/2016 SPM-SC-01-02252016-1-2 100 - 200 cm	SC-02 02/24/2016 SPM-SC-02-02242016-0-0.1 0 - 10 cm	SC-02 02/24/2016 SPM-SC-02-02242016-0.1-1 10 - 100 cm	SC-02 02/24/2016 SPM-SC-02-02242016-1-2 100 - 200 cm	SC-03 02/25/2016 SPM-SC-03-02252016-0-0.1 0 - 10 cm	SC-03 02/25/2016 SPM-SC-03-02252016-0.1-1 10 - 100 cm	SC-03 02/25/2016 SPM-SC-03-02252016-1-2 100 - 200 cm	SC-04 02/26/2016 SPM-SC-04-02262016-0-0.1 0 - 10 cm	SC-04 02/26/2016 SPM-SC-04-02262016-0.1-1 10 - 100 cm
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromomethane	74-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	179601-23-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	103-65-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
p-Isopropyltoluene	99-87-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	135-98-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	98-06-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes													
Benzene	71-43-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1330-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
2,4,5-Trichlorophenol	95-95-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	95-48-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	88-74-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	88-75-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3 & 4 Methylphenol	65794-96-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	106-44-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	65-85-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	100-51-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl butyl phthalate	85-68-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (Continued)													
Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location Date Sample Depth	SC-01 02/25/2016 SPM-SC-01- 02252016-0-0.1 0 - 10 cm	SC-01 02/25/2016 SPM-SC-01- 02252016-0.1-1 10 - 100 cm	SC-01 02/25/2016 SPM-SC-01- 02252016-1-2 100 - 200 cm	SC-02 02/24/2016 SPM-SC-02- 02242016-0-0.1 0 - 10 cm	SC-02 02/24/2016 SPM-SC-02- 02242016-0.1-1 10 - 100 cm	SC-02 02/24/2016 SPM-SC-02- 02242016-1-2 100 - 200 cm	SC-03 02/25/2016 SPM-SC-03- 02252016-0-0.1 0 - 10 cm	SC-03 02/25/2016 SPM-SC-03- 02252016-0.1-1 10 - 100 cm	SC-03 02/25/2016 SPM-SC-03- 02252016-1-2 100 - 200 cm	SC-04 02/26/2016 SPM-SC-04- 02262016-0-0.1 0 - 10 cm	SC-04 02/26/2016 SPM-SC-04- 02262016-0.1-1 10 - 100 cm
Analyte	**CAS_RN**	**Unit**											
Bis(2-chloroethyl) ether	111-44-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	84-66-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	84-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	117-84-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	86-30-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Phenol	108-95-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	90-12-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	91-57-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Benzofluoranthenes	TOTBFA	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HPAHs	T-HPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total LPAHs	T-LPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PAHs	T-PAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pesticides / Herbicides													
4,4'-DDD	72-54-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDE	72-55-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Aldrin	309-00-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlordane	57-74-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-Chlordane	5103-71-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Lindane	58-89-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total DDT	T-DDT	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	SC-01 02/25/2016 SPM-SC-01-02252016-0-0.1 0 - 10 cm	SC-01 02/25/2016 SPM-SC-01-02252016-0.1-1 10 - 100 cm	SC-01 02/25/2016 SPM-SC-01-02252016-1-2 100 - 200 cm	SC-02 02/24/2016 SPM-SC-02-02242016-0-0.1 0 - 10 cm	SC-02 02/24/2016 SPM-SC-02-02242016-0.1-1 10 - 100 cm	SC-02 02/24/2016 SPM-SC-02-02242016-1-2 100 - 200 cm	SC-03 02/25/2016 SPM-SC-03-02252016-0-0.1 0 - 10 cm	SC-03 02/25/2016 SPM-SC-03-02252016-0.1-1 10 - 100 cm	SC-03 02/25/2016 SPM-SC-03-02252016-1-2 100 - 200 cm	SC-04 02/26/2016 SPM-SC-04-02262016-0-0.1 0 - 10 cm	SC-04 02/26/2016 SPM-SC-04-02262016-0.1-1 10 - 100 cm
		Location / Date / Sample / Depth											
2,4,5-T	93-76-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-D	94-75-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-DB	94-82-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dalapon	75-99-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dicamba	1918-00-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	120-36-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dinoseb	88-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPA	94-74-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPP	93-65-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silvex	93-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans													
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	1746-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	40321-76-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	39227-28-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	57653-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	19408-74-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	35822-46-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDD	3268-87-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDD	41903-57-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDD	36088-22-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDD	34465-46-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDD	37871-00-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	51207-31-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	57117-31-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	70648-26-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	57117-44-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	72918-21-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	60851-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	67562-39-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	55673-89-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDF	39001-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDF	30402-14-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDF	30402-15-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDF	55684-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDF	38998-75-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Organometallic													
Tributyltin Ion	36643-28-4	ug/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyl Aroclors													
Aroclor 1016	12674-11-2	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U	< 0.0040 UJ	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U
Aroclor 1221	11104-28-2	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U
Aroclor 1232	11141-16-5	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U
Aroclor 1242	53469-21-9	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U
Aroclor 1248	12672-29-6	mg/kg	**0.0091**	**0.011**	**0.023**	**0.012**	**0.011**	**0.012**	**0.0079**	**0.01**	**0.026**	**0.0069**	**0.0083**
Aroclor 1254	11097-69-1	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U
Aroclor 1260	11096-82-5	mg/kg	**0.021**	**0.013**	**0.029**	**0.029**	**0.039**	**0.031**	**0.011 J**	**0.017**	**0.034**	**0.015**	**0.034**
Aroclor 1262	37324-23-5	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U
Aroclor 1268	11100-14-4	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0040 U
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	**0.0301**	**0.024**	**0.052**	**0.041**	**0.05**	**0.043**	**0.0189**	**0.027**	**0.06**	**0.0219**	**0.0423**
Polychlorinated Biphenyl Congeners													
PCB 105	32598-14-4	mg/kg	**0.0006**	**0.000505**	**0.000951**	**0.000142**	**0.00015**	**0.0000791**	**0.0000608**	**0.0000832**	**0.000192**	**0.000355**	**0.000362**
PCB 110	38380-03-9	mg/kg	**0.00281**	**0.00228**	**0.00382**	**0.000664**	**0.000722**	**0.000438**	**0.000261**	**0.000405**	**0.00081**	**0.0015**	**0.00171**
PCB 114	74472-37-0	mg/kg	**0.0000376**	**0.0000319 J**	**0.0000631**	**0.00000786 J**	**0.00000815 J**	**0.00000397 J**	**0.00000345 J**	**0.00000461 J**	**0.000011 J**	**0.0000181 J**	**0.0000202 J**
PCB 119	56558-17-9	mg/kg	**0.000115**	**0.0000766**	**0.000124**	**0.0000259 J**	**0.0000301 J**	**0.0000181 J**	**0.0000106 J**	**0.0000131 J**	**0.0000283 J**	**0.0000555**	**0.0000673**

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-01	SC-01	SC-01	SC-02	SC-02	SC-02	SC-03	SC-03	SC-03	SC-04	SC-04
		Date	02/25/2016	02/25/2016	02/25/2016	02/24/2016	02/24/2016	02/24/2016	02/25/2016	02/25/2016	02/25/2016	02/26/2016	02/26/2016
		Sample	SPM-SC-01-02252016-0-0.1	SPM-SC-01-02252016-0.1-1	SPM-SC-01-02252016-1-2	SPM-SC-02-02242016-0-0.1	SPM-SC-02-02242016-0.1-1	SPM-SC-02-02242016-1-2	SPM-SC-03-02252016-0-0.1	SPM-SC-03-02252016-0.1-1	SPM-SC-03-02252016-1-2	SPM-SC-04-02262016-0-0.1	SPM-SC-04-02262016-0.1-1
		Depth	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm
Analyte	**CAS_RN**	**Unit**											
PCB 123	65510-44-3	mg/kg	**0.0000326**	**0.0000284 J**	**0.0000602**	**0.00000725 J**	**0.00000934 J**	**0.00000423 J**	**0.00000317 J**	< 0.00000253 U	**0.0000108 J**	**0.0000197 J**	**0.0000199 J**
PCB 126	57465-28-8	mg/kg	**0.0000134 J**	**0.00000743 J**	**0.0000151 J**	**0.00000191 J**	**0.00000275 J**	**0.00000203 J**	**0.000000964 J**	**0.00000125 J**	< 0.00000292 U	**0.00000507 J**	**0.00000693 J**
PCB 151	52663-63-5	mg/kg	**0.00105**	**0.000724**	**0.00118**	**0.000264**	**0.000412**	**0.000267**	**0.0000771**	**0.00024**	**0.00025**	**0.000637**	**0.000663**
PCB 153	35065-27-1	mg/kg	**0.00389**	**0.00273**	**0.00434**	**0.000995**	**0.00145**	**0.000856**	**0.000329**	**0.000746**	**0.000916**	**0.00226**	**0.00233**
PCB 156	38380-08-4	mg/kg	**0.000296**	**0.000238**	**0.000392**	**0.0000765**	**0.0000992**	**0.0000557**	**0.0000283**	**0.0000426 J**	**0.0000864**	**0.000177**	**0.000186**
PCB 157	69782-90-7	mg/kg	**0.0000693**	**0.0000523**	**0.000081**	**0.0000174 J**	**0.0000184 J**	**0.00000935 J**	**0.00000685 J**	< 0.00000719 U	**0.0000189 J**	**0.0000363**	**0.0000351**
PCB 167	52663-72-6	mg/kg	**0.000134**	**0.000107**	**0.000162**	**0.0000362 J**	**0.000042 J**	**0.0000254 J**	**0.0000134 J**	**0.0000197 J**	**0.0000357 J**	**0.0000813**	**0.0000779**
PCB 168	59291-65-5	mg/kg	**0.0000103 J**	**0.00000415**	**0.0000108 J**	**0.00000184 J**	**0.00000233 J**	**0.00000123**	**0.00000127 J**	**0.00000156**	**0.00000142**	**0.00000828 J**	**0.00000435**
PCB 169	32774-16-6	mg/kg	**0.00000625**	**0.00000522**	**0.00000686**	**0.00000184**	**0.0000014**	**0.00000129**	**0.00000143**	**0.00000178**	**0.00000187**	**0.00000859**	**0.00000604**
PCB 170	35065-30-6	mg/kg	**0.00129**	**0.000848**	**0.00138**	**0.000338**	**0.000554**	**0.000302**	**0.0000912**	**0.000222**	**0.000272**	**0.000779**	**0.000757**
PCB 177	52663-70-4	mg/kg	**0.000949**	**0.00066**	**0.00104**	**0.000244**	**0.000396**	**0.00022**	**0.0000733**	**0.000166**	**0.00021**	**0.000568**	**0.000563**
PCB 18	37680-65-2	mg/kg	**0.000752**	**0.00122**	**0.00246**	**0.000146**	**0.000136**	**0.000135**	**0.0000686**	**0.000171**	**0.000295**	**0.000352**	**0.00063**
PCB 180	35065-29-3	mg/kg	**0.00321**	**0.00221**	**0.00345**	**0.000896**	**0.0014**	**0.000784**	**0.000226**	**0.00058**	**0.0007**	**0.00191**	**0.00198**
PCB 183	52663-69-1	mg/kg	**0.000843**	**0.000601**	**0.000918**	**0.000225**	**0.000381**	**0.000197**	**0.0000596**	**0.000148**	**0.00017**	**0.000483**	**0.000495**
PCB 189	39635-31-9	mg/kg	**0.0000479**	**0.0000301 J**	**0.0000517**	**0.0000127 J**	**0.0000201 J**	**0.0000112 J**	**0.00000305 J**	**0.00000858 J**	**0.0000106 J**	**0.0000226 J**	**0.0000348**
PCB 194	35694-08-7	mg/kg	**0.000664**	**0.000437**	**0.000664**	**0.000207**	**0.000304**	**0.000156**	**0.0000552**	**0.000113**	**0.000137**	**0.000398**	**0.000435**
PCB 195	52663-78-2	mg/kg	**0.000334**	**0.000211**	**0.000297**	**0.0000855**	**0.000138**	**0.0000716**	**0.0000226 J**	**0.0000546**	**0.0000612**	**0.000185**	**0.000191**
PCB 201	40186-71-8	mg/kg	< 0.00011 U	**0.0000746**	**0.000111**	**0.0000316 J**	**0.0000448 J**	**0.0000248 J**	**0.00000881 J**	**0.0000186 J**	**0.0000223 J**	**0.0000649**	**0.0000672**
PCB 206	40186-72-9	mg/kg	**0.000273**	**0.000188**	**0.00025**	**0.0000959**	**0.000104**	**0.0000651**	**0.0000306**	**0.0000593**	**0.0000599**	**0.000164**	**0.000177**
PCB 209	2051-24-3	mg/kg	**0.0000619**	**0.0000709**	**0.000125**	**0.0000194 J**	**0.0000211 J**	**0.0000129 J**	**0.0000104 J**	**0.000019 J**	**0.0000203 J**	**0.0000474**	**0.0000578**
PCB 28	7012-37-5	mg/kg	**0.000837**	**0.00101**	**0.00273**	**0.000201**	**0.000209**	**0.00018**	**0.000101**	**0.000197**	**0.000426**	**0.000478**	**0.000709**
PCB 37	38444-90-5	mg/kg	**0.000228**	**0.000233**	**0.000606**	**0.0000496**	**0.0000567**	**0.0000397 J**	**0.0000262**	**0.0000401 J**	**0.0000991**	**0.00014**	**0.000171**
PCB 44	41464-39-5	mg/kg	**0.000884**	**0.00109**	**0.00302**	**0.000235**	**0.000247**	**0.00019**	**0.000105**	**0.000167**	**0.000425**	**0.000519**	**0.000703**
PCB 74	32690-93-0	mg/kg	**0.000446**	**0.000468**	**0.00148**	**0.000103**	**0.000115**	**0.0000822**	**0.0000443**	**0.0000725**	**0.000205**	**0.000239**	**0.000309**
PCB 77	32598-13-3	mg/kg	**0.0000976**	**0.0000862**	**0.000233**	**0.0000212 J**	**0.0000241 J**	**0.0000162 J**	**0.00000833 J**	**0.0000146 J**	**0.0000377 J**	**0.0000504**	**0.0000653**
PCB 81	70362-50-4	mg/kg	**0.0000107 J**	**0.00000823 J**	**0.0000166 J**	**0.00000191 J**	**0.00000239 J**	**0.000000817 J**	**0.000000261 J**	**0.000000419 J**	**0.0000012 J**	**0.0000176 J**	**0.00000373 J**
PCB 99	38380-01-7	mg/kg	**0.00128**	**0.000957**	**0.00172**	**0.000306**	**0.00033**	**0.000182**	**0.000126**	**0.000158**	**0.000368**	**0.000653**	**0.000761**
Total PCB Congeners	T-PCBCong	mg/kg	**0.0672**	**0.0563**	**0.104**	**0.0171**	**0.022**	**0.0132**	**0.00604**	**0.0118**	**0.0192**	**0.0382**	**0.0434**
Conventionals													
Ammonia as Nitrogen	7664-41-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	TOC	%	**1.32**	**1.48**	**1.54**	**2.13**	**2.28**	**1.79**	**1.23**	**1.87**	**1.63**	**1.45**	**1.98**
Total Solids	TS	%	--	--	--	--	--	--	--	--	--	--	--
Total Volatile Solids	TVS	%	--	--	--	--	--	--	--	--	--	--	--
Particle Size													
Gravel	Phisize <-1	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize > 10	PhiSize >10	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 0 to 1 Coarse Sand	PhiSize 0-1	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize -1 to 0 Very Coarse Sand	PhiSize -1-0	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 1 to 2 Medium Sand	PhiSize 1-2	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 2 to 3 Fine Sand	PhiSize 2-3	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 3 to 4 Very Fine Sand	PhiSize 3-4	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 4 To 5 Coarse Silt	PhiSize 4-5	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 5 to 6 Medium Silt	PhiSize 5-6	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 6 to 7 Fine Silt	PhiSize 6-7	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 7 to 8 Very Fine Silt	PhiSize 7-8	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 8 to 9 Clay	PhiSize 8-9	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 9 to 10 Clay	PhiSize 9-10	%	--	--	--	--	--	--	--	--	--	--	--

Notes:

Bold - detected

U - Analyte not detected at or above Reporting Limit (RL) shown

J - Result value estimated

UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

cm - centimeters

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	SC-04 02/26/2016 SPM-SC-04-02262016-1-2 100 - 200 cm	SC-05 02/25/2016 SPM-SC-05-02252016-0-0.1 0 - 10 cm	SC-05 02/25/2016 SPM-SC-05-02252016-0.1-1 10 - 100 cm	SC-05 02/25/2016 SPM-SC-05-02252016-1-2 100 - 200 cm	SC-06 02/24/2016 SPM-SC-06-02242016-0-0.1 0 - 10 cm	SC-06 02/24/2016 SPM-SC-06-02242016-0.1-1 10 - 100 cm	SC-06 02/24/2016 SPM-SC-06-02242016-1-2 100 - 200 cm	SC-07 02/25/2016 SPM-SC-07-02252016-0-0.1 0 - 10 cm	SC-07 02/25/2016 SPM-SC-07-02252016-0.1-1 10 - 100 cm	SC-07 02/25/2016 SPM-SC-07-02252016-1-2 100 - 200 cm	SC-08 02/25/2016 SPM-SC-08-02252016-0-0.1 0 - 10 cm
Metals													
Arsenic	7440-38-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440-43-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Selenium	7782-49-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silver	7440-22-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons													
Gasoline Range Organics	TPH-GRO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diesel Range Organics	TPH-DRO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Motor Oil Range Organics	TPH-ORO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	563-58-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	142-28-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	594-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	106-43-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	108-86-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene (DCE)	156-59-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results
Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	SC-04 02/26/2016 SPM-SC-04-02262016-1-2 100 - 200 cm	SC-05 02/25/2016 SPM-SC-05-02252016-0-0.1 0 - 10 cm	SC-05 02/25/2016 SPM-SC-05-02252016-0.1-1 10 - 100 cm	SC-05 02/25/2016 SPM-SC-05-02252016-1-2 100 - 200 cm	SC-06 02/24/2016 SPM-SC-06-02242016-0-0.1 0 - 10 cm	SC-06 02/24/2016 SPM-SC-06-02242016-0.1-1 10 - 100 cm	SC-06 02/24/2016 SPM-SC-06-02242016-1-2 100 - 200 cm	SC-07 02/25/2016 SPM-SC-07-02252016-0-0.1 0 - 10 cm	SC-07 02/25/2016 SPM-SC-07-02252016-0.1-1 10 - 100 cm	SC-07 02/25/2016 SPM-SC-07-02252016-1-2 100 - 200 cm	SC-08 02/25/2016 SPM-SC-08-02252016-0-0.1 0 - 10 cm
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromomethane	74-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	179601-23-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	103-65-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
p-Isopropyltoluene	99-87-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	135-98-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	98-06-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes													
Benzene	71-43-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1330-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
2,4,5-Trichlorophenol	95-95-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	95-48-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	88-74-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	88-75-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3 & 4 Methylphenol	65794-96-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	106-44-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	65-85-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	100-51-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl butyl phthalate	85-68-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (Continued)													
Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Location			SC-04	SC-05	SC-05	SC-05	SC-06	SC-06	SC-06	SC-07	SC-07	SC-07	SC-08
Date			02/26/2016	02/25/2016	02/25/2016	02/25/2016	02/24/2016	02/24/2016	02/24/2016	02/25/2016	02/25/2016	02/25/2016	02/25/2016
Sample			SPM-SC-04-02262016-1-2	SPM-SC-05-02252016-0-0.1	SPM-SC-05-02252016-0.1-1	SPM-SC-05-02252016-1-2	SPM-SC-06-02242016-0-0.1	SPM-SC-06-02242016-0.1-1	SPM-SC-06-02242016-1-2	SPM-SC-07-02252016-0-0.1	SPM-SC-07-02252016-0.1-1	SPM-SC-07-02252016-1-2	SPM-SC-08-02252016-0-0.1
Depth			100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**											
Bis(2-chloroethyl) ether	111-44-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	84-66-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	84-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	117-84-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	86-30-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Phenol	108-95-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	90-12-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	91-57-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Benzofluoranthenes	TOTBFA	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HPAHs	T-HPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total LPAHs	T-LPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PAHs	T-PAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pesticides / Herbicides													
4,4'-DDD	72-54-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDE	72-55-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Aldrin	309-00-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlordane	57-74-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-Chlordane	5103-71-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Lindane	58-89-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total DDT	T-DDT	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-04	SC-05	SC-05	SC-05	SC-06	SC-06	SC-06	SC-07	SC-07	SC-07	SC-08
		Date	02/26/2016	02/25/2016	02/25/2016	02/25/2016	02/24/2016	02/24/2016	02/24/2016	02/25/2016	02/25/2016	02/25/2016	02/25/2016
		Sample	SPM-SC-04-02262016-1-2	SPM-SC-05-02252016-0-0.1	SPM-SC-05-02252016-0.1-1	SPM-SC-05-02252016-1-2	SPM-SC-06-02242016-0-0.1	SPM-SC-06-02242016-0.1-1	SPM-SC-06-02242016-1-2	SPM-SC-07-02252016-0-0.1	SPM-SC-07-02252016-0.1-1	SPM-SC-07-02252016-1-2	SPM-SC-08-02252016-0-0.1
		Depth	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**											
2,4,5-T	93-76-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-D	94-75-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-DB	94-82-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dalapon	75-99-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dicamba	1918-00-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	120-36-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dinoseb	88-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPA	94-74-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPP	93-65-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silvex	93-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans													
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	1746-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	40321-76-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	39227-28-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	57653-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	19408-74-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	35822-46-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDD	3268-87-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDD	41903-57-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDD	36088-22-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDD	34465-46-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDD	37871-00-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	51207-31-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	57117-31-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	70648-26-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	57117-44-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	72918-21-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	60851-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	67562-39-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	55673-89-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDF	39001-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDF	30402-14-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDF	30402-15-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDF	55684-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDF	38998-75-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Organometallic													
Tributyltin Ion	36643-28-4	ug/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyl Aroclors													
Aroclor 1016	12674-11-2	mg/kg	< 0.0040 U	< 0.040 U	< 0.040 U	< 0.080 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1221	11104-28-2	mg/kg	< 0.0040 U	< 0.040 U	< 0.040 U	< 0.080 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1232	11141-16-5	mg/kg	< 0.0040 U	< 0.040 U	< 0.040 U	< 0.080 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1242	53469-21-9	mg/kg	< 0.0040 U	< 0.040 U	< 0.040 U	< 0.080 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1248	12672-29-6	mg/kg	**0.018**	< 0.040 U	< 0.040 U	< 0.080 U	**0.013**	**0.011**	**0.014**	< 0.080 U	< 0.080 U	**0.038**	**0.0045**
Aroclor 1254	11097-69-1	mg/kg	< 0.0040 U	< 0.040 U	< 0.040 U	< 0.080 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1260	11096-82-5	mg/kg	**0.025**	< 0.040 U	< 0.040 U	< 0.080 U	**0.08**	**0.031**	**0.051**	< 0.080 U	< 0.080 U	**0.067**	**0.0056**
Aroclor 1262	37324-23-5	mg/kg	< 0.0040 U	< 0.040 U	< 0.040 U	< 0.080 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1268	11100-14-4	mg/kg	< 0.0040 U	< 0.040 U	< 0.040 U	< 0.080 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	**0.043**	< 0.040 U	< 0.040 U	< 0.080 U	**0.093**	**0.042**	**0.065**	< 0.080 U	< 0.080 U	**0.105**	**0.0101**
Polychlorinated Biphenyl Congeners													
PCB 105	32598-14-4	mg/kg	**0.000778**	**0.0000497**	**0.0000461 J**	**0.000138**	**0.000143**	**0.0000994**	**0.000127**	**0.000447**	**0.000639**	**0.000965**	**0.000488**
PCB 110	38380-03-9	mg/kg	**0.00421**	**0.000218**	**0.000212**	**0.000615**	**0.000658**	**0.000477**	**0.000715**	**0.00189**	**0.00279**	**0.00425**	**0.00779**
PCB 114	74472-37-0	mg/kg	**0.0000475**	**0.0000028 J**	**0.00000292 J**	**0.00000775 J**	**0.00000771 J**	**0.0000054 J**	**0.00000642 J**	**0.0000277**	**0.0000399**	**0.0000584**	< 0.0000291 U
PCB 119	56558-17-9	mg/kg	**0.000175**	**0.00000791 J**	**0.00000885 J**	**0.0000202 J**	**0.0000248 J**	**0.0000135 J**	**0.0000326 J**	**0.0000736**	**0.0000746**	**0.000125**	**0.000514**

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-04	SC-05	SC-05	SC-05	SC-06	SC-06	SC-06	SC-07	SC-07	SC-07	SC-08
		Date	02/26/2016	02/25/2016	02/25/2016	02/25/2016	02/24/2016	02/24/2016	02/24/2016	02/25/2016	02/25/2016	02/25/2016	02/25/2016
		Sample	SPM-SC-04-02262016-1-2	SPM-SC-05-02252016-0-0.1	SPM-SC-05-02252016-0.1-1	SPM-SC-05-02252016-1-2	SPM-SC-06-02242016-0-0.1	SPM-SC-06-02242016-0.1-1	SPM-SC-06-02242016-1-2	SPM-SC-07-02252016-0-0.1	SPM-SC-07-02252016-0.1-1	SPM-SC-07-02252016-1-2	SPM-SC-08-02252016-0-0.1
		Depth	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**											
PCB 123	65510-44-3	mg/kg	**0.0000436**	**0.00000299 J**	< 0.00000268 U	**0.00000719 J**	**0.00000492 J**	< 0.00000413 U	**0.00000725 J**	**0.0000293**	**0.0000306**	**0.0000511**	**0.0000243 J**
PCB 126	57465-28-8	mg/kg	**0.000015 J**	**0.000000963 J**	**0.0000014**	**0.00000257 J**	**0.00000205 J**	**0.00000189 J**	**0.00000283 J**	**0.00000829 J**	**0.0000126 J**	**0.0000168 J**	**0.00000767 J**
PCB 151	52663-63-5	mg/kg	**0.00158**	**0.0000625**	**0.0000732**	**0.000209**	**0.000344**	**0.000285**	**0.000563**	**0.000659**	**0.00139**	**0.00197**	**0.00124**
PCB 153	35065-27-1	mg/kg	**0.00538**	**0.000254**	**0.000256**	**0.000752**	**0.0012**	**0.00096**	**0.00175**	**0.00246**	**0.00496**	**0.00673**	**0.00504**
PCB 156	38380-08-4	mg/kg	**0.000412**	**0.0000225 J**	**0.0000197 J**	**0.0000632**	**0.0000849**	**0.0000652**	**0.000102**	**0.000203**	**0.000385**	**0.0005**	**0.00049**
PCB 157	69782-90-7	mg/kg	**0.0000742**	**0.00000481 J**	**0.00000455 J**	**0.0000137 J**	**0.0000163 J**	**0.0000112 J**	**0.0000146 J**	**0.0000444**	**0.0000731**	**0.0000932**	**0.000108**
PCB 167	52663-72-6	mg/kg	**0.000191**	**0.0000107 J**	**0.00000977 J**	**0.0000262 J**	**0.0000376 J**	**0.0000301 J**	**0.0000473 J**	**0.000083**	**0.000166**	**0.000209**	**0.000194**
PCB 168	59291-65-5	mg/kg	**0.00000467**	**0.000000729**	**0.00000134**	**0.0000025 J**	**0.00000232**	**0.00000171**	**0.00000149**	**0.00000247**	**0.00000476**	**0.00000324**	**0.0000168 J**
PCB 169	32774-16-6	mg/kg	**0.00000609**	**0.000000861**	**0.00000136**	**0.00000196**	**0.00000275**	**0.00000192**	**0.00000174**	**0.0000033**	**0.00000661**	**0.00000466**	**0.00000831**
PCB 170	35065-30-6	mg/kg	**0.00176**	**0.0000699**	**0.0000865**	**0.000224**	**0.000434**	**0.000378**	**0.000609**	**0.000668**	**0.00201**	**0.00224**	**0.00081**
PCB 177	52663-70-4	mg/kg	**0.00141**	**0.0000513**	**0.0000648**	**0.000169**	**0.000299**	**0.000262**	**0.0005**	**0.000561**	**0.00139**	**0.00175**	**0.000695**
PCB 18	37680-65-2	mg/kg	**0.00116**	**0.000066**	**0.000152**	**0.00024**	**0.000107**	**0.000125**	**0.000133**	**0.000433**	**0.000584**	**0.00144**	**0.000517**
PCB 180	35065-29-3	mg/kg	**0.00441**	**0.000175**	**0.000214**	**0.000583**	**0.00109**	**0.000986**	**0.00165**	**0.00179**	**0.00478**	**0.00561**	**0.00151**
PCB 183	52663-69-1	mg/kg	**0.00116**	**0.0000465**	**0.0000543**	**0.00014**	**0.000286**	**0.000237**	**0.000423**	**0.00046**	**0.00118**	**0.0014**	**0.000418**
PCB 189	39635-31-9	mg/kg	< 0.0000607 U	**0.00000274 J**	**0.00000308 J**	< 0.00000881 U	**0.0000157 J**	< 0.0000129 U	**0.0000225 J**	**0.0000263**	**0.0000802**	**0.0000785**	**0.0000387**
PCB 194	35694-08-7	mg/kg	**0.000937**	**0.0000409**	**0.0000461 J**	**0.000125**	**0.00024**	**0.00019**	**0.000312**	**0.000405**	**0.00115**	**0.00111**	**0.000196**
PCB 195	52663-78-2	mg/kg	**0.000431**	**0.0000177 J**	**0.0000203 J**	**0.0000555**	**0.00011**	**0.0000881**	**0.000142**	**0.000193**	**0.000508**	**0.000509**	**0.000094**
PCB 201	40186-71-8	mg/kg	**0.000147**	< 0.00000591 U	**0.00000678 J**	**0.0000173 J**	**0.0000364 J**	**0.0000282 J**	**0.0000501**	**0.0000662**	**0.000164**	**0.000185**	**0.0000383**
PCB 206	40186-72-9	mg/kg	**0.00032**	**0.0000249**	**0.0000206 J**	**0.0000468 J**	**0.0000883**	**0.0000626**	**0.0000918**	**0.000201**	**0.000371**	**0.00033**	**0.000115**
PCB 209	2051-24-3	mg/kg	**0.0000953**	**0.00000858 J**	**0.0000082 J**	**0.0000138 J**	**0.0000189 J**	**0.0000152 J**	**0.0000147 J**	**0.0000576**	**0.0000699**	**0.0000852**	**0.0000456**
PCB 28	7012-37-5	mg/kg	**0.00151**	**0.0000991**	**0.00016**	< 0.000312 U	**0.000164**	**0.000169**	**0.000219**	**0.000566**	**0.000728**	**0.0019**	**0.000638**
PCB 37	38444-90-5	mg/kg	**0.000382**	**0.0000237 J**	**0.000033 J**	**0.0000728**	**0.0000491 J**	**0.0000404 J**	**0.000058**	**0.000136**	**0.000198**	**0.000484**	**0.000136**
PCB 44	41464-39-5	mg/kg	**0.00181**	**0.0000948**	**0.000148**	**0.000315**	**0.000218**	**0.000171**	**0.000248**	**0.000648**	**0.000998**	**0.00214**	**0.0000115**
PCB 74	32690-93-0	mg/kg	**0.000725**	**0.0000407**	**0.0000602**	**0.000143**	**0.000102**	**0.0000815**	**0.000122**	**0.0003**	**0.000397**	**0.000995**	**0.00052**
PCB 77	32598-13-3	mg/kg	**0.000134**	**0.00000839 J**	**0.0000126 J**	**0.0000272 J**	**0.0000213 J**	**0.0000173 J**	**0.0000248 J**	**0.0000565**	**0.0000751**	**0.000176**	**0.000047**
PCB 81	70362-50-4	mg/kg	**0.00000761 J**	**0.000000155 J**	**0.00000138**	**0.00000133 J**	**0.00000846 J**	**0.0000042 J**	**0.000000903 J**	**0.00000981 J**	**0.0000126 J**	**0.0000157 J**	**0.0000204 J**
PCB 99	38380-01-7	mg/kg	**0.0018**	**0.0000931**	**0.0000888**	**0.00028**	**0.000288**	**0.00018**	**0.000323**	**0.000841**	**0.00111**	**0.00172**	**0.00335**
Total PCB Congeners	T-PCBCong	mg/kg	**0.0976**	**0.00495**	**0.0063**	**0.0147**	**0.0183**	**0.0146**	**0.0239**	**0.0429**	**0.0772**	**0.114**	**0.0974**
Conventionals													
Ammonia as Nitrogen	7664-41-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	TOC	%	**1.87**	**1.56**	**1.98**	**2.03**	**1.86**	**2**	**2.13**	**1.9**	**2.19**	**1.96**	**2.18**
Total Solids	TS	%	--	--	--	--	--	--	--	--	--	--	--
Total Volatile Solids	TVS	%	--	--	--	--	--	--	--	--	--	--	--
Particle Size													
Gravel	Phisize <-1	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize > 10	PhiSize >10	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 0 to 1 Coarse Sand	PhiSize 0-1	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize -1 to 0 Very Coarse Sand	PhiSize -1-0	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 1 to 2 Medium Sand	PhiSize 1-2	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 2 to 3 Fine Sand	PhiSize 2-3	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 3 to 4 Very Fine Sand	PhiSize 3-4	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 4 To 5 Coarse Silt	PhiSize 4-5	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 5 to 6 Medium Silt	PhiSize 5-6	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 6 to 7 Fine Silt	PhiSize 6-7	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 7 to 8 Very Fine Silt	PhiSize 7-8	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 8 to 9 Clay	PhiSize 8-9	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 9 to 10 Clay	PhiSize 9-10	%	--	--	--	--	--	--	--	--	--	--	--

Notes:

Bold - detected

U - Analyte not detected at or above Reporting Limit (RL) shown

J - Result value estimated

UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

cm - centimeters

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location Date Sample Depth	SC-08 02/25/2016 SPM-SC-08-02252016-0.1-1 10 - 100 cm	SC-08 02/25/2016 SPM-SC-08-02252016-1-2 100 - 200 cm	SC-09 02/26/2016 SPM-SC-09-02262016-0-0.1 0 - 10 cm	SC-09 02/26/2016 SPM-SC-09-02262016-0.1-1 10 - 100 cm	SC-09 02/26/2016 SPM-SC-09-02262016-1-2 100 - 200 cm	SC-10 02/24/2016 SPM-SC-10-02242016-0-0.1 0 - 10 cm	SC-10 02/24/2016 SPM-SC-10-02242016-0.1-1 10 - 100 cm	SC-10 02/24/2016 SPM-SC-10-02242016-1-2 100 - 200 cm	SC-11 02/25/2016 SPM-SC-11-02252016-0-0.1 0 - 10 cm	SC-11 02/25/2016 SPM-SC-11-02252016-0.1-1 10 - 100 cm	SC-11 02/25/2016 SPM-SC-11-02252016-1-2 100 - 200 cm
Analyte	**CAS_RN**	**Unit**											
Metals													
Arsenic	7440-38-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440-43-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Selenium	7782-49-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silver	7440-22-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons													
Gasoline Range Organics	TPH-GRO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diesel Range Organics	TPH-DRO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Motor Oil Range Organics	TPH-ORO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	563-58-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	142-28-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	594-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	106-43-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	108-86-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene (DCE)	156-59-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	SC-08 02/25/2016 SPM-SC-08-02252016-0.1-1 10 - 100 cm	SC-08 02/25/2016 SPM-SC-08-02252016-1-2 100 - 200 cm	SC-09 02/26/2016 SPM-SC-09-02262016-0-0.1 0 - 10 cm	SC-09 02/26/2016 SPM-SC-09-02262016-0.1-1 10 - 100 cm	SC-09 02/26/2016 SPM-SC-09-02262016-1-2 100 - 200 cm	SC-10 02/24/2016 SPM-SC-10-02242016-0-0.1 0 - 10 cm	SC-10 02/24/2016 SPM-SC-10-02242016-0.1-1 10 - 100 cm	SC-10 02/24/2016 SPM-SC-10-02242016-1-2 100 - 200 cm	SC-11 02/25/2016 SPM-SC-11-02252016-0-0.1 0 - 10 cm	SC-11 02/25/2016 SPM-SC-11-02252016-0.1-1 10 - 100 cm	SC-11 02/25/2016 SPM-SC-11-02252016-1-2 100 - 200 cm
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromomethane	74-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	179601-23-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	103-65-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
p-Isopropyltoluene	99-87-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	135-98-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	98-06-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes													
Benzene	71-43-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1330-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
2,4,5-Trichlorophenol	95-95-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	95-48-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	88-74-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	88-75-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3 & 4 Methylphenol	65794-96-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	106-44-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	65-85-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	100-51-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl butyl phthalate	85-68-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (Continued)													
Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	SC-08 02/25/2016 SPM-SC-08-02252016-0.1-1 10 - 100 cm	SC-08 02/25/2016 SPM-SC-08-02252016-1-2 100 - 200 cm	SC-09 02/26/2016 SPM-SC-09-02262016-0-0.1 0 - 10 cm	SC-09 02/26/2016 SPM-SC-09-02262016-0.1-1 10 - 100 cm	SC-09 02/26/2016 SPM-SC-09-02262016-1-2 100 - 200 cm	SC-10 02/24/2016 SPM-SC-10-02242016-0-0.1 0 - 10 cm	SC-10 02/24/2016 SPM-SC-10-02242016-0.1-1 10 - 100 cm	SC-10 02/24/2016 SPM-SC-10-02242016-1-2 100 - 200 cm	SC-11 02/25/2016 SPM-SC-11-02252016-0-0.1 0 - 10 cm	SC-11 02/25/2016 SPM-SC-11-02252016-0.1-1 10 - 100 cm	SC-11 02/25/2016 SPM-SC-11-02252016-1-2 100 - 200 cm
Bis(2-chloroethyl) ether	111-44-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	84-66-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	84-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	117-84-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	86-30-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Phenol	108-95-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	90-12-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	91-57-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Benzofluoranthenes	TOTBFA	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HPAHs	T-HPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total LPAHs	T-LPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PAHs	T-PAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pesticides / Herbicides													
4,4'-DDD	72-54-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDE	72-55-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Aldrin	309-00-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlordane	57-74-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-Chlordane	5103-71-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Lindane	58-89-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total DDT	T-DDT	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-08	SC-08	SC-09	SC-09	SC-09	SC-10	SC-10	SC-10	SC-11	SC-11	SC-11
		Date	02/25/2016	02/25/2016	02/26/2016	02/26/2016	02/26/2016	02/24/2016	02/24/2016	02/24/2016	02/25/2016	02/25/2016	02/25/2016
		Sample	SPM-SC-08-02252016-0.1-1	SPM-SC-08-02252016-1-2	SPM-SC-09-02262016-0-0.1	SPM-SC-09-02262016-0.1-1	SPM-SC-09-02262016-1-2	SPM-SC-10-02242016-0-0.1	SPM-SC-10-02242016-0.1-1	SPM-SC-10-02242016-1-2	SPM-SC-11-02252016-0-0.1	SPM-SC-11-02252016-0.1-1	SPM-SC-11-02252016-1-2
		Depth	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm
Analyte	**CAS_RN**	**Unit**											
2,4,5-T	93-76-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-D	94-75-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-DB	94-82-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dalapon	75-99-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dicamba	1918-00-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	120-36-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dinoseb	88-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPA	94-74-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPP	93-65-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silvex	93-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans													
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	1746-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	40321-76-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	39227-28-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	57653-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	19408-74-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	35822-46-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDD	3268-87-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDD	41903-57-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDD	36088-22-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDD	34465-46-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDD	37871-00-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	51207-31-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	57117-31-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	70648-26-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	57117-44-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	72918-21-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	60851-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	67562-39-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	55673-89-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDF	39001-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDF	30402-14-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDF	30402-15-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDF	55684-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDF	38998-75-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Organometallic													
Tributyltin Ion	36643-28-4	ug/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyl Aroclors													
Aroclor 1016	12674-11-2	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0080 U
Aroclor 1221	11104-28-2	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0080 U
Aroclor 1232	11141-16-5	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0080 U
Aroclor 1242	53469-21-9	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0080 U
Aroclor 1248	12672-29-6	mg/kg	**0.0097**	**0.017**	**0.00945**	**0.0083**	**0.016**	**0.0095**	**0.015**	**0.017**	< 0.080 U	**0.021**	**0.03**
Aroclor 1254	11097-69-1	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0080 U
Aroclor 1260	11096-82-5	mg/kg	**0.023**	**0.031**	**0.028**	**0.057**	**0.045**	**0.018**	**0.059**	**0.052**	< 0.080 U	**0.083**	**0.074**
Aroclor 1262	37324-23-5	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0080 U
Aroclor 1268	11100-14-4	mg/kg	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0080 U
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	**0.0327**	**0.048**	**0.03745**	**0.0653**	**0.061**	**0.0275**	**0.074**	**0.069**	< 0.080 U	**0.104**	**0.104**
Polychlorinated Biphenyl Congeners													
PCB 105	32598-14-4	mg/kg	**0.000468**	**0.000172**	**0.000324**	**0.000111 J**	**0.000275**	**0.000566**	**0.00101**	**0.000937**	**0.000904**	**0.00124**	**0.001685**
PCB 110	38380-03-9	mg/kg	**0.00221**	**0.000777**	**0.001411**	**0.00057 J**	**0.00118**	**0.00236**	**0.00471**	**0.00442**	**0.00394**	**0.00561**	**0.007655**
PCB 114	74472-37-0	mg/kg	**0.0000262**	**0.00000966 J**	**0.0000187**	**0.00000664 J**	**0.0000162 J**	**0.0000341**	**0.000056**	**0.0000565**	**0.0000546**	**0.0000755**	**0.0001015**
PCB 119	56558-17-9	mg/kg	**0.0000785**	**0.0000257**	**0.00004465**	**0.0000155 J**	**0.0000368**	**0.0000798**	**0.000169**	**0.000143**	**0.000157**	**0.00019**	**0.0002195**

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-08	SC-08	SC-09	SC-09	SC-09	SC-10	SC-10	SC-10	SC-11	SC-11	SC-11
		Date	02/25/2016	02/25/2016	02/26/2016	02/26/2016	02/26/2016	02/24/2016	02/24/2016	02/24/2016	02/25/2016	02/25/2016	02/25/2016
		Sample	SPM-SC-08-02252016-0.1-1	SPM-SC-08-02252016-1-2	SPM-SC-09-02262016-0-0.1	SPM-SC-09-02262016-0.1-1	SPM-SC-09-02262016-1-2	SPM-SC-10-02242016-0-0.1	SPM-SC-10-02242016-0.1-1	SPM-SC-10-02242016-1-2	SPM-SC-11-02252016-0-0.1	SPM-SC-11-02252016-0.1-1	SPM-SC-11-02252016-1-2
		Depth	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm
Analyte	**CAS_RN**	**Unit**											
PCB 123	65510-44-3	mg/kg	**0.000025 J**	**0.00000839 J**	**0.00002007**	**0.00000432 J**	< 0.0000116 U	**0.0000322**	**0.0000491**	**0.0000493**	**0.00005**	**0.0000625**	**0.0000929**
PCB 126	57465-28-8	mg/kg	**0.0000113 J**	**0.0000031 J**	< 0.00000131 U	< 0.0000022 U	**0.00000429 J**	**0.00000905**	**0.0000204 J**	**0.0000178**	**0.0000139 J**	**0.0000212 J**	**0.00002655**
PCB 151	52663-63-5	mg/kg	**0.00129**	**0.000267**	**0.00095245**	**0.000616 J**	**0.0004**	**0.00078**	**0.00269**	**0.00305**	**0.00116**	**0.0032**	**0.00421**
PCB 153	35065-27-1	mg/kg	**0.00428**	**0.000948**	**0.0031145**	**0.00183 J**	**0.0014**	**0.0029**	**0.00941**	**0.00947**	**0.00437**	**0.011**	**0.0137**
PCB 156	38380-08-4	mg/kg	**0.000276**	**0.0000815**	**0.0001833**	**0.0000965 J**	**0.000107**	**0.000265**	**0.000638**	**0.000627**	**0.000421**	**0.000742**	**0.000969**
PCB 157	69782-90-7	mg/kg	**0.000051**	**0.0000165 J**	**0.000035525**	**0.0000122 J**	**0.0000211 J**	**0.0000592**	**0.000126**	**0.000105**	**0.0000972**	**0.000146**	**0.0001755**
PCB 167	52663-72-6	mg/kg	**0.000125**	**0.0000349**	**0.000088**	**0.0000456 J**	**0.0000453**	**0.000116**	**0.000285**	**0.000283**	**0.00019**	**0.000343**	**0.000429**
PCB 168	59291-65-5	mg/kg	**0.0000113 J**	**0.00000198 J**	**0.000009555**	**0.00000178**	< 0.00000251 U	**0.00000572**	**0.0000258 J**	**0.0000126**	**0.0000151 J**	**0.000023 J**	**0.00001509**
PCB 169	32774-16-6	mg/kg	**0.000013**	**0.0000016**	**0.00000402**	**0.00000242**	**0.00000228**	**0.00000138**	**0.00000856**	**0.00000364**	**0.0000061**	**0.00000695**	**0.000006745**
PCB 170	35065-30-6	mg/kg	**0.00149**	**0.000302**	**0.0012545**	**0.000704 J**	**0.000438**	**0.000939**	**0.00395**	**0.00358**	**0.0013**	**0.00427**	**0.00474**
PCB 177	52663-70-4	mg/kg	**0.00115**	**0.000229**	**0.00097015**	**0.00053 J**	**0.000335**	**0.000676**	**0.00273**	**0.00261**	**0.000993**	**0.00322**	**0.00356**
PCB 18	37680-65-2	mg/kg	**0.000537**	**0.000206**	**0.000457**	**0.00012 J**	**0.000202**	**0.000438**	**0.000955**	**0.000997**	**0.000808**	**0.00109**	**0.00199**
PCB 180	35065-29-3	mg/kg	**0.0039**	**0.000768**	**0.0033755**	**0.00186 J**	**0.00106**	**0.00234**	**0.0101**	**0.00906**	**0.00314**	**0.0107**	**0.0118**
PCB 183	52663-69-1	mg/kg	**0.00105**	**0.000182**	**0.00083395**	**0.000478 J**	**0.000268**	**0.000595**	**0.00248**	**0.00229**	**0.0008**	**0.00259**	**0.00307**
PCB 189	39635-31-9	mg/kg	**0.0000521**	**0.0000108 J**	**0.000046715**	**0.0000222 J**	**0.0000164 J**	**0.0000337**	**0.000141**	**0.000126**	**0.0000491**	**0.000144**	**0.0001705**
PCB 194	35694-08-7	mg/kg	**0.000806**	**0.000145**	**0.0007761**	**0.000314 J**	**0.000226**	**0.000539**	**0.00225**	**0.00174**	**0.000782**	**0.00244**	**0.002345**
PCB 195	52663-78-2	mg/kg	**0.000373**	**0.0000649**	**0.0003591**	**0.000154 J**	**0.000105**	**0.000234**	**0.00101**	**0.000833**	**0.000353**	**0.00118**	**0.001095**
PCB 201	40186-71-8	mg/kg	**0.000129**	**0.0000228 J**	**0.0001351**	**0.0000475 J**	**0.0000341**	**0.0000853**	**0.000337**	**0.000266**	**0.000121**	**0.000357**	**0.0003865**
PCB 206	40186-72-9	mg/kg	**0.00029**	**0.0000561**	**0.0002469**	**0.0000771 J**	**0.0000717**	**0.000374**	**0.000709**	**0.000497**	**0.000358**	**0.000778**	**0.00072**
PCB 209	2051-24-3	mg/kg	**0.000134**	**0.0000183 J**	**0.00003592**	**0.0000126 J**	**0.0000155 J**	**0.0000857**	**0.000118**	**0.0000887**	**0.0000891**	**0.000118**	**0.000116**
PCB 28	7012-37-5	mg/kg	**0.000738**	**0.000276**	**0.0008935**	**0.000174 J**	**0.000313**	**0.00081**	**0.00139**	**0.00184**	**0.00112**	**0.00167**	**0.003125**
PCB 37	38444-90-5	mg/kg	**0.000196**	**0.000064**	**0.000241**	**0.0000437 J**	**0.0000844**	**0.000242**	**0.000378**	**0.000433**	**0.000281**	**0.000469**	**0.000813**
PCB 44	41464-39-5	mg/kg	**0.000798**	**0.000325**	**0.000741**	< 0.00000149 UJ	**0.00000321**	**0.000909**	**0.0016**	**0.00179**	**0.00144**	**0.00198**	**0.003515**
PCB 74	32690-93-0	mg/kg	**0.000413**	**0.000138**	**0.000373**	**0.000083 J**	**0.000181**	**0.000529**	**0.000808**	**0.000878**	**0.000608**	**0.000892**	**0.001725**
PCB 77	32598-13-3	mg/kg	**0.0000988**	**0.000025**	**0.00007365**	**0.0000179 J**	**0.0000335**	**0.000103**	**0.000158**	**0.00017**	**0.000114**	**0.000174**	**0.0002975**
PCB 81	70362-50-4	mg/kg	**0.0000212 J**	**0.000000857 J**	**0.00000629**	**0.00000115 J**	**0.0000138 J**	**0.00000666**	**0.0000209 J**	**0.0000131**	**0.0000125 J**	**0.0000129 J**	**0.00002705**
PCB 99	38380-01-7	mg/kg	**0.000979**	**0.000363**	**0.000594**	**0.000191 J**	**0.000554**	**0.00109**	**0.00207**	**0.00187**	**0.00178**	**0.00243**	**0.003145**
Total PCB Congeners	T-PCBCong	mg/kg	**0.0659**	**0.0177**	**0.0515**	**0.0228**	**0.0244**	**0.0548**	**0.146**	**0.141**	**0.0843**	**0.166**	**0.219**
Conventionals													
Ammonia as Nitrogen	7664-41-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	TOC	%	**1.73**	**1.89**	**1.925**	**2.26**	**2.03**	**2.29**	**2.07**	**2.19**	**1.98**	**1.97**	**1.915**
Total Solids	TS	%	--	--	--	--	--	--	--	--	--	--	--
Total Volatile Solids	TVS	%	--	--	--	--	--	--	--	--	--	--	--
Particle Size													
Gravel	Phisize <-1	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize > 10	PhiSize >10	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 0 to 1 Coarse Sand	PhiSize 0-1	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize -1 to 0 Very Coarse Sand	PhiSize -1-0	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 1 to 2 Medium Sand	PhiSize 1-2	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 2 to 3 Fine Sand	PhiSize 2-3	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 3 to 4 Very Fine Sand	PhiSize 3-4	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 4 To 5 Coarse Silt	PhiSize 4-5	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 5 to 6 Medium Silt	PhiSize 5-6	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 6 to 7 Fine Silt	PhiSize 6-7	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 7 to 8 Very Fine Silt	PhiSize 7-8	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 8 to 9 Clay	PhiSize 8-9	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 9 to 10 Clay	PhiSize 9-10	%	--	--	--	--	--	--	--	--	--	--	--

Notes:

Bold - detected

U - Analyte not detected at or above Reporting Limit (RL) shown

J - Result value estimated

UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

cm - centimeters

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	SC-12 02/26/2016 SPM-SC-12-02262016-0-0.1 0 - 10 cm	SC-12 02/26/2016 SPM-SC-12-02262016-0.1-1 10 - 100 cm	SC-12 02/26/2016 SPM-SC-12-02262016-1-2 100 - 200 cm	SC-13 02/26/2016 SPM-SC-13-02262016-0-0.1 0 - 10 cm	SC-13 02/26/2016 SPM-SC-13-02262016-0.1-1 10 - 100 cm	SC-13 02/26/2016 SPM-SC-13-02262016-1-2 100 - 200 cm	SC-14 02/25/2016 SPM-SC-14-02252016-0-0.1 0 - 10 cm	SC-14 02/25/2016 SPM-SC-14-02252016-0.1-1 10 - 100 cm	SC-14 02/25/2016 SPM-SC-14-02252016-1-2 100 - 200 cm	SC-15 02/24/2016 SPM-SC-15-02242016-0-0.1 0 - 10 cm	SC-15 02/24/2016 SPM-SC-15-02242016-0.1-1 10 - 100 cm
Metals													
Arsenic	7440-38-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440-43-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Selenium	7782-49-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silver	7440-22-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons													
Gasoline Range Organics	TPH-GRO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diesel Range Organics	TPH-DRO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Motor Oil Range Organics	TPH-ORO	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	563-58-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	142-28-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	594-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	106-43-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	108-86-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene (DCE)	156-59-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Location / Date / Sample / Depth			SC-12 02/26/2016 SPM-SC-12-02262016-0-0.1 0 - 10 cm	SC-12 02/26/2016 SPM-SC-12-02262016-0.1-1 10 - 100 cm	SC-12 02/26/2016 SPM-SC-12-02262016-1-2 100 - 200 cm	SC-13 02/26/2016 SPM-SC-13-02262016-0-0.1 0 - 10 cm	SC-13 02/26/2016 SPM-SC-13-02262016-0.1-1 10 - 100 cm	SC-13 02/26/2016 SPM-SC-13-02262016-1-2 100 - 200 cm	SC-14 02/25/2016 SPM-SC-14-02252016-0-0.1 0 - 10 cm	SC-14 02/25/2016 SPM-SC-14-02252016-0.1-1 10 - 100 cm	SC-14 02/25/2016 SPM-SC-14-02252016-1-2 100 - 200 cm	SC-15 02/24/2016 SPM-SC-15-02242016-0-0.1 0 - 10 cm	SC-15 02/24/2016 SPM-SC-15-02242016-0.1-1 10 - 100 cm
Analyte	**CAS_RN**	**Unit**											
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromomethane	74-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	179601-23-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	103-65-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
p-Isopropyltoluene	99-87-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	135-98-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	98-06-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes													
Benzene	71-43-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1330-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
2,4,5-Trichlorophenol	95-95-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	95-48-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	88-74-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	88-75-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3 & 4 Methylphenol	65794-96-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	106-44-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	65-85-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	100-51-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl butyl phthalate	85-68-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (Continued)													
Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Location / Date / Sample / Depth			SC-12 02/26/2016 SPM-SC-12-02262016-0-0.1 0 - 10 cm	SC-12 02/26/2016 SPM-SC-12-02262016-0.1-1 10 - 100 cm	SC-12 02/26/2016 SPM-SC-12-02262016-1-2 100 - 200 cm	SC-13 02/26/2016 SPM-SC-13-02262016-0-0.1 0 - 10 cm	SC-13 02/26/2016 SPM-SC-13-02262016-0.1-1 10 - 100 cm	SC-13 02/26/2016 SPM-SC-13-02262016-1-2 100 - 200 cm	SC-14 02/25/2016 SPM-SC-14-02252016-0-0.1 0 - 10 cm	SC-14 02/25/2016 SPM-SC-14-02252016-0.1-1 10 - 100 cm	SC-14 02/25/2016 SPM-SC-14-02252016-1-2 100 - 200 cm	SC-15 02/24/2016 SPM-SC-15-02242016-0-0.1 0 - 10 cm	SC-15 02/24/2016 SPM-SC-15-02242016-0.1-1 10 - 100 cm
Analyte	**CAS_RN**	**Unit**											
Bis(2-chloroethyl) ether	111-44-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	84-66-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	84-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	117-84-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	86-30-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Phenol	108-95-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	90-12-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	91-57-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Benzofluoranthenes	TOTBFA	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HPAHs	T-HPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total LPAHs	T-LPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PAHs	T-PAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pesticides / Herbicides													
4,4'-DDD	72-54-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDE	72-55-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Aldrin	309-00-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlordane	57-74-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-Chlordane	5103-71-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Lindane	58-89-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total DDT	T-DDT	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	SC-12	SC-12	SC-12	SC-13	SC-13	SC-13	SC-14	SC-14	SC-14	SC-15	SC-15
		Date	02/26/2016	02/26/2016	02/26/2016	02/26/2016	02/26/2016	02/26/2016	02/25/2016	02/25/2016	02/25/2016	02/24/2016	02/24/2016
		Sample	SPM-SC-12-02262016-0-0.1	SPM-SC-12-02262016-0.1-1	SPM-SC-12-02262016-1-2	SPM-SC-13-02262016-0-0.1	SPM-SC-13-02262016-0.1-1	SPM-SC-13-02262016-1-2	SPM-SC-14-02252016-0-0.1	SPM-SC-14-02252016-0.1-1	SPM-SC-14-02252016-1-2	SPM-SC-15-02242016-0-0.1	SPM-SC-15-02242016-0.1-1
		Depth	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm
2,4,5-T	93-76-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-D	94-75-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-DB	94-82-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dalapon	75-99-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dicamba	1918-00-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	120-36-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dinoseb	88-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPA	94-74-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPP	93-65-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silvex	93-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans													
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	1746-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	40321-76-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	39227-28-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	57653-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	19408-74-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	35822-46-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDD	3268-87-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDD	41903-57-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDD	36088-22-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDD	34465-46-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDD	37871-00-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	51207-31-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	57117-31-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	70648-26-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	57117-44-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	72918-21-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	60851-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	67562-39-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	55673-89-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDF	39001-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDF	30402-14-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDF	30402-15-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDF	55684-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDF	38998-75-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Organometallic													
Tributyltin Ion	36643-28-4	ug/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyl Aroclors													
Aroclor 1016	12674-11-2	mg/kg	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1221	11104-28-2	mg/kg	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1232	11141-16-5	mg/kg	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1242	53469-21-9	mg/kg	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1248	12672-29-6	mg/kg	**0.01**	**0.016**	**0.031**	< 0.0080 U	**0.022**	**0.03**	**0.0145**	**0.013**	< 0.080 U	**0.018**	**0.01 J**
Aroclor 1254	11097-69-1	mg/kg	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1260	11096-82-5	mg/kg	**0.024**	**0.096**	**0.083**	**0.01**	**0.11**	**0.11 J**	**0.07**	**0.063**	**0.13**	**0.081**	**0.07**
Aroclor 1262	37324-23-5	mg/kg	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Aroclor 1268	11100-14-4	mg/kg	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.0040 U	< 0.0080 U	< 0.0080 U	< 0.080 U	< 0.0080 U	< 0.0040 U
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	**0.034**	**0.112**	**0.114**	**0.01**	**0.132**	**0.14**	**0.0845**	**0.076**	**0.13**	**0.099**	**0.08**
Polychlorinated Biphenyl Congeners													
PCB 105	32598-14-4	mg/kg	**0.000541**	**0.00137**	**0.00177**	**0.000319**	**0.00115**	**0.00226**	**0.0009865**	**0.000667**	**0.00179**	**0.00109**	**0.000614**
PCB 110	38380-03-9	mg/kg	**0.00224**	**0.00652**	**0.00812**	**0.00139**	**0.00553**	**0.0116**	**0.005025**	**0.0032**	**0.00826**	**0.00543**	**0.00311**
PCB 114	74472-37-0	mg/kg	**0.0000287**	**0.0000867**	**0.000103**	**0.0000175 J**	**0.0000686**	**0.000133**	**0.0000562**	**0.0000381**	**0.0000984**	**0.0000635**	**0.0000398 J**
PCB 119	56558-17-9	mg/kg	**0.0000899**	**0.000168**	**0.000244**	**0.0000529**	**0.000157**	**0.000347**	**0.0001755**	**0.0000896**	**0.000262**	**0.00019**	**0.0000985**

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-12	SC-12	SC-12	SC-13	SC-13	SC-13	SC-14	SC-14	SC-14	SC-15	SC-15
		Date	02/26/2016	02/26/2016	02/26/2016	02/26/2016	02/26/2016	02/26/2016	02/25/2016	02/25/2016	02/25/2016	02/24/2016	02/24/2016
		Sample	SPM-SC-12-02262016-0-0.1	SPM-SC-12-02262016-0.1-1	SPM-SC-12-02262016-1-2	SPM-SC-13-02262016-0-0.1	SPM-SC-13-02262016-0.1-1	SPM-SC-13-02262016-1-2	SPM-SC-14-02252016-0-0.1	SPM-SC-14-02252016-0.1-1	SPM-SC-14-02252016-1-2	SPM-SC-15-02242016-0-0.1	SPM-SC-15-02242016-0.1-1
		Depth	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm	100 - 200 cm	0 - 10 cm	10 - 100 cm
Analyte	**CAS_RN**	**Unit**											
PCB 123	65510-44-3	mg/kg	**0.0000296**	**0.0000669**	**0.0000969**	**0.0000202 J**	**0.0000599**	**0.000124**	**0.00005605**	**0.0000367**	**0.0000922**	**0.0000514**	**0.0000324 J**
PCB 126	57465-28-8	mg/kg	**0.00000924 J**	**0.0000273**	**0.000028**	**0.00000356 J**	**0.0000265**	**0.0000379**	< 0.0000241 U	< 0.0000125 U	**0.0000342**	**0.0000235 J**	**0.0000192 J**
PCB 151	52663-63-5	mg/kg	**0.000928**	**0.00549**	**0.00324**	**0.000395**	**0.00492**	**0.00517**	**0.00341**	**0.00237**	**0.00521**	**0.00407**	**0.00296**
PCB 153	35065-27-1	mg/kg	**0.00332**	**0.0166**	**0.011**	**0.0015**	**0.0141**	**0.0178**	**0.01103**	**0.00748**	**0.0171**	**0.0139**	**0.0101**
PCB 156	38380-08-4	mg/kg	**0.000261**	**0.00102**	**0.000859**	**0.000138**	**0.000873**	**0.00126**	**0.000665**	**0.000453**	**0.0012**	**0.000806**	**0.000546**
PCB 157	69782-90-7	mg/kg	**0.0000563**	**0.000165**	**0.000176**	**0.0000319**	**0.000139**	**0.000264**	**0.00012825**	**0.0000834**	**0.000213**	**0.000139**	**0.0000877**
PCB 167	52663-72-6	mg/kg	**0.000122**	**0.000448**	**0.000391**	**0.0000577**	**0.000406**	**0.000565**	**0.000306**	**0.000218**	**0.000513**	**0.000383**	**0.000283**
PCB 168	59291-65-5	mg/kg	**0.0000103 J**	**0.00000632**	**0.0000239 J**	**0.00000447 J**	**0.0000148**	**0.0000279**	**0.00002195**	**0.0000144 J**	**0.000028**	**0.0000224 J**	**0.00000676**
PCB 169	32774-16-6	mg/kg	**0.00000609**	**0.00000847**	**0.0000147**	**0.00000814**	**0.0000208**	**0.0000242**	**0.000005925**	**0.00000544**	**0.0000115**	**0.0000114**	**0.00000737**
PCB 170	35065-30-6	mg/kg	**0.00101**	**0.00611**	**0.00351**	**0.000395**	**0.00549**	**0.00579**	**0.00395**	**0.00272**	**0.00629**	**0.00594**	**0.00407**
PCB 177	52663-70-4	mg/kg	**0.000774**	**0.00475**	**0.00256**	**0.000321**	**0.00395**	**0.00423**	**0.002855**	**0.00206**	**0.00504**	**0.00434**	**0.00291**
PCB 18	37680-65-2	mg/kg	**0.000499**	**0.00101**	**0.0017**	**0.000367**	**0.000851**	**0.00182**	**0.0007535**	**0.000531**	**0.00131**	**0.000819**	**0.00035**
PCB 180	35065-29-3	mg/kg	**0.00257**	**0.0161**	**0.00858**	**0.00104**	**0.0139**	**0.0142**	**0.00994**	**0.0069**	**0.0162**	**0.0163**	**0.0103**
PCB 183	52663-69-1	mg/kg	**0.000614**	**0.00386**	**0.00215**	**0.000255**	**0.00335**	**0.00383**	**0.00268**	**0.00181**	**0.00402**	**0.00408**	**0.00274**
PCB 189	39635-31-9	mg/kg	**0.0000352**	**0.000222**	**0.000124**	**0.000016 J**	**0.000186**	**0.000209**	**0.0001375**	**0.000104**	**0.000227**	**0.000197**	**0.00014**
PCB 194	35694-08-7	mg/kg	**0.000554**	**0.00315**	**0.00175**	**0.000233**	**0.00281**	**0.00286**	**0.002085**	**0.00142**	**0.0032**	**0.00379**	**0.00202**
PCB 195	52663-78-2	mg/kg	**0.00025**	**0.00149**	**0.000767**	**0.0001**	**0.00133**	**0.00132**	**0.0009525**	**0.000683**	**0.00152**	**0.00176**	**0.00093**
PCB 201	40186-71-8	mg/kg	**0.0000964**	**0.000481**	**0.000257**	**0.0000355**	**0.000418**	**0.000452**	**0.00034**	**0.000262**	**0.000502**	**0.000596**	**0.000301**
PCB 206	40186-72-9	mg/kg	**0.000243**	**0.00084**	**0.000566**	**0.000121**	**0.000787**	**0.00109**	**0.000694**	**0.000411**	**0.000892**	**0.00121**	**0.000503**
PCB 209	2051-24-3	mg/kg	**0.0000745**	**0.000104**	**0.000136**	< 0.000037 U	**0.000129**	**0.000448**	**0.00012245**	**0.00008**	**0.000147**	**0.000142**	**0.0000668**
PCB 28	7012-37-5	mg/kg	**0.000655**	**0.00173**	**0.00246**	**0.00048**	**0.00137**	**0.00288**	**0.001315**	**0.00101**	**0.00227**	**0.00135**	**0.000686**
PCB 37	38444-90-5	mg/kg	**0.000187**	**0.000474**	**0.000574**	**0.000113**	**0.000387**	**0.000716**	**0.000345**	**0.000258**	**0.000571**	**0.000396**	**0.000196**
PCB 44	41464-39-5	mg/kg	**0.000815**	**0.00209**	**0.00305**	**0.000515**	**0.00157**	**0.00387**	**0.00149**	**0.00103**	**0.0026**	**0.00151**	**0.00081**
PCB 74	32690-93-0	mg/kg	**0.000362**	**0.000959**	**0.0013**	**0.000223**	**0.000777**	**0.00167**	**0.000693**	**0.000512**	**0.00123**	**0.000738**	**0.000412**
PCB 77	32598-13-3	mg/kg	**0.0000685**	**0.000183**	**0.000236**	**0.0000471**	**0.000153**	**0.000309**	**0.000143**	**0.0000961**	**0.00022**	**0.000161**	**0.0000903**
PCB 81	70362-50-4	mg/kg	**0.0000105 J**	**0.0000219 J**	**0.0000859**	**0.0000149 J**	**0.0000592**	**0.000118**	**0.000011325**	**0.00000894 J**	**0.0000329**	**0.0000137 J**	**0.0000102 J**
PCB 99	38380-01-7	mg/kg	**0.0011**	**0.00251**	**0.00359**	**0.000598**	**0.00207**	**0.005**	**0.002055**	**0.00127**	**0.00358**	**0.00228**	**0.00118**
Total PCB Congeners	T-PCBCong	mg/kg	**0.0558**	**0.219**	**0.193**	**0.0291**	**0.19**	**0.272**	**0.153**	**0.103**	**0.243**	**0.197**	**0.126**
Conventionals													
Ammonia as Nitrogen	7664-41-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	TOC	%	**1.91**	**1.95**	**1.72**	**2.3**	**2.01**	**1.63**	**1.88**	**1.79**	**1.85**	**1.68**	**0.905**
Total Solids	TS	%	--	--	--	--	--	--	--	--	--	--	--
Total Volatile Solids	TVS	%	--	--	--	--	--	--	--	--	--	--	--
Particle Size													
Gravel	Phisize <-1	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize > 10	PhiSize >10	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 0 to 1 Coarse Sand	PhiSize 0-1	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize -1 to 0 Very Coarse Sand	PhiSize -1-0	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 1 to 2 Medium Sand	PhiSize 1-2	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 2 to 3 Fine Sand	PhiSize 2-3	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 3 to 4 Very Fine Sand	PhiSize 3-4	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 4 To 5 Coarse Silt	PhiSize 4-5	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 5 to 6 Medium Silt	PhiSize 5-6	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 6 to 7 Fine Silt	PhiSize 6-7	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 7 to 8 Very Fine Silt	PhiSize 7-8	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 8 to 9 Clay	PhiSize 8-9	%	--	--	--	--	--	--	--	--	--	--	--
PhiSize 9 to 10 Clay	PhiSize 9-10	%	--	--	--	--	--	--	--	--	--	--	--

Notes:

Bold - detected

U - Analyte not detected at or above Reporting Limit (RL) shown

J - Result value estimated

UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

cm - centimeters

Table D.11. Historical Sediment Sample Analytical Results
Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-15	TRANS-A-BOT	TRANS-A-SED	TRANS-A-TOP	TRANS-B-BOT	TRANS-B-SED	TRANS-B-TOP	73-G	74-G	84-G	85-G
		Date	02/24/2016	10/08/2007	03/12/2008	10/09/2007	10/08/2007	03/12/2008	10/09/2007	03/16/2004	03/16/2004	09/14/2004	09/14/2004
		Sample	SPM-SC-15-02242016-1-2	TRANS-A-BOT	TRANS-A-SED	TRANS-A-TOP	TRANS-B-BOT	TRANS-B-SED	TRANS-B-TOP	T117-SE73-SG	T117-SE74-SG	T117-SE84-SG	T117-SE85-SG
		Depth	100 - 200 cm	0 - 30 cm	10 - 100 cm	0 - 30 cm	0 - 30 cm	0 - 10 cm	0 - 30 cm	0 - 10 cm	0 - 10 cm	0 - 7 cm	0 - 7 cm
Analyte	**CAS_RN**	**Unit**											
Metals													
Arsenic	7440-38-2	mg/kg	--	**4.9**	**13 J**	**4.9**	**2.5**	**18.5 J**	**10.8**	--	--	--	--
Barium	7440-39-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440-43-9	mg/kg	--	**0.216**	**0.201**	**0.442**	**0.218**	**0.311**	**1.08**	--	--	--	--
Chromium	7440-47-3	mg/kg	--	**16.2**	**25.5**	**16.4**	**20.8**	**28.7**	**22.2**	--	--	--	--
Copper	7440-50-8	mg/kg	--	**249**	**42.5 J**	**74.6**	**146**	**66.9 J**	**1020**	--	--	--	--
Lead	7439-92-1	mg/kg	--	**55.9**	**50**	**39.7**	**25.2**	**37.7**	**121**	--	--	--	--
Mercury	7439-97-6	mg/kg	--	**0.208**	**0.303**	**0.07**	**0.023**	**0.154**	**0.187**	--	--	--	--
Nickel	7440-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Selenium	7782-49-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silver	7440-22-4	mg/kg	--	**0.082**	**0.306**	**0.191**	**0.137**	**0.447**	**0.191**	--	--	--	--
Zinc	7440-66-6	mg/kg	--	**109**	**83.8 J**	**250**	**83.4**	**104 J**	**528**	--	--	--	--
Total Petroleum Hydrocarbons													
Gasoline Range Organics	TPH-GRO	mg/kg	--	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 5.1 U	--	--	--	--
Diesel Range Organics	TPH-DRO	mg/kg	--	**26**	**87 J**	**1300 J**	< 50 U	**98 J**	**160 J**	--	--	--	--
Motor Oil Range Organics	TPH-ORO	mg/kg	--	**240 J**	**490 J**	**360 J**	< 100 U	**570 J**	**620 J**	--	--	--	--
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	--	**266 J**	**577**	**1660 J**	< 100 U	**668**	**780 J**	--	--	--	--
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	563-58-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	--	< 0.0095 U	< 0.012 U	< 0.19 U	< 0.0098 U	< 0.014 U	< 0.048 U	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	--	< 0.0095 U	< 0.012 U	< 0.19 U	< 0.0098 U	< 0.014 U	< 0.048 U	--	--	--	--
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	142-28-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	--	< 0.0095 U	< 0.012 U	< 0.19 U	< 0.0098 U	< 0.014 U	< 0.048 U	--	--	--	--
2,2-Dichloropropane	594-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	106-43-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	108-86-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene (DCE)	156-59-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-15	TRANS-A-BOT	TRANS-A-SED	TRANS-A-TOP	TRANS-B-BOT	TRANS-B-SED	TRANS-B-TOP	73-G	74-G	84-G	85-G
		Date	02/24/2016	10/08/2007	03/12/2008	10/09/2007	10/08/2007	03/12/2008	10/09/2007	03/16/2004	03/16/2004	09/14/2004	09/14/2004
		Sample	SPM-SC-15-02242016-1-2	TRANS-A-BOT	TRANS-A-SED	TRANS-A-TOP	TRANS-B-BOT	TRANS-B-SED	TRANS-B-TOP	T117-SE73-SG	T117-SE74-SG	T117-SE84-SG	T117-SE85-SG
		Depth	100 - 200 cm	0 - 30 cm	10 - 100 cm	0 - 30 cm	0 - 30 cm	0 - 10 cm	0 - 30 cm	0 - 10 cm	0 - 10 cm	0 - 7 cm	0 - 7 cm
Analyte	**CAS_RN**	**Unit**											
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibromomethane	74-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	179601-23-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	103-65-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
p-Isopropyltoluene	99-87-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	135-98-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	98-06-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes													
Benzene	71-43-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1330-20-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
2,4,5-Trichlorophenol	95-95-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	mg/kg	--	< 0.048 U	< 0.059 U	< 0.94 U	< 0.049 U	< 0.069 U	< 0.24 U	--	--	--	--
2,4-Dinitrophenol	51-28-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	95-48-7	mg/kg	--	< 0.0095 U	**0.0023**	< 0.19 U	< 0.0098 U	< 0.014 U	< 0.048 U	--	--	--	--
2-Nitroaniline	88-74-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	88-75-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3 & 4 Methylphenol	65794-96-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	106-44-5	mg/kg	--	**0.0084**	**0.007**	< 0.19 U	< 0.0098 U	**0.0071**	< 0.048 U	--	--	--	--
4-Nitroaniline	100-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	65-85-0	mg/kg	--	**0.17**	< 0.24 U	< 3.8 U	< 0.20 U	< 0.28 U	**0.72**	--	--	--	--
Benzyl alcohol	100-51-6	mg/kg	--	**0.048**	< 0.030 U	< 0.38 U	**0.011**	**0.087**	**0.94**	--	--	--	--
Benzyl butyl phthalate	85-68-7	mg/kg	--	**0.14**	**0.036**	**0.26**	**0.018**	**0.049**	**0.41**	--	--	--	--
Semivolatile Organic Compounds (Continued)													
Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-15	TRANS-A-BOT	TRANS-A-SED	TRANS-A-TOP	TRANS-B-BOT	TRANS-B-SED	TRANS-B-TOP	73-G	74-G	84-G	85-G
		Date	02/24/2016	10/08/2007	03/12/2008	10/09/2007	10/08/2007	03/12/2008	10/09/2007	03/16/2004	03/16/2004	09/14/2004	09/14/2004
		Sample	SPM-SC-15-02242016-1-2	TRANS-A-BOT	TRANS-A-SED	TRANS-A-TOP	TRANS-B-BOT	TRANS-B-SED	TRANS-B-TOP	T117-SE73-SG	T117-SE74-SG	T117-SE84-SG	T117-SE85-SG
		Depth	100 - 200 cm	0 - 30 cm	10 - 100 cm	0 - 30 cm	0 - 30 cm	0 - 10 cm	0 - 30 cm	0 - 10 cm	0 - 10 cm	0 - 7 cm	0 - 7 cm
Analyte	**CAS_RN**	**Unit**											
Bis(2-chloroethyl) ether	111-44-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	--	**0.33**	**0.12**	< 0.31 U	< 0.076 U	**0.2**	**2.3**	--	--	--	--
Carbazole	86-74-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	mg/kg	--	**0.0037**	**0.0049**	< 0.19 U	< 0.0098 U	**0.0044**	**0.0083**	--	--	--	--
Diethyl phthalate	84-66-2	mg/kg	--	< 0.0035 U	< 0.0063 U	< 0.19 U	< 0.0020 U	< 0.014 U	< 0.039 U	--	--	--	--
Dimethyl phthalate	131-11-3	mg/kg	--	**0.62**	**0.048**	**0.74**	**0.08**	**0.16**	**3.7**	--	--	--	--
Di-n-butyl phthalate	84-74-2	mg/kg	--	**0.17**	**0.021**	< 0.38 U	< 0.028 U	**0.039**	< 0.43 U	--	--	--	--
Di-n-octyl phthalate	117-84-0	mg/kg	--	< 0.0095 U	< 0.012 U	< 0.19 U	**0.0067**	< 0.014 U	< 0.048 U	--	--	--	--
Hexachlorobenzene	118-74-1	mg/kg	--	< 0.0095 U	< 0.012 U	< 0.19 U	< 0.0098 U	< 0.014 U	< 0.048 U	--	--	--	--
Hexachlorobutadiene	87-68-3	mg/kg	--	< 0.0095 U	< 0.012 U	< 0.19 U	< 0.0098 U	< 0.014 U	< 0.048 U	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	86-30-6	mg/kg	--	< 0.0095 U	< 0.012 U	< 0.19 U	< 0.0098 U	< 0.014 U	< 0.048 U	--	--	--	--
Pentachlorophenol	87-86-5	mg/kg	--	< 0.095 U	< 0.12 U	< 1.9 U	< 0.098 U	< 0.14 U	< 0.48 U	--	--	--	--
Phenol	108-95-2	mg/kg	--	< 0.055 U	**0.018**	< 0.56 U	< 0.028 U	**0.016**	< 0.25 U	--	--	--	--
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	90-12-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	91-57-6	mg/kg	--	< 0.0044 U	**0.0092**	< 0.19 U	< 0.0098 U	**0.0047**	< 0.014 U	--	--	--	--
Acenaphthene	83-32-9	mg/kg	--	< 0.0042 U	**0.004**	< 0.19 U	< 0.0098 U	**0.007**	< 0.048 U	--	--	--	--
Acenaphthylene	208-96-8	mg/kg	--	< 0.0062 U	**0.013**	< 0.19 U	< 0.0019 U	**0.011**	< 0.015 U	--	--	--	--
Anthracene	120-12-7	mg/kg	--	< 0.011 U	**0.031**	< 0.19 U	< 0.0030 U	**0.034**	< 0.035 U	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	mg/kg	--	**0.092**	**0.063**	< 0.19 U	< 0.020 U	**0.081**	**0.29**	--	--	--	--
Fluoranthene	206-44-0	mg/kg	--	**0.17**	**0.18**	< 0.19 U	< 0.030 U	**0.23**	< 0.36 U	--	--	--	--
Fluorene	86-73-7	mg/kg	--	**0.0046**	**0.0068**	< 0.19 U	< 0.0098 U	**0.011**	**0.012**	--	--	--	--
Naphthalene	91-20-3	mg/kg	--	< 0.0058 U	**0.011**	< 0.19 U	< 0.0098 U	**0.006**	< 0.017 U	--	--	--	--
Phenanthrene	85-01-8	mg/kg	--	< 0.077 U	**0.063**	< 0.19 U	< 0.011 U	**0.12**	< 0.13 U	--	--	--	--
Pyrene	129-00-0	mg/kg	--	< 0.17 U	**0.15**	< 0.19 U	< 0.030 U	**0.2**	< 0.38 U	--	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	--	**0.058**	**0.084**	< 0.19 U	< 0.012 U	**0.097**	< 0.19 U	--	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	--	**0.076**	**0.093**	< 0.19 U	< 0.016 U	**0.1**	< 0.25 U	--	--	--	--
Benzo(b)fluoranthene	205-99-2	mg/kg	--	**0.14**	**0.16**	< 0.19 U	< 0.026 U	**0.17**	**0.51**	--	--	--	--
Benzo(k)fluoranthene	207-08-9	mg/kg	--	**0.05**	**0.054 J**	< 0.19 U	< 0.0090 U	**0.061 J**	**0.16**	--	--	--	--
Chrysene	218-01-9	mg/kg	--	**0.12**	**0.16**	< 0.19 U	< 0.024 U	**0.19**	< 0.42 U	--	--	--	--
Dibenzo(a,h)anthracene	53-70-3	mg/kg	--	**0.015**	**0.015**	< 0.19 U	**0.0042**	**0.02**	**0.064**	--	--	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	--	**0.098**	**0.07**	< 0.19 U	< 0.017 U	**0.094**	**0.33**	--	--	--	--
Total Benzofluoranthenes	TOTBFA	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HPAHs	T-HPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total LPAHs	T-LPAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PAHs	T-PAH	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Pesticides / Herbicides													
4,4'-DDD	72-54-8	mg/kg	--	**0.0038**	**0.0016**	< 0.0015 U	< 0.00078 U	**0.0012**	**0.006**	--	--	--	--
4,4'-DDE	72-55-9	mg/kg	--	**0.0009 J**	< 0.0034 U	< 0.0015 U	< 0.00078 U	< 0.0014 U	< 0.00079 U	--	--	--	--
4,4'-DDT	50-29-3	mg/kg	--	**0.027 J**	< 0.16 U	< 0.0053 U	**0.017 J**	< 0.051 U	**0.095 J**	--	--	--	--
Aldrin	309-00-2	mg/kg	--	< 0.00079 U	**0.046 J**	< 0.0015 U	< 0.00078 U	< 0.0014 U	< 0.00079 U	--	--	--	--
Chlordane	57-74-9	mg/kg	--	< 0.0099 U	< 0.012 U	< 0.015 U	< 0.0078 U	< 0.034 U	< 0.022 U	--	--	--	--
cis-Chlordane	5103-71-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	mg/kg	--	< 0.00079 U	< 0.0018 U	< 0.0015 U	< 0.00078 U	< 0.0015 U	< 0.0021 U	--	--	--	--
Heptachlor	76-44-8	mg/kg	--	< 0.00079 U	< 0.0012 U	< 0.0015 U	< 0.00078 U	< 0.0014 U	< 0.00079 U	--	--	--	--
Lindane	58-89-9	mg/kg	--	< 0.00079 U	< 0.0020 U	< 0.0015 U	< 0.00078 U	< 0.0022 U	< 0.00079 U	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total DDT	T-DDT	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location Date Sample Depth	SC-15 02/24/2016 SPM-SC-15-02242016-1-2 100 - 200 cm	TRANS-A-BOT 10/08/2007 TRANS-A-BOT 0 - 30 cm	TRANS-A-SED 03/12/2008 TRANS-A-SED 10 - 100 cm	TRANS-A-TOP 10/09/2007 TRANS-A-TOP 0 - 30 cm	TRANS-B-BOT 10/08/2007 TRANS-B-BOT 0 - 30 cm	TRANS-B-SED 03/12/2008 TRANS-B-SED 0 - 10 cm	TRANS-B-TOP 10/09/2007 TRANS-B-TOP 0 - 30 cm	73-G 03/16/2004 T117-SE73-SG 0 - 10 cm	74-G 03/16/2004 T117-SE74-SG 0 - 10 cm	84-G 09/14/2004 T117-SE84-SG 0 - 7 cm	85-G 09/14/2004 T117-SE85-SG 0 - 7 cm
Analyte	**CAS_RN**	**Unit**											
2,4,5-T	93-76-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-D	94-75-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,4-DB	94-82-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dalapon	75-99-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dicamba	1918-00-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dichloroprop	120-36-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dinoseb	88-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPA	94-74-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
MCPP	93-65-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Silvex	93-72-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Dioxins/Furans													
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	1746-01-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	40321-76-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	39227-28-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	57653-85-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	19408-74-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	35822-46-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDD	3268-87-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDD	41903-57-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDD	36088-22-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDD	34465-46-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDD	37871-00-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	51207-31-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	57117-31-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	70648-26-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	57117-44-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	72918-21-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	60851-34-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	67562-39-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	55673-89-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
OCDF	39001-02-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total TCDF	30402-14-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PeCDF	30402-15-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HxCDF	55684-94-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total HpCDF	38998-75-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Organometallic													
Tributyltin Ion	36643-28-4	ug/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyl Aroclors													
Aroclor 1016	12674-11-2	mg/kg	< 0.0040 U	< 0.0079 U	< 0.059 U	< 0.0073 U	< 0.0078 U	< 0.014 U	< 0.0079 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
Aroclor 1221	11104-28-2	mg/kg	< 0.0040 U	--	--	--	--	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
Aroclor 1232	11141-16-5	mg/kg	< 0.0040 U	--	--	--	--	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.040 U
Aroclor 1242	53469-21-9	mg/kg	< 0.0040 U	--	--	--	--	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
Aroclor 1248	12672-29-6	mg/kg	< 0.0040 U	< 0.0079 U	< 0.087 U	< 0.0073 U	< 0.0078 U	**0.033**	< 0.0079 U	**0.021 J**	< 0.020 U	< 0.020 U	< 0.020 U
Aroclor 1254	11097-69-1	mg/kg	< 0.0040 U	< 0.0079 U	< 0.059 U	< 0.0073 U	< 0.0078 U	< 0.014 U	< 0.0079 U	**0.072**	**0.041**	< 0.039 U	**0.046**
Aroclor 1260	11096-82-5	mg/kg	**0.011**	**0.17**	**1.7**	**0.073**	**0.13**	**0.65**	**0.32**	**0.17**	**0.082**	**0.088**	**0.071**
Aroclor 1262	37324-23-5	mg/kg	< 0.0040 U	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	11100-14-4	mg/kg	< 0.0040 U	--	--	--	--	--	--	--	--	--	--
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	**0.011**	**0.17**	**43.35**	**0.073**	**0.13**	**16.608**	**0.32**	--	--	--	--
Polychlorinated Biphenyl Congeners													
PCB 105	32598-14-4	mg/kg	**0.00022**	--	--	--	--	--	--	--	--	--	--
PCB 110	38380-03-9	mg/kg	**0.00125**	--	--	--	--	--	--	--	--	--	--
PCB 114	74472-37-0	mg/kg	**0.0000119**	--	--	--	--	--	--	--	--	--	--
PCB 119	56558-17-9	mg/kg	**0.0000419**	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	SC-15	TRANS-A-BOT	TRANS-A-SED	TRANS-A-TOP	TRANS-B-BOT	TRANS-B-SED	TRANS-B-TOP	73-G	74-G	84-G	85-G
		Date	02/24/2016	10/08/2007	03/12/2008	10/09/2007	10/08/2007	03/12/2008	10/09/2007	03/16/2004	03/16/2004	09/14/2004	09/14/2004
		Sample	SPM-SC-15-02242016-1-2	TRANS-A-BOT	TRANS-A-SED	TRANS-A-TOP	TRANS-B-BOT	TRANS-B-SED	TRANS-B-TOP	T117-SE73-SG	T117-SE74-SG	T117-SE84-SG	T117-SE85-SG
		Depth	100 - 200 cm	0 - 30 cm	10 - 100 cm	0 - 30 cm	0 - 30 cm	0 - 10 cm	0 - 30 cm	0 - 10 cm	0 - 10 cm	0 - 7 cm	0 - 7 cm
Analyte	**CAS_RN**	**Unit**											
PCB 123	65510-44-3	mg/kg	**0.0000107**	--	--	--	--	--	--	--	--	--	--
PCB 126	57465-28-8	mg/kg	**0.00000545**	--	--	--	--	--	--	--	--	--	--
PCB 151	52663-63-5	mg/kg	**0.00109**	--	--	--	--	--	--	--	--	--	--
PCB 153	35065-27-1	mg/kg	**0.00354**	--	--	--	--	--	--	--	--	--	--
PCB 156	38380-08-4	mg/kg	**0.000219**	--	--	--	--	--	--	--	--	--	--
PCB 157	69782-90-7	mg/kg	**0.0000324**	--	--	--	--	--	--	--	--	--	--
PCB 167	52663-72-6	mg/kg	**0.000102**	--	--	--	--	--	--	--	--	--	--
PCB 168	59291-65-5	mg/kg	**0.00000521**	--	--	--	--	--	--	--	--	--	--
PCB 169	32774-16-6	mg/kg	**0.00000142**	--	--	--	--	--	--	--	--	--	--
PCB 170	35065-30-6	mg/kg	**0.00169**	--	--	--	--	--	--	--	--	--	--
PCB 177	52663-70-4	mg/kg	**0.00116**	--	--	--	--	--	--	--	--	--	--
PCB 18	37680-65-2	mg/kg	**0.000126**	--	--	--	--	--	--	--	--	--	--
PCB 180	35065-29-3	mg/kg	**0.00422**	--	--	--	--	--	--	--	--	--	--
PCB 183	52663-69-1	mg/kg	**0.00104**	--	--	--	--	--	--	--	--	--	--
PCB 189	39635-31-9	mg/kg	**0.000059**	--	--	--	--	--	--	--	--	--	--
PCB 194	35694-08-7	mg/kg	**0.000845**	--	--	--	--	--	--	--	--	--	--
PCB 195	52663-78-2	mg/kg	**0.000378**	--	--	--	--	--	--	--	--	--	--
PCB 201	40186-71-8	mg/kg	**0.000125**	--	--	--	--	--	--	--	--	--	--
PCB 206	40186-72-9	mg/kg	**0.000218**	--	--	--	--	--	--	--	--	--	--
PCB 209	2051-24-3	mg/kg	**0.0000326**	--	--	--	--	--	--	--	--	--	--
PCB 28	7012-37-5	mg/kg	**0.000223**	--	--	--	--	--	--	--	--	--	--
PCB 37	38444-90-5	mg/kg	**0.0000601**	--	--	--	--	--	--	--	--	--	--
PCB 44	41464-39-5	mg/kg	**0.00033**	--	--	--	--	--	--	--	--	--	--
PCB 74	32690-93-0	mg/kg	**0.000137**	--	--	--	--	--	--	--	--	--	--
PCB 77	32598-13-3	mg/kg	**0.0000284**	--	--	--	--	--	--	--	--	--	--
PCB 81	70362-50-4	mg/kg	**0.0000034 J**	--	--	--	--	--	--	--	--	--	--
PCB 99	38380-01-7	mg/kg	**0.000518**	--	--	--	--	--	--	--	--	--	--
Total PCB Congeners	T-PCBCong	mg/kg	**0.048**	--	--	--	--	--	--	--	--	--	--
Conventionals													
Ammonia as Nitrogen	7664-41-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	TOC	%	**0.366**	--	--	--	--	--	--	**3.2**	**2.7**	**1.22**	**3.23**
Total Solids	TS	%	--	**85**	**42.4**	**91.6**	**85.6**	**36.4**	**83.2**	--	--	--	--
Total Volatile Solids	TVS	%	--	--	--	--	--	--	--	--	--	--	--
Particle Size													
Gravel	Phisize <-1	%	--	--	--	--	--	--	--	--	--	**0.6**	**0.3**
PhiSize > 10	PhiSize >10	%	--	--	--	--	--	--	--	--	--	**2**	**10**
PhiSize 0 to 1 Coarse Sand	PhiSize 0-1	%	--	--	--	--	--	--	--	--	--	**20**	**2.8**
PhiSize -1 to 0 Very Coarse Sand	PhiSize -1-0	%	--	--	--	--	--	--	--	--	--	**2.5**	**0.2**
PhiSize 1 to 2 Medium Sand	PhiSize 1-2	%	--	--	--	--	--	--	--	--	--	**50.9**	**4.6**
PhiSize 2 to 3 Fine Sand	PhiSize 2-3	%	--	--	--	--	--	--	--	--	--	**9.8**	**3.6**
PhiSize 3 to 4 Very Fine Sand	PhiSize 3-4	%	--	--	--	--	--	--	--	--	--	**1.9**	**5.9**
PhiSize 4 To 5 Coarse Silt	PhiSize 4-5	%	--	--	--	--	--	--	--	--	--	**2.9**	**10.5**
PhiSize 5 to 6 Medium Silt	PhiSize 5-6	%	--	--	--	--	--	--	--	--	--	**3.7**	**24.2**
PhiSize 6 to 7 Fine Silt	PhiSize 6-7	%	--	--	--	--	--	--	--	--	--	**2.5**	**19.5**
PhiSize 7 to 8 Very Fine Silt	PhiSize 7-8	%	--	--	--	--	--	--	--	--	--	**1.6**	**10.3**
PhiSize 8 to 9 Clay	PhiSize 8-9	%	--	--	--	--	--	--	--	--	--	**1**	**4.5**
PhiSize 9 to 10 Clay	PhiSize 9-10	%	--	--	--	--	--	--	--	--	--	**0.5**	**3.6**

Notes:
Bold - detected
U - Analyte not detected at or above Reporting Limit (RL) shown
J - Result value estimated
UJ - Analyte not detected and the Reporting Limit (RL) is an estimate
cm - centimeters

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	98-G	99-G	100-G	101-G	102-G	COMP1-SC	COMP1-SC	MARINABANK-140306	MARINABANK-140317	PERIM-1-POST	PERIM-1-PRE
		Date	08/29/2008	08/29/2008	08/29/2008	08/29/2008	08/29/2008	09/16/2004	09/16/2004	03/06/2014	03/17/2014	05/12/2014	11/22/2013
		Sample	T117-98-SG	T117-99-SG	T117-100-SG	T117-101-SG	T117-102-SG	T117-SC-COMP1	T117-SC-COMP1PW	MARINABANK-140306	MARINABANK-140317	SG-PERIM-1-POST	SG-PERIM-1-PRE
		Depth	0 - 6 cm	0 - 6 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 4 ft	0 - 122 cm	-	-	0 - 10 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**											
Metals													
Arsenic	7440-38-2	mg/kg	--	--	--	--	--	**9.8**	--	--	--	**8.02**	**9.24**
Barium	7440-39-3	mg/kg	--	--	--	--	--	--	--	--	--	**44.7 J**	--
Cadmium	7440-43-9	mg/kg	--	--	--	--	--	**0.26**	--	--	< 0.0078 U	< 1.0 U	< 1.0 U
Chromium	7440-47-3	mg/kg	--	--	--	--	--	**30**	--	--	**24.2**	**7.39 J**	< 10 U
Copper	7440-50-8	mg/kg	--	--	--	--	--	**51.3**	--	--	--	**17.6**	**16.2**
Lead	7439-92-1	mg/kg	--	--	--	--	--	**21**	--	--	**66.4**	**16.6**	**11.2**
Mercury	7439-97-6	mg/kg	**0.14**	**0.07**	--	--	--	< 0.10 U	--	--	< 0.0357 U	**0.097**	< 0.10 U
Nickel	7440-02-0	mg/kg	--	--	--	--	--	**24**	--	--	--	--	--
Selenium	7782-49-2	mg/kg	--	--	--	--	--	--	--	--	--	< 1.0 UJ	--
Silver	7440-22-4	mg/kg	--	--	--	--	--	**0.08 J**	--	--	--	< 1.0 U	< 1.0 U
Zinc	7440-66-6	mg/kg	--	--	--	--	--	**99**	--	--	--	**72.2**	**45.9 J**
Total Petroleum Hydrocarbons													
Gasoline Range Organics	TPH-GRO	mg/kg	--	--	--	--	--	--	--	--	< 2.0 U	--	--
Diesel Range Organics	TPH-DRO	mg/kg	--	--	--	--	--	--	--	--	**520 J**	--	--
Motor Oil Range Organics	TPH-ORO	mg/kg	--	--	--	--	--	--	--	--	**1500**	--	--
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	--	--	--	--	--	--	--	--	**2000 J**	--	--
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	--	--	--	--	--	--	--	--	< 0.014 U	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	--	--	--	--	--	--	--	--	< 0.028 U	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	--	--	--	--	--	--	--	--	< 0.011 U	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	--	--	--	--	--	--	--	--	< 0.028 U	--	--
1,1-Dichloroethane	75-34-3	mg/kg	--	--	--	--	--	--	--	--	< 0.0080 UJ	--	--
1,1-Dichloroethene	75-35-4	mg/kg	--	--	--	--	--	--	--	--	< 0.15 UJ	--	--
1,1-Dichloropropene	563-58-6	mg/kg	--	--	--	--	--	--	--	--	< 0.0094 U	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--	--	--	--	--	--	--	--	< 0.0090 U	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	--	--	--	--	--	--	--	--	< 0.018 U	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	--	--	--	--	--	< 0.020 U	--	--	< 0.020 UJ	< 0.0020 U	**0.0056**
1,2,4-Trimethylbenzene	95-63-6	mg/kg	--	--	--	--	--	--	--	--	< 0.015 U	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	--	--	--	--	--	--	--	--	< 0.062 UJ	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	--	--	--	--	--	--	--	--	< 0.019 U	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	--	--	--	--	--	< 0.020 U	--	--	< 0.020 UJ	< 0.0020 U	< 0.0040 U
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	--	--	--	--	--	--	--	--	< 0.012 U	--	--
1,2-Dichloropropane	78-87-5	mg/kg	--	--	--	--	--	--	--	--	< 0.034 U	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	--	--	--	--	--	--	--	--	< 0.013 UJ	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg	--	--	--	--	--	< 0.020 U	--	--	< 0.020 U	< 0.0020 U	< 0.0026 U
1,3-Dichloropropane	142-28-9	mg/kg	--	--	--	--	--	--	--	--	< 0.016 U	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	--	--	--	--	--	< 0.020 U	--	--	< 0.020 UJ	< 0.0020 U	< 0.0024 U
2,2-Dichloropropane	594-20-7	mg/kg	--	--	--	--	--	--	--	--	< 0.0088 U	--	--
2-Butanone	78-93-3	mg/kg	--	--	--	--	--	--	--	--	< 0.015 U	--	--
2-Chlorotoluene	95-49-8	mg/kg	--	--	--	--	--	--	--	--	< 0.010 U	--	--
2-Hexanone	591-78-6	mg/kg	--	--	--	--	--	--	--	--	< 0.0078 UJ	--	--
4-Chlorotoluene	106-43-4	mg/kg	--	--	--	--	--	--	--	--	< 0.012 UJ	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	--	--	--	--	--	--	--	--	< 0.017 U	--	--
Acetone	67-64-1	mg/kg	--	--	--	--	--	--	--	--	< 0.018 UJ	--	--
Bromobenzene	108-86-1	mg/kg	--	--	--	--	--	--	--	--	< 0.26 UJ	--	--
Bromodichloromethane	75-27-4	mg/kg	--	--	--	--	--	--	--	--	< 0.0082 U	--	--
Bromoform	75-25-2	mg/kg	--	--	--	--	--	--	--	--	< 0.0094 UJ	--	--
Bromomethane	74-83-9	mg/kg	--	--	--	--	--	--	--	--	< 0.070 UJ	--	--
Carbon Tetrachloride	56-23-5	mg/kg	--	--	--	--	--	--	--	--	< 0.24 U	--	--
Chlorobenzene	108-90-7	mg/kg	--	--	--	--	--	--	--	--	< 0.0084 U	--	--
Chloroethane	75-00-3	mg/kg	--	--	--	--	--	--	--	--	< 0.0098 U	--	--
Chloroform	67-66-3	mg/kg	--	--	--	--	--	--	--	--	< 0.0098 U	--	--
Chloromethane	74-87-3	mg/kg	--	--	--	--	--	--	--	--	< 0.017 UJ	--	--
cis-1,2-Dichloroethene (DCE)	156-59-2	mg/kg	--	--	--	--	--	--	--	--	< 0.0094 UJ	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	98-G	99-G	100-G	101-G	102-G	COMP1-SC	COMP1-SC	MARINABANK-140306	MARINABANK-140317	PERIM-1-POST	PERIM-1-PRE
		Date	08/29/2008	08/29/2008	08/29/2008	08/29/2008	08/29/2008	09/16/2004	09/16/2004	03/06/2014	03/17/2014	05/12/2014	11/22/2013
		Sample	T117-98-SG	T117-99-SG	T117-100-SG	T117-101-SG	T117-102-SG	T117-SC-COMP1	T117-SC-COMP1PW	MARINABANK-140306	MARINABANK-140317	SG-PERIM-1-POST	SG-PERIM-1-PRE
		Depth	0 - 6 cm	0 - 6 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 4 ft	0 - 122 cm	-	-	0 - 10 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**											
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--	--	--	--	--	--	--	--	< 0.014 U	--	--
Dibromochloromethane	124-48-1	mg/kg	--	--	--	--	--	--	--	--	< 0.013 U	--	--
Dibromomethane	74-95-3	mg/kg	--	--	--	--	--	--	--	--	< 0.014 U	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	--	--	--	--	--	--	--	--	< 0.019 UJ	--	--
Isopropylbenzene	98-82-8	mg/kg	--	--	--	--	--	--	--	--	< 0.017 UJ	--	--
m,p-Xylenes	179601-23-1	mg/kg	--	--	--	--	--	--	--	--	< 0.015 UJ	--	--
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	--	--	--	--	--	--	--	--	< 0.0357 U	--	--
Methylene Chloride	75-09-2	mg/kg	--	--	--	--	--	--	--	--	< 0.017 U	--	--
n-Propylbenzene	103-65-1	mg/kg	--	--	--	--	--	--	--	--	< 2.0 UJ	--	--
o-Xylene	95-47-6	mg/kg	--	--	--	--	--	--	--	--	< 0.017 U	--	--
p-Isopropyltoluene	99-87-6	mg/kg	--	--	--	--	--	--	--	--	< 0.013 UJ	--	--
sec-Butylbenzene	135-98-8	mg/kg	--	--	--	--	--	--	--	--	< 0.0595 UJ	--	--
Styrene	100-42-5	mg/kg	--	--	--	--	--	--	--	--	< 0.0238 UJ	--	--
tert-Butylbenzene	98-06-6	mg/kg	--	--	--	--	--	--	--	--	< 0.0298 UJ	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	--	--	--	--	--	--	--	--	< 0.238 U	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	--	--	--	--	--	--	--	--	< 0.0298 U	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--	--	--	--	--	--	--	--	< 0.571 U	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	--	--	--	--	--	--	--	--	< 0.571 UJ	--	--
Trichlorofluoromethane	75-69-4	mg/kg	--	--	--	--	--	--	--	--	< 0.017 U	--	--
Vinyl Chloride	75-01-4	mg/kg	--	--	--	--	--	--	--	--	< 0.0066 UJ	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes													
Benzene	71-43-2	mg/kg	--	--	--	--	--	--	--	--	< 0.018 UJ	--	--
Toluene	108-88-3	mg/kg	--	--	--	--	--	--	--	--	< 0.0417 U	--	--
Ethylbenzene	100-41-4	mg/kg	--	--	--	--	--	--	--	--	< 0.0066 UJ	--	--
Total Xylenes	1330-20-7	mg/kg	--	--	--	--	--	--	--	--	< 0.017 U	--	--
Semivolatile Organic Compounds													
2,4,5-Trichlorophenol	95-95-4	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.010 U	< 0.0096 U
2,4,6-Trichlorophenol	88-06-2	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.010 U	< 0.0080 U
2,4-Dichlorophenol	120-83-2	mg/kg	--	--	--	--	--	< 0.059 U	--	--	--	< 0.0020 U	< 0.0058 U
2,4-Dimethylphenol	105-67-9	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.010 U	< 0.019 U
2,4-Dinitrophenol	51-28-5	mg/kg	--	--	--	--	--	< 0.20 U	--	--	--	< 0.020 U	< 0.014 U
2,4-Dinitrotoluene	121-14-2	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.010 U	< 0.0016 UJ
2,6-Dinitrotoluene	606-20-2	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.010 U	< 0.0019 U
2-Chloronaphthalene	91-58-7	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0014 UJ
2-Chlorophenol	95-57-8	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0062 U
2-Methylphenol	95-48-7	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0064 U
2-Nitroaniline	88-74-4	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.010 U	< 0.0026 U
2-Nitrophenol	88-75-5	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.010 U	< 0.0082 U
3 & 4 Methylphenol	65794-96-9	mg/kg	--	--	--	--	--	--	--	--	--	< 0.0040 U	**0.059**
3,3'-Dichlorobenzidine	91-94-1	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg	--	--	--	--	--	< 0.12 U	--	--	--	< 0.010 U	< 0.017 U
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	--	--	--	--	--	< 0.20 U	--	--	--	< 0.020 U	< 0.011 U
4-Bromophenyl phenyl ether	101-55-3	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0016 UJ
4-Chloro-3-methylphenol	59-50-7	mg/kg	--	--	--	--	--	< 0.039 U	--	--	--	< 0.010 U	< 0.0044 U
4-Chloroaniline	106-47-8	mg/kg	--	--	--	--	--	< 0.059 U	--	--	--	< 0.020 U	<
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0016 UJ
4-Methylphenol	106-44-5	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	--	--
4-Nitroaniline	100-01-6	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.10 U	< 0.018 UJ
4-Nitrophenol	100-02-7	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.020 U	< 0.018 U
Benzoic acid	65-85-0	mg/kg	--	--	--	--	--	< 0.20 U	--	--	--	< 0.10 U	< 0.054 U
Benzyl alcohol	100-51-6	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.020 U	**0.02**
Benzyl butyl phthalate	85-68-7	mg/kg	--	--	--	--	--	**0.03**	--	--	--	< 0.010 U	< 0.0058 U
Semivolatile Organic Compounds (Continued)													
Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0014 UJ

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	98-G	99-G	100-G	101-G	102-G	COMP1-SC	COMP1-SC	MARINABANK-140306	MARINABANK-140317	PERIM-1-POST	PERIM-1-PRE
		Date	08/29/2008	08/29/2008	08/29/2008	08/29/2008	08/29/2008	09/16/2004	09/16/2004	03/06/2014	03/17/2014	05/12/2014	11/22/2013
		Sample	T117-98-SG	T117-99-SG	T117-100-SG	T117-101-SG	T117-102-SG	T117-SC-COMP1	T117-SC-COMP1PW	MARINABANK-140306	MARINABANK-140317	SG-PERIM-1-POST	SG-PERIM-1-PRE
		Depth	0 - 6 cm	0 - 6 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 4 ft	0 - 122 cm	-	-	0 - 10 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**											
Bis(2-chloroethyl) ether	111-44-4	mg/kg	--	--	--	--	--	< 0.039 U	--	--	--	< 0.0020 U	< 0.0016 UJ
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg	--	--	--	--	--	--	--	--	--	< 0.0020 U	< 0.0016 UJ
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	--	--	--	--	--	**0.27**	--	--	--	**0.13 J**	**0.067**
Carbazole	86-74-8	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	**0.0091**	**0.0054**
Dibenzofuran	132-64-9	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	**0.0027**	**0.0013**
Diethyl phthalate	84-66-2	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.010 U	< 0.0040 U
Dimethyl phthalate	131-11-3	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.010 U	**0.0027**
Di-n-butyl phthalate	84-74-2	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.010 U	< 0.020 U
Di-n-octyl phthalate	117-84-0	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	**0.013**	< 0.0032 U
Hexachlorobenzene	118-74-1	mg/kg	--	--	--	--	--	--	--	--	--	< 0.0020 U	< 0.0010 UJ
Hexachlorobutadiene	87-68-3	mg/kg	--	--	--	--	--	--	--	--	< 0.0225 U	< 0.0020 U	< 0.0020 U
Hexachlorocyclopentadiene	77-47-4	mg/kg	--	--	--	--	--	--	--	--	--	< 0.0020 U	< 0.0022 U
Hexachloroethane	67-72-1	mg/kg	--	--	--	--	--	--	--	--	--	< 0.0020 U	< 0.0032 U
Isophorone	78-59-1	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0011 UJ
Nitrobenzene	98-95-3	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0026 U
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	--	--	--	--	--	< 0.039 U	--	--	--	< 0.0020 U	< 0.0030 U
N-Nitrosodiphenylamine	86-30-6	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	< 0.0010 UJ
Pentachlorophenol	87-86-5	mg/kg	--	--	--	--	--	< 0.099 U	--	--	--	< 0.010 U	< 0.0062 UJ
Phenol	108-95-2	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0020 U	**0.02**
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	90-12-0	mg/kg	--	--	--	--	--	--	--	--	--	< 0.0050 U	< 0.0020 U
2-Methylnaphthalene	91-57-6	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0050 U	< 0.0010 U
Acenaphthene	83-32-9	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0050 U	**0.0024**
Acenaphthylene	208-96-8	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0050 U	< 0.0020 U
Anthracene	120-12-7	mg/kg	--	--	--	--	--	**0.036**	--	--	--	< 0.0050 U	**0.0054**
Benzo(g,h,i)perylene	191-24-2	mg/kg	--	--	--	--	--	**0.071**	--	--	--	**0.026**	**0.028**
Fluoranthene	206-44-0	mg/kg	--	--	--	--	--	**0.32**	--	--	--	**0.088**	**0.072**
Fluorene	86-73-7	mg/kg	--	--	--	--	--	< 0.020 U	--	--	--	< 0.0050 U	**0.0028**
Naphthalene	91-20-3	mg/kg	--	--	--	--	--	< 0.020 U	--	--	< 0.038 U	< 0.0050 U	< 0.0020 U
Phenanthrene	85-01-8	mg/kg	--	--	--	--	--	**0.11**	--	--	--	**0.044**	**0.042**
Pyrene	129-00-0	mg/kg	--	--	--	--	--	**0.3**	--	--	--	**0.078**	**0.073**
Benz(a)anthracene	56-55-3	mg/kg	--	--	--	--	--	**0.14**	--	--	--	**0.03**	**0.023**
Benzo(a)pyrene	50-32-8	mg/kg	--	--	--	--	--	**0.14**	--	--	--	**0.032**	**0.033**
Benzo(b)fluoranthene	205-99-2	mg/kg	--	--	--	--	--	**0.22**	--	--	--	**0.053**	**0.053**
Benzo(k)fluoranthene	207-08-9	mg/kg	--	--	--	--	--	**0.16**	--	--	--	**0.017**	**0.019**
Chrysene	218-01-9	mg/kg	--	--	--	--	--	**0.21**	--	--	--	**0.044**	**0.039**
Dibenzo(a,h)anthracene	53-70-3	mg/kg	--	--	--	--	--	**0.028**	--	--	--	**0.0057**	**0.0059**
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	--	--	--	--	--	**0.089**	--	--	--	**0.028**	**0.03**
Total Benzofluoranthenes	TOTBFA	mg/kg	--	--	--	--	--	--	--	--	--	**0.07**	**0.072**
Total HPAHs	T-HPAH	mg/kg	--	--	--	--	--	--	--	--	--	**0.402**	**0.376**
Total LPAHs	T-LPAH	mg/kg	--	--	--	--	--	--	--	--	--	**0.044**	**0.053**
Total PAHs	T-PAH	mg/kg	--	--	--	--	--	--	--	--	--	**0.446**	**0.428**
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	mg/kg	--	--	--	--	--	--	--	--	--	**0.046**	**0.046**
Pesticides / Herbicides													
4,4'-DDD	72-54-8	mg/kg	--	--	--	--	--	< 0.0020 U	--	--	< 0.019 U	--	--
4,4'-DDE	72-55-9	mg/kg	--	--	--	--	--	< 0.0020 U	--	--	**0.0438**	--	--
4,4'-DDT	50-29-3	mg/kg	--	--	--	--	--	< 0.0020 U	--	--	< 0.017 U	--	--
Aldrin	309-00-2	mg/kg	--	--	--	--	--	< 0.0010 U	--	--	**0.345**	--	--
Chlordane	57-74-9	mg/kg	--	--	--	--	--	--	--	--	**0.0279**	--	--
cis-Chlordane	5103-71-9	mg/kg	--	--	--	--	--	< 0.0010 U	--	--	< 0.017 U	--	--
Dieldrin	60-57-1	mg/kg	< 0.0076 U	< 0.0046 U	--	--	--	< 0.0059 U	--	--	**0.314**	--	--
Heptachlor	76-44-8	mg/kg	--	--	--	--	--	< 0.0010 U	--	--	< 0.0088 U	--	--
Lindane	58-89-9	mg/kg	--	--	--	--	--	< 0.0010 U	--	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	--	--	--	--	--	--	--	--	**0.0279**	--	--
Total DDT	T-DDT	mg/kg	--	--	--	--	--	--	--	--	**0.0438**	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	98-G	99-G	100-G	101-G	102-G	COMP1-SC	COMP1-SC	MARINABANK-140306	MARINABANK-140317	PERIM-1-POST	PERIM-1-PRE
		Date	08/29/2008	08/29/2008	08/29/2008	08/29/2008	08/29/2008	09/16/2004	09/16/2004	03/06/2014	03/17/2014	05/12/2014	11/22/2013
		Sample	T117-98-SG	T117-99-SG	T117-100-SG	T117-101-SG	T117-102-SG	T117-SC-COMP1	T117-SC-COMP1PW	MARINABANK-140306	MARINABANK-140317	SG-PERIM-1-POST	SG-PERIM-1-PRE
		Depth	0 - 6 cm	0 - 6 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 4 ft	0 - 122 cm	-	-	0 - 10 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**											
2,4,5-T	93-76-5	mg/kg	--	--	--	--	--	--	--	--	< 0.0595 U	--	--
2,4-D	94-75-7	mg/kg	--	--	--	--	--	--	--	--	< 0.0357 U	--	--
2,4-DB	94-82-6	mg/kg	--	--	--	--	--	--	--	--	< 0.0298 U	--	--
Dalapon	75-99-0	mg/kg	--	--	--	--	--	--	--	--	< 0.238 U	--	--
Dicamba	1918-00-9	mg/kg	--	--	--	--	--	--	--	--	< 0.0417 U	--	--
Dichloroprop	120-36-5	mg/kg	--	--	--	--	--	--	--	--	< 0.0298 U	--	--
Dinoseb	88-85-7	mg/kg	--	--	--	--	--	--	--	--	< 0.020 U	--	--
MCPA	94-74-6	mg/kg	--	--	--	--	--	--	--	--	< 0.571 U	--	--
MCPP	93-65-2	mg/kg	--	--	--	--	--	--	--	--	< 0.571 U	--	--
Silvex	93-72-1	mg/kg	--	--	--	--	--	--	--	--	< 0.0238 U	--	--
Dioxins/Furans													
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/kg	--	--	--	--	--	--	--	--	--	**1.88 J**	**1.41 J**
2,3,7,8-TCDD	1746-01-6	mg/kg	--	--	**0.000000722**	--	**0.000000392 J**	--	--	--	--	< 0.000000295 U	< 0.000000322 U
1,2,3,7,8-PeCDD	40321-76-4	mg/kg	--	--	**0.00000161 J**	--	< 0.0000025 U	--	--	--	--	< 0.000000758 U	< 0.000000692 U
1,2,3,4,7,8-HxCDD	39227-28-6	mg/kg	--	--	**0.00000201 J**	--	**0.00000167 J**	--	--	--	--	< 0.00000149 U	< 0.00000125 U
1,2,3,6,7,8-HxCDD	57653-85-7	mg/kg	--	--	**0.00000769**	--	**0.00000579**	--	--	--	--	**0.0000018 J**	< 0.00000128 U
1,2,3,7,8,9-HxCDD	19408-74-3	mg/kg	--	--	**0.00000461**	--	**0.00000354**	--	--	--	--	< 0.00000151 U	< 0.00000128 U
1,2,3,4,6,7,8-HpCDD	35822-46-9	mg/kg	--	--	**0.000246**	--	**0.000156**	--	--	--	--	**0.0000389**	**0.0000242**
OCDD	3268-87-9	mg/kg	--	--	**0.0025**	--	**0.00142**	--	--	--	--	**0.000255**	**0.000171 J**
Total TCDD	41903-57-5	mg/kg	--	--	**0.00000776 J**	--	**0.00000568 J**	--	--	--	--	**0.00000316**	< 0.000000322 U
Total PeCDD	36088-22-9	mg/kg	--	--	**0.0000143 J**	--	**0.0000117 J**	--	--	--	--	**0.00000233 J**	**0.00000207**
Total HxCDD	34465-46-8	mg/kg	--	--	**0.0000606**	--	**0.0000494 J**	--	--	--	--	**0.0000157**	**0.00000933**
Total HpCDD	37871-00-4	mg/kg	--	--	**0.000554**	--	**0.000373**	--	--	--	--	**0.0000883**	**0.0000623**
2,3,7,8-TCDF	51207-31-9	mg/kg	--	--	**0.00000101**	--	**0.000000899**	--	--	--	--	**0.000000564 J**	< 0.000000407 U
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	--	--	**0.000000862 J**	--	**0.000000687 J**	--	--	--	--	< 0.000000478 U	< 0.000000779 U
2,3,4,7,8-PeCDF	57117-31-4	mg/kg	--	--	**0.00000228 J**	--	**0.00000193 J**	--	--	--	--	< 0.000000463 U	< 0.00000076 U
1,2,3,4,7,8-HxCDF	70648-26-9	mg/kg	--	--	**0.00000422**	--	**0.00000302**	--	--	--	--	**0.00000191 J**	< 0.00000096 U
1,2,3,6,7,8-HxCDF	57117-44-9	mg/kg	--	--	**0.00000177 J**	--	**0.0000015 J**	--	--	--	--	< 0.000000805 U	< 0.000000979 U
1,2,3,7,8,9-HxCDF	72918-21-9	mg/kg	--	--	**0.000000958 J**	--	**0.000000835 J**	--	--	--	--	< 0.00000131 U	< 0.00000136 U
2,3,4,6,7,8-HxCDF	60851-34-5	mg/kg	--	--	**0.00000274**	--	**0.00000213 J**	--	--	--	--	< 0.000000944 U	< 0.00000102 U
1,2,3,4,6,7,8-HpCDF	67562-39-4	mg/kg	--	--	**0.0000526**	--	**0.0000314**	--	--	--	--	**0.00000749**	**0.00000497**
1,2,3,4,7,8,9-HpCDF	55673-89-7	mg/kg	--	--	**0.00000294**	--	**0.00000253**	--	--	--	--	< 0.000000856 U	< 0.000000537 U
OCDF	39001-02-0	mg/kg	--	--	**0.00017**	--	**0.000104**	--	--	--	--	**0.0000168**	**0.0000118**
Total TCDF	30402-14-3	mg/kg	--	--	**0.0000203 J**	--	**0.0000182 J**	--	--	--	--	**0.0000127 J**	**0.00000447 J**
Total PeCDF	30402-15-4	mg/kg	--	--	**0.0000237**	--	**0.0000197 J**	--	--	--	--	**0.0000118 J**	**0.00000887 J**
Total HxCDF	55684-94-1	mg/kg	--	--	**0.0000673 J**	--	**0.0000471 J**	--	--	--	--	**0.0000157 J**	**0.00000852**
Total HpCDF	38998-75-3	mg/kg	--	--	**0.000167**	--	**0.000105**	--	--	--	--	**0.0000223**	**0.0000138 J**
Organometallic													
Tributyltin Ion	36643-28-4	ug/L	--	--	--	--	--	--	< 0.020 UJ	--	--	--	--
Polychlorinated Biphenyl Aroclors													
Aroclor 1016	12674-11-2	mg/kg	< 0.020 U	< 0.099 U	< 0.020 U	< 0.098 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.0225 U	< 0.0040 UJ	< 0.020 U
Aroclor 1221	11104-28-2	mg/kg	< 0.020 U	< 0.099 U	< 0.020 U	< 0.098 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.0113 U	< 0.0040 U	< 0.020 U
Aroclor 1232	11141-16-5	mg/kg	< 0.020 U	< 0.099 U	< 0.020 U	< 0.098 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.0113 U	< 0.0040 U	< 0.020 U
Aroclor 1242	53469-21-9	mg/kg	< 0.020 U	< 0.099 U	< 0.020 U	< 0.098 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.016 U	< 0.0040 U	< 0.020 U
Aroclor 1248	12672-29-6	mg/kg	< 0.020 U	< 0.099 U	< 0.020 U	< 0.098 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.016 U	< 0.0040 U	< 0.020 U
Aroclor 1254	11097-69-1	mg/kg	**0.04**	< 0.099 U	< 0.020 U	< 0.24 U	**0.056**	< 0.040 U	--	**1.6**	**3.5**	**0.092**	< 0.020 U
Aroclor 1260	11096-82-5	mg/kg	**0.078**	**0.28**	**0.059**	**0.57**	**0.15**	**0.031**	--	**1.4**	**1.9**	**0.064**	**0.058**
Aroclor 1262	37324-23-5	mg/kg	< 0.020 U	< 0.099 U	< 0.020 U	< 0.098 U	< 0.020 U	--	--	--	--	--	--
Aroclor 1268	11100-14-4	mg/kg	< 0.020 U	< 0.099 U	< 0.020 U	< 0.098 U	< 0.020 U	--	--	--	--	--	--
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	--	--	--	--	--	--	--	**3**	**5.4**	**0.156**	**0.058**
Polychlorinated Biphenyl Congeners													
PCB 105	32598-14-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 110	38380-03-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 114	74472-37-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 119	56558-17-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location Date Sample Depth	98-G 08/29/2008 T117-98-SG 0 - 6 cm	99-G 08/29/2008 T117-99-SG 0 - 6 cm	100-G 08/29/2008 T117-100-SG 0 - 10 cm	101-G 08/29/2008 T117-101-SG 0 - 10 cm	102-G 08/29/2008 T117-102-SG 0 - 10 cm	COMP1-SC 09/16/2004 T117-SC-COMP1 0 - 4 ft	COMP1-SC 09/16/2004 T117-SC-COMP1PW 0 - 122 cm	MARINABANK-140306 03/06/2014 MARINABANK-140306 -	MARINABANK-140317 03/17/2014 MARINABANK-140317 -	PERIM-1-POST 05/12/2014 SG-PERIM-1-POST 0 - 10 cm	PERIM-1-PRE 11/22/2013 SG-PERIM-1-PRE 0 - 10 cm
Analyte	**CAS_RN**	**Unit**											
PCB 123	65510-44-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 126	57465-28-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 151	52663-63-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 153	35065-27-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 156	38380-08-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 157	69782-90-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 167	52663-72-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 168	59291-65-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 169	32774-16-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 170	35065-30-6	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 177	52663-70-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 18	37680-65-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 180	35065-29-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 183	52663-69-1	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 189	39635-31-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 194	35694-08-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 195	52663-78-2	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 201	40186-71-8	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 206	40186-72-9	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 209	2051-24-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 28	7012-37-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 37	38444-90-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 44	41464-39-5	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 74	32690-93-0	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 77	32598-13-3	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 81	70362-50-4	mg/kg	--	--	--	--	--	--	--	--	--	--	--
PCB 99	38380-01-7	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Total PCB Congeners	T-PCBCong	mg/kg	--	--	--	--	--	--	--	--	--	--	--
Conventionals													
Ammonia as Nitrogen	7664-41-7	mg/kg	--	--	--	--	--	**38.3**	--	--	--	--	--
Total Organic Carbon	TOC	%	**1.91**	**1.83**	**3.19**	**2.69**	**3.49**	**2.22**	--	--	**0.527**	**1.05**	**0.566**
Total Solids	TS	%	**34.5**	**50.2**	**38.8**	**49.4**	**41.1**	**44.1**	--	--	--	--	--
Total Volatile Solids	TVS	%	--	--	--	--	--	**9.26**	--	--	--	--	--
Particle Size													
Gravel	Phisize <-1	%	--	--	--	--	--	< 0.10 U	--	--	--	--	--
PhiSize > 10	PhiSize >10	%	--	--	--	--	--	**6.3**	--	--	--	--	--
PhiSize 0 to 1 Coarse Sand	PhiSize 0-1	%	--	--	--	--	--	**2**	--	--	--	--	--
PhiSize -1 to 0 Very Coarse Sand	PhiSize -1-0	%	--	--	--	--	--	**1.9**	--	--	--	--	--
PhiSize 1 to 2 Medium Sand	PhiSize 1-2	%	--	--	--	--	--	**3.2**	--	--	--	--	--
PhiSize 2 to 3 Fine Sand	PhiSize 2-3	%	--	--	--	--	--	**6**	--	--	--	--	--
PhiSize 3 to 4 Very Fine Sand	PhiSize 3-4	%	--	--	--	--	--	**13.9**	--	--	--	--	--
PhiSize 4 To 5 Coarse Silt	PhiSize 4-5	%	--	--	--	--	--	**6**	--	--	--	--	--
PhiSize 5 to 6 Medium Silt	PhiSize 5-6	%	--	--	--	--	--	**32.8**	--	--	--	--	--
PhiSize 6 to 7 Fine Silt	PhiSize 6-7	%	--	--	--	--	--	**18.2**	--	--	--	--	--
PhiSize 7 to 8 Very Fine Silt	PhiSize 7-8	%	--	--	--	--	--	**4.3**	--	--	--	--	--
PhiSize 8 to 9 Clay	PhiSize 8-9	%	--	--	--	--	--	**3.4**	--	--	--	--	--
PhiSize 9 to 10 Clay	PhiSize 9-10	%	--	--	--	--	--	**2.1**	--	--	--	--	--

Notes:

Bold - detected

U - Analyte not detected at or above Reporting Limit (RL) shown

J - Result value estimated

UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

cm - centimeters

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location Date Sample Depth	PERIM-2-POST 05/12/2014 SG-PERIM-2-POST 0 - 10 cm	PERIM-2-PRE 11/22/2013 SG-PERIM-2-PRE 0 - 10 cm	PERIM-3-POST 05/12/2014 SG-PERIM-3-POST 0 - 10 cm	PERIM-3-PRE 11/22/2013 SG-PERIM-3-PRE 0 - 10 cm	PERIM-4-POST 05/12/2014 SG-PERIM-4-POST 0 - 10 cm	PERIM-4-PRE 11/22/2013 SG-PERIM-4-PRE 0 - 10 cm	PERIM-5-POST 05/12/2014 SG-PERIM-5-POST 0 - 10 cm	PERIM-5-PRE 11/22/2013 SG-PERIM-5-PRE 0 - 10 cm
Analyte	**CAS_RN**	**Unit**								
Metals										
Arsenic	7440-38-2	mg/kg	**9.97**	**9.54**	**2.92**	**8.21**	**3.49**	**8.59**	**4.26**	**15.8**
Barium	7440-39-3	mg/kg	**53.9 J**	--	**31.5 J**	--	**35.6 J**	--	**45.8 J**	--
Cadmium	7440-43-9	mg/kg	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chromium	7440-47-3	mg/kg	**16.9 J**	**15.5**	**10.5 J**	**13.4**	**9.94 J**	**14.3**	**12.7 J**	**16.6**
Copper	7440-50-8	mg/kg	**35.7**	**35.4**	**17.4**	**27.8**	**16.8**	**31.5**	**21.8**	**41.2**
Lead	7439-92-1	mg/kg	**16.8**	**13.9**	**5.11**	**11.4**	**6.44**	**11.5**	**7.02**	**17**
Mercury	7439-97-6	mg/kg	**0.19**	**0.24 J**	**0.063**	**0.11 J**	**0.075**	**0.11 J**	**0.071**	**0.15 J**
Nickel	7440-02-0	mg/kg	--	--	--	--	--	--	--	--
Selenium	7782-49-2	mg/kg	< 1.0 UJ	--	< 1.0 UJ	--	< 1.0 UJ	--	< 1.0 UJ	--
Silver	7440-22-4	mg/kg	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Zinc	7440-66-6	mg/kg	**78.4**	**72.6 J**	**31.8**	**66.1 J**	**36.8**	**63.4 J**	**39.7**	**79.4 J**
Total Petroleum Hydrocarbons										
Gasoline Range Organics	TPH-GRO	mg/kg	--	--	--	--	--	--	--	--
Diesel Range Organics	TPH-DRO	mg/kg	--	--	--	--	--	--	--	--
Motor Oil Range Organics	TPH-ORO	mg/kg	--	--	--	--	--	--	--	--
Diesel and Oil Extended Range Organics	TPH-EXT	mg/kg	--	--	--	--	--	--	--	--
Volatile Organic Compounds										
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	mg/kg	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	mg/kg	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	mg/kg	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	mg/kg	--	--	--	--	--	--	--	--
1,1-Dichloropropene	563-58-6	mg/kg	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	mg/kg	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	mg/kg	< 0.0040 U	**0.0077**	< 0.0020 U	**0.004**	< 0.0020 U	**0.006**	< 0.0020 U	**0.0089**
1,2,4-Trimethylbenzene	95-63-6	mg/kg	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	mg/kg	< 0.0040 U	**0.0041**	< 0.0020 U	< 0.0040 U	< 0.0020 U	< 0.0040 U	< 0.0020 U	**0.005**
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	mg/kg	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	mg/kg	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	mg/kg	< 0.0040 U	**0.0036**	< 0.0020 U	< 0.0026 U	< 0.0020 U	**0.0028**	< 0.0020 U	**0.0039**
1,3-Dichloropropane	142-28-9	mg/kg	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	mg/kg	< 0.0040 U	**0.0035**	< 0.0020 U	< 0.0024 U	< 0.0020 U	< 0.0024 U	< 0.0020 U	**0.0031**
2,2-Dichloropropane	594-20-7	mg/kg	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	mg/kg	--	--	--	--	--	--	--	--
2-Chlorotoluene	95-49-8	mg/kg	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	mg/kg	--	--	--	--	--	--	--	--
4-Chlorotoluene	106-43-4	mg/kg	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	mg/kg	--	--	--	--	--	--	--	--
Acetone	67-64-1	mg/kg	--	--	--	--	--	--	--	--
Bromobenzene	108-86-1	mg/kg	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	mg/kg	--	--	--	--	--	--	--	--
Bromoform	75-25-2	mg/kg	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	mg/kg	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	mg/kg	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	mg/kg	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	mg/kg	--	--	--	--	--	--	--	--
Chloroform	67-66-3	mg/kg	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	mg/kg	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene (DCE)	156-59-2	mg/kg	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	PERIM-2-POST	PERIM-2-PRE	PERIM-3-POST	PERIM-3-PRE	PERIM-4-POST	PERIM-4-PRE	PERIM-5-POST	PERIM-5-PRE
		Date	05/12/2014	11/22/2013	05/12/2014	11/22/2013	05/12/2014	11/22/2013	05/12/2014	11/22/2013
		Sample	SG-PERIM-2-POST	SG-PERIM-2-PRE	SG-PERIM-3-POST	SG-PERIM-3-PRE	SG-PERIM-4-POST	SG-PERIM-4-PRE	SG-PERIM-5-POST	SG-PERIM-5-PRE
		Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**								
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	mg/kg	--	--	--	--	--	--	--	--
Dibromomethane	74-95-3	mg/kg	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	mg/kg	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	mg/kg	--	--	--	--	--	--	--	--
m,p-Xylenes	179601-23-1	mg/kg	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	1634-04-4	mg/kg	--	--	--	--	--	--	--	--
Methylene Chloride	75-09-2	mg/kg	--	--	--	--	--	--	--	--
n-Propylbenzene	103-65-1	mg/kg	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	mg/kg	--	--	--	--	--	--	--	--
p-Isopropyltoluene	99-87-6	mg/kg	--	--	--	--	--	--	--	--
sec-Butylbenzene	135-98-8	mg/kg	--	--	--	--	--	--	--	--
Styrene	100-42-5	mg/kg	--	--	--	--	--	--	--	--
tert-Butylbenzene	98-06-6	mg/kg	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	127-18-4	mg/kg	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	mg/kg	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	79-01-6	mg/kg	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	mg/kg	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	mg/kg	--	--	--	--	--	--	--	--
Benzene, Toluene, Ethylbenzene, and Total Xylenes										
Benzene	71-43-2	mg/kg	--	--	--	--	--	--	--	--
Toluene	108-88-3	mg/kg	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	mg/kg	--	--	--	--	--	--	--	--
Total Xylenes	1330-20-7	mg/kg	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds										
2,4,5-Trichlorophenol	95-95-4	mg/kg	< 0.020 U	< 0.0096 U	< 0.010 U	< 0.0096 U	< 0.010 U	< 0.0096 U	< 0.010 U	< 0.0096 U
2,4,6-Trichlorophenol	88-06-2	mg/kg	< 0.020 U	< 0.0080 U	< 0.010 U	< 0.0080 U	< 0.010 U	< 0.0080 U	< 0.010 U	< 0.0080 U
2,4-Dichlorophenol	120-83-2	mg/kg	< 0.0040 U	< 0.0058 U	< 0.0020 U	< 0.0058 U	< 0.0020 U	< 0.0058 U	< 0.0020 U	< 0.0058 U
2,4-Dimethylphenol	105-67-9	mg/kg	< 0.020 U	< 0.019 U	< 0.010 U	< 0.019 U	< 0.010 U	< 0.019 U	< 0.010 U	< 0.019 U
2,4-Dinitrophenol	51-28-5	mg/kg	< 0.040 U	< 0.014 U	< 0.020 U	< 0.014 U	< 0.020 U	< 0.014 U	< 0.020 U	< 0.014 U
2,4-Dinitrotoluene	121-14-2	mg/kg	< 0.020 U	< 0.0016 UJ	< 0.010 U	< 0.0016 UJ	< 0.010 U	< 0.0016 UJ	< 0.010 U	< 0.0016 UJ
2,6-Dinitrotoluene	606-20-2	mg/kg	< 0.020 U	< 0.0019 U	< 0.010 U	< 0.0019 U	< 0.010 U	< 0.0019 U	< 0.010 U	< 0.0019 U
2-Chloronaphthalene	91-58-7	mg/kg	< 0.0040 U	< 0.0014 UJ	< 0.0020 U	< 0.0014 UJ	< 0.0020 U	< 0.0014 UJ	< 0.0020 U	< 0.0014 UJ
2-Chlorophenol	95-57-8	mg/kg	< 0.0040 U	< 0.0062 U	< 0.0020 U	< 0.0062 U	< 0.0020 U	< 0.0062 U	< 0.0020 U	< 0.0062 U
2-Methylphenol	95-48-7	mg/kg	< 0.0040 U	< 0.0064 U	< 0.0020 U	< 0.0064 U	< 0.0020 U	< 0.0064 U	< 0.0020 U	< 0.0064 U
2-Nitroaniline	88-74-4	mg/kg	< 0.020 U	< 0.0026 U	< 0.010 U	< 0.0026 U	< 0.010 U	< 0.0026 U	< 0.010 U	< 0.0026 U
2-Nitrophenol	88-75-5	mg/kg	< 0.020 U	< 0.0082 U	< 0.010 U	< 0.0082 U	< 0.010 U	< 0.0082 U	< 0.010 U	< 0.0082 U
3 & 4 Methylphenol	65794-96-9	mg/kg	**0.018**	< 0.014 U	< 0.0040 U	< 0.014 U	**0.004**	< 0.014 U	< 0.0040 U	< 0.014 U
3,3'-Dichlorobenzidine	91-94-1	mg/kg	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	mg/kg	< 0.020 U	< 0.017 U	< 0.010 U	< 0.017 U	< 0.010 U	< 0.017 U	< 0.010 U	< 0.017 U
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	< 0.040 U	< 0.011 U	< 0.020 U	< 0.011 U	< 0.020 U	< 0.011 U	< 0.020 U	< 0.011 U
4-Bromophenyl phenyl ether	101-55-3	mg/kg	< 0.0040 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 U	< 0.0020 U	< 0.0016 UJ
4-Chloro-3-methylphenol	59-50-7	mg/kg	< 0.020 U	< 0.0044 U	< 0.010 U	< 0.0044 U	< 0.010 U	< 0.0044 U	< 0.010 U	< 0.0044 U
4-Chloroaniline	106-47-8	mg/kg	< 0.020 U	<	< 0.020 U	<	< 0.020 U	<	< 0.020 U	<
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	< 0.0040 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ
4-Methylphenol	106-44-5	mg/kg	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	mg/kg	< 0.20 U	< 0.018 UJ	< 0.10 U	< 0.018 UJ	< 0.10 U	< 0.018 UJ	< 0.10 U	< 0.018 UJ
4-Nitrophenol	100-02-7	mg/kg	< 0.040 U	< 0.018 U	< 0.020 U	< 0.018 U	< 0.020 U	< 0.018 U	< 0.020 U	< 0.018 U
Benzoic acid	65-85-0	mg/kg	< 0.20 U	< 0.054 U	< 0.10 U	< 0.054 U	< 0.10 U	< 0.054 U	< 0.10 U	< 0.054 U
Benzyl alcohol	100-51-6	mg/kg	< 0.040 U	**0.052**	< 0.020 U	**0.034**	< 0.020 U	**0.018**	< 0.020 U	**0.035 J**
Benzyl butyl phthalate	85-68-7	mg/kg	**0.029**	**0.017 J**	< 0.010 U	**0.0082 J**	< 0.010 U	**0.01**	< 0.010 UJ	**0.015 J**
Semivolatile Organic Compounds (Continued)										
Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	mg/kg	< 0.0040 U	< 0.0014 UJ	< 0.0020 U	< 0.0014 UJ	< 0.0020 U	< 0.0014 UJ	< 0.0020 U	< 0.0014 UJ

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location Date	PERIM-2-POST 05/12/2014	PERIM-2-PRE 11/22/2013	PERIM-3-POST 05/12/2014	PERIM-3-PRE 11/22/2013	PERIM-4-POST 05/12/2014	PERIM-4-PRE 11/22/2013	PERIM-5-POST 05/12/2014	PERIM-5-PRE 11/22/2013
		Sample Depth	SG-PERIM-2-POST 0 - 10 cm	SG-PERIM-2-PRE 0 - 10 cm	SG-PERIM-3-POST 0 - 10 cm	SG-PERIM-3-PRE 0 - 10 cm	SG-PERIM-4-POST 0 - 10 cm	SG-PERIM-4-PRE 0 - 10 cm	SG-PERIM-5-POST 0 - 10 cm	SG-PERIM-5-PRE 0 - 10 cm
Analyte	**CAS_RN**	**Unit**								
Bis(2-chloroethyl) ether	111-44-4	mg/kg	< 0.0040 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ
bis(2-Chloroisopropyl)ether	39638-32-9	mg/kg	< 0.0040 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ	< 0.0020 U	< 0.0016 UJ
Bis(2-ethylhexyl) phthalate	117-81-7	mg/kg	**0.44 J**	**0.12 J**	**0.079 J**	**0.1 J**	**0.077 J**	**0.1**	**0.12 J**	**0.11**
Carbazole	86-74-8	mg/kg	**0.0099**	**0.0053**	**0.0023**	**0.0042**	**0.0045**	**0.0055**	**0.0043**	**0.01 J**
Dibenzofuran	132-64-9	mg/kg	**0.0074**	**0.003**	< 0.0020 U	**0.0027**	**0.0034**	**0.0042**	**0.0051**	**0.0089 J**
Diethyl phthalate	84-66-2	mg/kg	< 0.020 U	**0.0041**	< 0.010 U	< 0.0040 U	< 0.010 U	< 0.0040 U	< 0.010 U	< 0.0040 U
Dimethyl phthalate	131-11-3	mg/kg	< 0.020 U	**0.0063**	< 0.010 U	**0.0055**	< 0.010 U	**0.0054**	< 0.010 U	**0.013**
Di-n-butyl phthalate	84-74-2	mg/kg	**0.04**	< 0.020 U	< 0.010 U	< 0.020 U	< 0.010 U	< 0.020 U	< 0.010 U	< 0.020 U
Di-n-octyl phthalate	117-84-0	mg/kg	< 0.020 U	< 0.0032 U	< 0.010 U	**0.004**	< 0.010 U	< 0.0032 U	< 0.010 U	**0.0056 J**
Hexachlorobenzene	118-74-1	mg/kg	< 0.0040 U	< 0.0010 UJ	< 0.0020 U	< 0.0010 UJ	< 0.0020 U	< 0.0010 U	< 0.0020 U	< 0.0010 UJ
Hexachlorobutadiene	87-68-3	mg/kg	< 0.0040 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U
Hexachlorocyclopentadiene	77-47-4	mg/kg	< 0.0040 U	< 0.0022 U	< 0.0020 U	< 0.0022 U	< 0.0020 U	< 0.0022 U	< 0.0020 U	< 0.0022 U
Hexachloroethane	67-72-1	mg/kg	< 0.0040 U	< 0.0032 U	< 0.0020 U	< 0.0032 U	< 0.0020 U	< 0.0032 U	< 0.0020 U	< 0.0032 U
Isophorone	78-59-1	mg/kg	< 0.0040 U	< 0.0011 UJ	< 0.0020 U	< 0.0011 UJ	< 0.0020 U	< 0.0011 UJ	**0.0067**	< 0.0011 UJ
Nitrobenzene	98-95-3	mg/kg	< 0.0040 U	< 0.0026 U	< 0.0020 U	< 0.0026 U	< 0.0020 U	< 0.0026 U	< 0.0020 U	< 0.0026 U
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	< 0.0040 U	< 0.0030 U	< 0.0020 U	< 0.0030 U	< 0.0020 U	< 0.0030 U	< 0.0020 U	< 0.0030 U
N-Nitrosodiphenylamine	86-30-6	mg/kg	< 0.0040 U	**0.0013 J**	< 0.0020 U	< 0.0010 UJ	< 0.0020 U	< 0.0010 UJ	< 0.0020 U	< 0.0010 UJ
Pentachlorophenol	87-86-5	mg/kg	< 0.020 U	**0.0097 J**	< 0.010 U	< 0.0062 UJ	< 0.010 U	< 0.0062 UJ	< 0.010 U	< 0.0062 UJ
Phenol	108-95-2	mg/kg	< 0.0040 U	**0.0057**	< 0.0020 U	< 0.0054 U	< 0.0020 U	< 0.0054 U	< 0.0020 U	**0.007**
Polycyclic Aromatic Hydrocarbons										
1-Methylnaphthalene	90-12-0	mg/kg	< 0.010 U	< 0.0020 U	< 0.0050 U	**0.0022**	< 0.0050 U	**0.0021**	< 0.0050 U	< 0.040 U
2-Methylnaphthalene	91-57-6	mg/kg	< 0.010 U	**0.0033**	< 0.0050 U	**0.0028**	< 0.0050 U	**0.0036**	**0.0055**	**0.0041 J**
Acenaphthene	83-32-9	mg/kg	< 0.010 U	**0.0029**	< 0.0050 U	**0.0024**	< 0.0050 U	**0.004**	< 0.0050 U	< 0.040 U
Acenaphthylene	208-96-8	mg/kg	< 0.010 U	**0.0025**	< 0.0050 U	< 0.0020 U	< 0.0050 U	**0.0025**	< 0.0050 U	< 0.040 U
Anthracene	120-12-7	mg/kg	**0.016**	**0.02**	< 0.0050 U	**0.0071**	**0.0078**	**0.0092**	**0.011**	**0.096 J**
Benzo(g,h,i)perylene	191-24-2	mg/kg	**0.053**	**0.034**	**0.011**	**0.031**	**0.019**	**0.032**	**0.015**	**0.17**
Fluoranthene	206-44-0	mg/kg	**0.15**	**0.1**	**0.03**	**0.07**	**0.1**	**0.12**	**0.045**	**1.3**
Fluorene	86-73-7	mg/kg	< 0.010 U	**0.008**	< 0.0050 U	**0.0031**	< 0.0050 U	**0.005**	**0.0054**	**0.051**
Naphthalene	91-20-3	mg/kg	< 0.010 U	**0.0025**	< 0.0050 U	**0.0021**	< 0.0050 U	**0.0022**	< 0.0050 U	< 0.040 U
Phenanthrene	85-01-8	mg/kg	**0.064**	**0.048**	**0.013**	**0.028**	**0.048**	**0.045**	**0.028**	**0.62 J**
Pyrene	129-00-0	mg/kg	**0.13**	**0.093**	**0.025**	**0.073**	**0.096**	**0.11**	**0.043**	**0.94**
Benz(a)anthracene	56-55-3	mg/kg	**0.057**	**0.034**	**0.011**	**0.033**	**0.037**	**0.045**	**0.016**	**0.43**
Benzo(a)pyrene	50-32-8	mg/kg	**0.055**	**0.041**	**0.012**	**0.039**	**0.032**	**0.046**	**0.016**	**0.33**
Benzo(b)fluoranthene	205-99-2	mg/kg	**0.11**	**0.082**	**0.022**	**0.073**	**0.055**	**0.031**	**0.028**	**0.63**
Benzo(k)fluoranthene	207-08-9	mg/kg	**0.029**	**0.027**	**0.0067**	**0.022**	**0.017**	**0.024**	**0.0084**	**0.18**
Chrysene	218-01-9	mg/kg	**0.093**	**0.058**	**0.016**	**0.047**	**0.043**	**0.056**	**0.026**	**0.38**
Dibenzo(a,h)anthracene	53-70-3	mg/kg	< 0.010 U	**0.0073**	< 0.0050 U	**0.007**	< 0.0050 U	**0.0071**	< 0.0050 U	**0.043**
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	**0.05**	**0.037**	**0.011**	**0.034**	**0.022**	**0.035**	**0.014**	**0.19**
Total Benzofluoranthenes	TOTBFA	mg/kg	**0.14**	**0.109**	**0.029**	**0.095**	**0.072**	**0.055**	**0.036**	**0.81**
Total HPAHs	T-HPAH	mg/kg	**0.73**	**0.51**	**0.145**	**0.429**	**0.42**	**0.51**	**0.211**	**4.6**
Total LPAHs	T-LPAH	mg/kg	**0.08**	**0.084**	**0.013**	**0.043**	**0.056**	**0.068**	**0.044**	**0.77 J**
Total PAHs	T-PAH	mg/kg	**0.81**	**0.6**	**0.158**	**0.472**	**0.48**	**0.57**	**0.256**	**5.4 J**
Total cPAHs TEQ (ND = 1/2 RDL)	T-cPAH-1/2U	mg/kg	**0.081**	**0.06**	**0.017**	**0.056**	**0.046**	**0.061**	**0.023**	**0.48**
Pesticides / Herbicides										
4,4'-DDD	72-54-8	mg/kg	--	--	--	--	--	--	--	--
4,4'-DDE	72-55-9	mg/kg	--	--	--	--	--	--	--	--
4,4'-DDT	50-29-3	mg/kg	--	--	--	--	--	--	--	--
Aldrin	309-00-2	mg/kg	--	--	--	--	--	--	--	--
Chlordane	57-74-9	mg/kg	--	--	--	--	--	--	--	--
cis-Chlordane	5103-71-9	mg/kg	--	--	--	--	--	--	--	--
Dieldrin	60-57-1	mg/kg	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	mg/kg	--	--	--	--	--	--	--	--
Lindane	58-89-9	mg/kg	--	--	--	--	--	--	--	--
trans-Chlordane	5103-74-2	mg/kg	--	--	--	--	--	--	--	--
Total DDT	T-DDT	mg/kg	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

		Location	PERIM-2-POST	PERIM-2-PRE	PERIM-3-POST	PERIM-3-PRE	PERIM-4-POST	PERIM-4-PRE	PERIM-5-POST	PERIM-5-PRE
		Date	05/12/2014	11/22/2013	05/12/2014	11/22/2013	05/12/2014	11/22/2013	05/12/2014	11/22/2013
		Sample	SG-PERIM-2-POST	SG-PERIM-2-PRE	SG-PERIM-3-POST	SG-PERIM-3-PRE	SG-PERIM-4-POST	SG-PERIM-4-PRE	SG-PERIM-5-POST	SG-PERIM-5-PRE
		Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Analyte	**CAS_RN**	**Unit**								
2,4,5-T	93-76-5	mg/kg	--	--	--	--	--	--	--	--
2,4-D	94-75-7	mg/kg	--	--	--	--	--	--	--	--
2,4-DB	94-82-6	mg/kg	--	--	--	--	--	--	--	--
Dalapon	75-99-0	mg/kg	--	--	--	--	--	--	--	--
Dicamba	1918-00-9	mg/kg	--	--	--	--	--	--	--	--
Dichloroprop	120-36-5	mg/kg	--	--	--	--	--	--	--	--
Dinoseb	88-85-7	mg/kg	--	--	--	--	--	--	--	--
MCPA	94-74-6	mg/kg	--	--	--	--	--	--	--	--
MCPP	93-65-2	mg/kg	--	--	--	--	--	--	--	--
Silvex	93-72-1	mg/kg	--	--	--	--	--	--	--	--
Dioxins/Furans										
Total Dioxin/Furan TEQ (ND = 1/2 RDL)	DF-TEQ-1/2U	ng/kg	**4.12 J**	**54.8 J**	**1.2 J**	**2.4 J**	**1.62 J**	**2.35 J**	**1.3 J**	**6.55 J**
2,3,7,8-TCDD	1746-01-6	mg/kg	< 0.000000409 U	**0.00000184**	< 0.000000394 U	< 0.000000448 U	< 0.000000478 U	< 0.000000333 U	< 0.000000424 U	< 0.000000266 U
1,2,3,7,8-PeCDD	40321-76-4	mg/kg	< 0.00000114 U	**0.00000532**	< 0.000000641 U	< 0.00000119 U	< 0.00000072 U	< 0.000000659 U	< 0.000000682 U	**0.00000111 J**
1,2,3,4,7,8-HxCDD	39227-28-6	mg/kg	< 0.00000165 U	**0.00000367 J**	< 0.00000125 U	< 0.00000111 U	< 0.00000116 U	< 0.00000109 U	< 0.000000914 U	**0.00000147 J**
1,2,3,6,7,8-HxCDD	57653-85-7	mg/kg	**0.00000435 J**	**0.00000909**	< 0.00000121 U	**0.00000194 J**	< 0.00000127 U	**0.00000234 J**	< 0.000000962 U	**0.00000518**
1,2,3,7,8,9-HxCDD	19408-74-3	mg/kg	**0.0000042 J**	**0.00000639**	< 0.00000124 U	< 0.00000117 U	< 0.00000123 U	**0.00000149 J**	< 0.000000951 U	**0.00000292 J**
1,2,3,4,6,7,8-HpCDD	35822-46-9	mg/kg	**0.000105**	**0.000095**	**0.0000178**	**0.0000512**	**0.0000392**	**0.0000691**	**0.0000238**	**0.000184**
OCDD	3268-87-9	mg/kg	**0.000826**	**0.000562 J**	**0.000124**	**0.000723 J**	**0.000315**	**0.00052 J**	**0.00016**	**0.00172 J**
Total TCDD	41903-57-5	mg/kg	**0.00000361**	**0.0000316 J**	< 0.000000394 U	< 0.000000448 U	< 0.000000478 U	< 0.000000333 U	< 0.000000424 U	**0.0000163 J**
Total PeCDD	36088-22-9	mg/kg	**0.0000487 J**	**0.0000682 J**	< 0.000000641 U	< 0.00000119 U	< 0.00000072 U	< 0.000000659 U	< 0.000000682 U	**0.0000716 J**
Total HxCDD	34465-46-8	mg/kg	**0.0000368**	**0.0000976**	**0.00000513**	**0.0000141**	**0.00000851**	**0.0000189**	**0.00000792**	**0.0000467**
Total HpCDD	37871-00-4	mg/kg	**0.000244**	**0.000214**	**0.0000402**	**0.000121**	**0.0000877**	**0.00016**	**0.000056**	**0.000485**
2,3,7,8-TCDF	51207-31-9	mg/kg	**0.0000043 J**	**0.00000194**	< 0.000000432 U	< 0.000000429 U	< 0.000000417 U	< 0.000000391 U	< 0.000000427 U	< 0.000000367 U
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	< 0.000000636 U	**0.00000322 J**	< 0.000000423 U	< 0.000000834 U	< 0.000000452 U	< 0.000000741 U	< 0.000000405 U	**0.000000727 J**
2,3,4,7,8-PeCDF	57117-31-4	mg/kg	**0.00000096 J**	**0.000104**	< 0.000000403 U	< 0.000000841 U	< 0.00000045 U	< 0.000000703 U	< 0.000000393 U	**0.00000218 J**
1,2,3,4,7,8-HxCDF	70648-26-9	mg/kg	**0.00000387 J**	**0.0000682**	< 0.00000064 U	< 0.00000114 U	**0.000000883 J**	< 0.0000018 U	**0.000000853 J**	**0.00000487 J**
1,2,3,6,7,8-HxCDF	57117-44-9	mg/kg	< 0.000000863 U	**0.0000131**	< 0.000000602 U	< 0.00000119 U	< 0.000000487 U	**0.000000784 J**	< 0.000000513 U	**0.00000127 J**
1,2,3,7,8,9-HxCDF	72918-21-9	mg/kg	< 0.00000137 U	**0.00000851**	< 0.00000103 U	< 0.00000182 U	< 0.000000763 U	< 0.000000433 U	< 0.000000764 U	< 0.00000118 U
2,3,4,6,7,8-HxCDF	60851-34-5	mg/kg	< 0.000000974 U	**0.000038**	< 0.000000714 U	< 0.00000128 U	< 0.000000577 U	**0.00000102 J**	< 0.000000569 U	**0.00000184 J**
1,2,3,4,6,7,8-HpCDF	67562-39-4	mg/kg	**0.0000195**	**0.0000277**	**0.00000341 J**	**0.00000983**	**0.00000658**	**0.0000124**	**0.00000471 J**	**0.000037**
1,2,3,4,7,8,9-HpCDF	55673-89-7	mg/kg	< 0.00000191 U	**0.00000692**	< 0.000000656 U	< 0.00000143 U	< 0.000000606 U	< 0.0000011 U	< 0.000000758 U	**0.0000024 J**
OCDF	39001-02-0	mg/kg	**0.0000576**	**0.0000557**	**0.00000792 J**	**0.0000392**	**0.0000227**	**0.0000539**	**0.0000128**	**0.000161**
Total TCDF	30402-14-3	mg/kg	**0.0000223 J**	**0.00653 J**	**0.00000159**	**0.00000642**	**0.00000325**	**0.00000446**	**0.00000486**	**0.0000229 J**
Total PeCDF	30402-15-4	mg/kg	**0.0000224 J**	**0.00266 J**	**0.00000222**	**0.0000073**	**0.00000452**	**0.00000835**	**0.00000583**	**0.000032 J**
Total HxCDF	55684-94-1	mg/kg	**0.000036**	**0.000604 J**	**0.0000035 J**	**0.000016 J**	**0.00000962**	**0.0000223 J**	**0.00000925 J**	**0.0000552**
Total HpCDF	38998-75-3	mg/kg	**0.0000618**	**0.000095**	**0.00000928**	**0.0000367**	**0.0000217**	**0.0000529**	**0.000149**	**0.000179**
Organometallic										
Tributyltin Ion	36643-28-4	ug/L	--	--	--	--	--	--	--	--
Polychlorinated Biphenyl Aroclors										
Aroclor 1016	12674-11-2	mg/kg	< 0.0080 UJ	< 0.020 U	< 0.0040 UJ	< 0.020 U	< 0.0040 UJ	< 0.020 U	< 0.0040 UJ	< 0.040 U
Aroclor 1221	11104-28-2	mg/kg	< 0.0080 U	< 0.020 U	< 0.0040 U	< 0.020 U	< 0.0040 U	< 0.020 U	< 0.0040 U	< 0.040 U
Aroclor 1232	11141-16-5	mg/kg	< 0.0080 U	< 0.020 U	< 0.0040 U	< 0.020 U	< 0.0040 U	< 0.020 U	< 0.0040 U	< 0.040 U
Aroclor 1242	53469-21-9	mg/kg	< 0.0080 U	< 0.020 U	< 0.0040 U	< 0.020 U	< 0.0040 U	< 0.020 U	< 0.0040 U	< 0.040 U
Aroclor 1248	12672-29-6	mg/kg	< 0.0080 U	< 0.020 U	< 0.0040 U	< 0.020 U	< 0.0040 U	< 0.020 U	< 0.0040 U	< 0.040 U
Aroclor 1254	11097-69-1	mg/kg	**0.044**	< 0.020 U	**0.0076**	< 0.020 U	**0.025**	< 0.020 U	**0.02**	< 0.040 U
Aroclor 1260	11096-82-5	mg/kg	**0.03**	**0.05**	**0.0055**	**0.029**	**0.021**	**0.054**	**0.016**	**0.16**
Aroclor 1262	37324-23-5	mg/kg	--	--	--	--	--	--	--	--
Aroclor 1268	11100-14-4	mg/kg	--	--	--	--	--	--	--	--
Total PCBs (Sum of Aroclors)	T-PCBs	mg/kg	**0.074**	**0.05**	**0.0131**	**0.029**	**0.046**	**0.054**	**0.036**	**0.16**
Polychlorinated Biphenyl Congeners										
PCB 105	32598-14-4	mg/kg	--	--	--	--	--	--	--	--
PCB 110	38380-03-9	mg/kg	--	--	--	--	--	--	--	--
PCB 114	74472-37-0	mg/kg	--	--	--	--	--	--	--	--
PCB 119	56558-17-9	mg/kg	--	--	--	--	--	--	--	--

Table D.11. Historical Sediment Sample Analytical Results

Project No. 190293, South Park Marina, Seattle, Washington

Analyte	CAS_RN	Unit	PERIM-2-POST 05/12/2014 SG-PERIM-2-POST 0 - 10 cm	PERIM-2-PRE 11/22/2013 SG-PERIM-2-PRE 0 - 10 cm	PERIM-3-POST 05/12/2014 SG-PERIM-3-POST 0 - 10 cm	PERIM-3-PRE 11/22/2013 SG-PERIM-3-PRE 0 - 10 cm	PERIM-4-POST 05/12/2014 SG-PERIM-4-POST 0 - 10 cm	PERIM-4-PRE 11/22/2013 SG-PERIM-4-PRE 0 - 10 cm	PERIM-5-POST 05/12/2014 SG-PERIM-5-POST 0 - 10 cm	PERIM-5-PRE 11/22/2013 SG-PERIM-5-PRE 0 - 10 cm
PCB 123	65510-44-3	mg/kg	--	--	--	--	--	--	--	--
PCB 126	57465-28-8	mg/kg	--	--	--	--	--	--	--	--
PCB 151	52663-63-5	mg/kg	--	--	--	--	--	--	--	--
PCB 153	35065-27-1	mg/kg	--	--	--	--	--	--	--	--
PCB 156	38380-08-4	mg/kg	--	--	--	--	--	--	--	--
PCB 157	69782-90-7	mg/kg	--	--	--	--	--	--	--	--
PCB 167	52663-72-6	mg/kg	--	--	--	--	--	--	--	--
PCB 168	59291-65-5	mg/kg	--	--	--	--	--	--	--	--
PCB 169	32774-16-6	mg/kg	--	--	--	--	--	--	--	--
PCB 170	35065-30-6	mg/kg	--	--	--	--	--	--	--	--
PCB 177	52663-70-4	mg/kg	--	--	--	--	--	--	--	--
PCB 18	37680-65-2	mg/kg	--	--	--	--	--	--	--	--
PCB 180	35065-29-3	mg/kg	--	--	--	--	--	--	--	--
PCB 183	52663-69-1	mg/kg	--	--	--	--	--	--	--	--
PCB 189	39635-31-9	mg/kg	--	--	--	--	--	--	--	--
PCB 194	35694-08-7	mg/kg	--	--	--	--	--	--	--	--
PCB 195	52663-78-2	mg/kg	--	--	--	--	--	--	--	--
PCB 201	40186-71-8	mg/kg	--	--	--	--	--	--	--	--
PCB 206	40186-72-9	mg/kg	--	--	--	--	--	--	--	--
PCB 209	2051-24-3	mg/kg	--	--	--	--	--	--	--	--
PCB 28	7012-37-5	mg/kg	--	--	--	--	--	--	--	--
PCB 37	38444-90-5	mg/kg	--	--	--	--	--	--	--	--
PCB 44	41464-39-5	mg/kg	--	--	--	--	--	--	--	--
PCB 74	32690-93-0	mg/kg	--	--	--	--	--	--	--	--
PCB 77	32598-13-3	mg/kg	--	--	--	--	--	--	--	--
PCB 81	70362-50-4	mg/kg	--	--	--	--	--	--	--	--
PCB 99	38380-01-7	mg/kg	--	--	--	--	--	--	--	--
Total PCB Congeners	T-PCBCong	mg/kg	--	--	--	--	--	--	--	--
Conventionals										
Ammonia as Nitrogen	7664-41-7	mg/kg	--	--	--	--	--	--	--	--
Total Organic Carbon	TOC	%	**4.31**	**1.17**	**0.871**	**1.28**	**1.22**	**1.33**	**1.38**	**2.3**
Total Solids	TS	%	--	--	--	--	--	--	--	--
Total Volatile Solids	TVS	%	--	--	--	--	--	--	--	--
Particle Size										
Gravel	Phisize <-1	%	--	--	--	--	--	--	--	--
PhiSize > 10	PhiSize >10	%	--	--	--	--	--	--	--	--
PhiSize 0 to 1 Coarse Sand	PhiSize 0-1	%	--	--	--	--	--	--	--	--
PhiSize -1 to 0 Very Coarse Sand	PhiSize -1-0	%	--	--	--	--	--	--	--	--
PhiSize 1 to 2 Medium Sand	PhiSize 1-2	%	--	--	--	--	--	--	--	--
PhiSize 2 to 3 Fine Sand	PhiSize 2-3	%	--	--	--	--	--	--	--	--
PhiSize 3 to 4 Very Fine Sand	PhiSize 3-4	%	--	--	--	--	--	--	--	--
PhiSize 4 To 5 Coarse Silt	PhiSize 4-5	%	--	--	--	--	--	--	--	--
PhiSize 5 to 6 Medium Silt	PhiSize 5-6	%	--	--	--	--	--	--	--	--
PhiSize 6 to 7 Fine Silt	PhiSize 6-7	%	--	--	--	--	--	--	--	--
PhiSize 7 to 8 Very Fine Silt	PhiSize 7-8	%	--	--	--	--	--	--	--	--
PhiSize 8 to 9 Clay	PhiSize 8-9	%	--	--	--	--	--	--	--	--
PhiSize 9 to 10 Clay	PhiSize 9-10	%	--	--	--	--	--	--	--	--

Notes:

Bold - detected

U - Analyte not detected at or above Reporting Limit (RL) shown

J - Result value estimated

UJ - Analyte not detected and the Reporting Limit (RL) is an estimate

cm - centimeters

APPENDIX E

Sampling and Analysis Plan and Quality Assurance Project Plan for Phase 1 Investigation

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E.1 Field Forms

E.1. Introduction

This Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) has been prepared for the South Park Marina Property (SPM Property or the Site) as Appendix E to the Remedial Investigation (RI) Work Plan (Work Plan) on behalf of the Potentially Liable Parties (PLP) Group, which consists of South Park Marina Limited Partnership (SPM), the Port of Seattle (Port), and the City of Seattle (City). This document meets the requirements of Agreed Order No. DE 16185 (the Agreed Order) between the Washington State Department of Ecology (Ecology), and South Park Marina Limited Partnership (SPM), the Port of Seattle (Port), and the City of Seattle (City), herein collectively referred to as the Potentially Liable Party (PLP) Group.

The purpose of this SAP/QAPP is to ensure that field sample collection, handling, and laboratory analysis conducted during the Phase 1 RI data collection program will generate data to meet project-specific data quality objectives (DQOs) defined in Section 8 of this Work Plan, in accordance with the Model Toxics Control Act (MTCA) requirements (Washington Administrative Code [WAC] 173-340-350). The SAP identifies the proposed number and location of environmental samples and defines field protocols for sample collection. The QAPP defines analytical laboratory methods and field and laboratory quality assurance (QA) protocols for the samples' chemical analysis. It is the responsibility of the Aspect Consulting, LLC (Aspect) personnel and subcontracted analytical laboratory and data validation personnel performing the RI sampling and analysis activities to adhere to the requirements of the SAP/QAPP. This SAP/QAPP may be updated if needed for the Phase 2 RI data collection program identified in the Work Plan.

The Phase 1 field scope includes refining the characterization of the Former A& B Barrel Area; investigating five potential source areas including the historical boat manufacturing building and area, the former gasoline service station and current auto repair shop area, the former radiator repair shop, the former and current boat maintenance areas, and the T-117 property line; and evaluating potential source control pathways to the Lower Duwamish Waterway (LDW). To investigate these areas, the following activities have been planned for Phase 1 site characterization:

- Wet-weather site inspection.
- Advancement of 21 soil borings extending to depths of between 20 and 30 feet below ground surface (bgs) and two hand auger borings extending to 3 feet bgs.
- Collection of at least 92 discreet soil samples during advancement of the 23 subsurface explorations. Laboratory analysis of select soil samples for physical properties and chemicals identified as potential Site contaminants.
- Completion of 12 soil borings as permanent groundwater monitoring wells.
- Development and sampling of the groundwater monitoring wells. Laboratory analysis of groundwater samples for potential Site contaminants.
- Collection of stormwater and catch basin solids samples for laboratory analysis.

- Inspection for potentially erodible soils along the riverbank and sampling of erodible soils if present.
- Evaluation of contaminant migration pathways to the LDW.

E.2. Sampling and Analysis Plan

Field investigation and sampling procedures to be followed during Phase 1 RI data collection are described in the following sections. Specific sample locations and chemical analyses are summarized in Tables E.1 (soil, catch basin solids, and potentially erodible bank soils) and E.2 (groundwater and stormwater). The rationale for the sampling program is described in Section 9 of the Work Plan. Figure E.1 depicts locations of the Phase 1 explorations to be completed. Explorations will be field-located with hand-held global positioning system (GPS) equipment using the survey coordinates of proposed explorations included in Tables E.1 and E.3. Explorations may be adjusted in the field based on the presence of utilities, structures, or other obstructions that may be encountered.

E.2.1. Pre-Sampling Activities

There are a number of field-related activities that must be accomplished prior to initiating the drilling and sample collection. These activities include:

- Conduct a wet-weather site walk to observe stormwater movement on the property and adjoining streets, map stormwater flow directions, and observe the shoreline bank for the presence of erodible soils.
- Field locating borings and surveying drilling locations with a hand-held GPS unit.
- Inspect the site for surface indications of sewer/septic features not already presented on existing utility maps; survey the locations with a hand-held GPS unit.
- Public and private utility locating on the SPM property.
- Conduct a camera survey of the two floor drains in Rick's Master Marine shop to determine if they are connected to the sanitary sewer system.

All of these activities will be documented in field notes and photographs.

E.2.2. Soil Sampling

Soil sampling for the Phase 1 RI will be conducted using a combination of soil borings and hand auger sampling to address existing data gaps related to the nature and extent of soil contamination at the SPM Property. For the purposes of this investigation, surface soils are considered to be those collected between 0 and 1-foot bgs, where 0 feet ground surface is the top of soil below any paving, pavement gravel base course, or gravel surfacing. Subsurface soils are considered those collected deeper than 1-foot bgs. The specific soil sample locations and chemical analyses are provided in Table E.1, with further discussion provided in Section 9.1 of the Work Plan. The planned depth intervals for soil samples at each location are provided in Table E.2. The following subsections detail the procedures for completing subsurface soil borings and surface soil samples, and for soil sample collection, handling, identification, and sample quality assurance/quality control (QA/QC) applicable to both exploration types. Table E.4 presents a list of containers to be used for sample collection.

E.2.3. Soil Borings

Aspect will subcontract with Holt Services, Inc. (Holt) a Washington-licensed resource protection well driller to complete soil borings in accordance with requirements of Chapter 173-160 WAC. Soil borings will be advanced to depths ranging from 20 to 30 feet bgs using direct-push (i.e., Geoprobe) drilling. If the direct-push drilling encounters refusal on subsurface conditions, the drillers will step out the boring a minimum of three feet and attempt to reach the target depth. If refusal is met at a location three times, and in Aspect’s judgement could be advanced using a hollow-stem auger (HSA) drill rig, then drilling will be switched to HSA methods. If HSA drilling methods are utilized and refusal is still encountered, a minimum of two attempts will be made at each boring location.

Direct push soil borings will be sampled on a continuous basis. Each boring will be advanced to collect samples at depth intervals specified in Table E.1 and as determined by field screening. Default sampling intervals for each soil boring are shown on Table E.1 and will be adjusted based on field observations as noted in the table. The direct-push drilling method provides continuous soil cores, depending on soil recovery, returned within disposable 1.5-inch-diameter plastic liners (4- or 5-foot lengths). The liners are sliced longitudinally and opened to access the soil core.

If HSA drilling is conducted, a decontaminated 18-inch-long split-spoon sampler will be used to collect relatively undisturbed soil at the bottom of the borehole at 2.5-foot depth intervals. The sampler will be driven using an appropriate hammer weight and drop height for the equipment used.

Each soil boring not completed as a monitoring well will be decommissioned by pressurized grouting or hydrated bentonite chips, in accordance with requirements of Chapter 173-160 WAC. Borings in the alluvial aquifer will be decommissioned by pressurized grout, while shallow borings in the fill will be decommissioned using hydrated bentonite chips. Decommissioning notes will be documented on boring logs, which will be included in the RI. For borings to be completed as groundwater monitoring wells, the installation procedure is described in Section E.2.4.

At boring locations where field screening indicates the potential for contamination in the Fill Unit, a conductor casing will be seated into the Silt Unit to minimize the potential for carry-down into the Alluvial Unit. The procedures for field screening potential contamination are outlined in Section E.3.2.3.2, and procedures for conductor casing methods are further outlined in Section E.3.2.1. below.

E.2.3.1. Drilling Adjacent to A&B Barrel Pond

Drilling for borings SB-26, MW-4, and MW-5, located immediately adjacent to the former A&B Barrel Pond (Figure E.1), will be conducted using dual-tube or conductor casing methods to minimize potential for carry-down of contaminants. Direct-push drilling will be conducted using a dual-tube drilling system in which the outer core barrel remains in place while extracting soil cores or groundwater drive point screens. The outer core barrel typically consists of 3- or 4-inch outer diameter hollow drill rods. In the vicinity of the former A&B Barrel Pond, the Silt Unit is expected to be present at approximately 10 feet bgs. Therefore, sampling from 8 feet bgs will proceed in 2-foot intervals to ensure the Silt Unit is not fully penetrated. Once the top of the Silt Unit has been identified, the outer core barrel will be advanced approximately 1 foot into the Silt Unit. Bentonite chips will be placed in the outer core barrel and hydrated to ensure a proper seal is formed. Once the outer core barrel is sealed, standard direct-push drill rods will be advanced within the casing to the planned sampling depth.

If HSA drilling methods are used, a conductor casing will be advanced into the Silt Unit and a layer of bentonite will be placed in the bottom of the casing, prior to advancing the auger through the seal into the underlying Alluvial Sand Unit. Alternatively, a direct-push drill rig could be used to advance the deeper portion of the boring through the interior of an auger advanced into the Silt Unit as the conductor casing. This dual-casing method would also be used in other areas if indications of heavily contaminated soils are observed in the Fill Unit.

E.2.3.2. Hand Auger Soil Explorations

At the two locations (HA-1 and HA-2) along the southern property boundary shown on Figure E.1, explorations from 0- to 3-feet depths will be completed using a hand auger. At each hand auger location, soil cuttings will be field screened continuously during hand auger advancement in accordance with the procedures outlined in Section E.2.1.3 below. Between the ground surface and 1 foot bgs, a discrete sample will be collected in accordance with EPA Method 5035 for volatile organic compound (VOC) analysis as further described below. A total of two representative soil samples will be collected from the 0- to 1-foot depth interval (excluding any paving, pavement base course, or gravel surfacing) and the 2- to 3-foot depth interval for additional analysis of nonvolatile compounds, as described below.

It should be noted that hand auger sampling was chosen for these locations due to access and overhead utility limitations. Further evaluation of the utilities present in this area, such as underground water and stormwater lines, may preclude sample collection from the exact locations marked on Figure E.1 and shown in Table E.1. Additionally, the fill material in those locations may not be amenable to hand augering due to the presence of large gravels or sloughing of noncohesive soils. If refusal is met due to the presence of a subsurface obstruction, the location will be abandoned using bentonite chips, and up to two additional nearby locations will attempted for hand auger sampling. Likewise, if sloughing of the borehole prevents advancement of the hand auger borehole, up to two additional nearby locations will be attempted. All borings attempted via hand auger will be backfilled with hydrated bentonite chips and covered with up to 3 inches of surface soil.

E.2.3.3. Logging, Field Screening, and Soil Sample Collection

E.2.3.3.1. Logging and Soil Descriptions

A qualified individual with field logging experience, under the direction of a Licensed Geologist (LG), will oversee the drilling activities, conduct all soil sampling, and prepare a geologic log for each of the explorations completed. For the purposes of this SAP/QAPP, a qualified individual for soil logging is defined as an LG, licensed engineer (PE), or a geologist- or engineer-in training (GIT/EIT) under the direction of an LG. The qualified individual will visually classify the soils in accordance with ASTM International (ASTM) Method D 2488 and record soil descriptions, amount of soil recovery, field screening results, and other relevant details (e.g., staining, debris, odors, etc.) on the boring log form (Attachment 1). If samples are collected for chemical analysis, the sample ID and depth will also be recorded on the log.

E.2.3.3.2. Field Screening

The qualified individual will conduct field screening of soil samples that includes a visual examination to note sheens and staining, olfactory observations, volatile organic vapor screening, and water sheen testing, as described below. Field screening observations will be documented on the boring log form.

Chemical odors and their relative magnitude will be noted qualitatively using the descriptions “slight, moderate, and strong.” Odors may be qualitatively described if they possess a distinct scent (e.g., “petroleum-like”).

Volatile organic vapor screening of soil cores from borings will be conducted at multiple depths using a 10.6 electron volt photoionization detector (PID) to monitor for the presence of VOCs. A minimum of one PID reading will be recorded in the vadose zone and for each soil type within each soil core, and additional readings will be recorded where elevated PID readings (i.e., greater than 10 parts per million [ppm] above background) are noted. Soil removed during hand auger advancement will also be screened using the PID as noted above. For the purposes of field screening, the following limits are set for determining elevated PID readings:

- Greater than 10 ppm above background – Additional readings will be collected from within the same area of the soil core to ensure that a representative sample was screened.
- Greater than 40 ppm above background – These concentrations could indicate potential contamination. Additional soil samples will be collected and analyzed for potential Site contaminants. Additionally, if these readings are observed in the Fill Unit, care will be taken to set a conductor casing in the Silt Unit as detailed in Section E.3.2.1.1.

Soil samples will be field-screened for presence of petroleum using a sheen test: placing a small aliquot of soil into a clean, disposable container, or black-plastic gold pan that is filled with water, observe the water surface for signs of sheen, and gently agitate the soil and record observations. Care will be taken to differentiate sheen created by petroleum (i.e., iridescent swirl of colors, coalesces after being disturbed) versus other organic matter (i.e., angular “waxy” sheets that do not coalesce after being disturbed), and recording the information appropriately. The relative magnitude of sheens will be logged during field screening using the following qualifiers:

- Slight – only light colors; irregular spread; does not cover entire water surface
- Moderate – some colors; covers majority of water surface
- Heavy – pronounced colors, rapid spread, covers entire water surface

E.2.3.3.3. Sample Collection

Up to four soil samples will be collected from each boring: two for chemical analysis, and two to be archived in case additional analysis is warranted. Generally, the planned sample depths are based on the location of each boring relative to the historical and current uses of the SPM Property and the objective of the investigation in that area. The planned interval for sample collection and analysis in each boring is shown in Table E.5 below. However, if borings contain field indications of contamination, additional samples may be collected and/or additional analyses may be run as indicated in the table.

Table E.5. Targeted Sample Selection Matrix

Investigation Area	**Former A&B Barrel Area**	**Historical Boat Manufacturing**	**Former Gasoline Service Station / Former Radiator Shop / Current Repair Shop**	**Shoreline**	**Former / Current Boat Maintenance**	**T-117 Property Line**
Sample Number	SB-26, MW-04, MW-05, MW-06, & MW-07	SB-27, SB-28, & MW-08	SB-29, SB-30, SB-31, SB-34, MW-12, & MW-13	MW-09, MW-10, & MW-11	SB-32, SB-33, MW-14, & MW-15	HA-01 & HA-02
1 (analysis)	0- to 1-foot depth bgs	0- to 1-foot depth bgs	0- to 1-foot depth bgs	0- to 1-foot depth bgs	0- to 1-foot depth bgs	0- to 1-foot depth bgs
2 (analysis)	1-foot zone straddling water table	1-foot zone straddling water table	3- to 5-foot depth bgs	1-foot zone straddling water table	3- to 5-foot depth bgs	2- to 3-foot depth bgs
3 (archival)	3- to 5-foot depth bgs	3- to 5-foot depth bgs	1-foot zone straddling water table	3- to 5-foot depth bgs	1-foot zone straddling water table	1- to 2-foot depth bgs
4 (archival)	Bottom of Boring	Bottom of boring	Bottom of boring	Bottom of boring	Bottom of boring	N/A

All soil samples to be submitted for gasoline-range total petroleum hydrocarbons (TPH) and VOC analyses will be collected in accordance with U.S. Environmental Protection Agency (EPA) Method 5035A. The soil aliquot for gasoline-range total petroleum hydrocarbons (TPH) and VOC analyses will be collected from the undisturbed soil sample core using a laboratory-supplied modified disposable plastic syringe as required by EPA Method 5035A and placed in pre-weighed laboratory-supplied vials.

For all other analyses, the soil samples will be removed from the sampler using a clean, stainless steel spoon and placed into certified-clean jars supplied by the analytical laboratory. Gravel-sized material greater than approximately 0.5 inch will be removed from the sample.

Table E.1 lists the chemical analyses for each soil sample to be collected during the Phase 1 RI. QC soil samples (e.g., trip blanks) will be collected at the respective frequencies prescribed in Section E.3.6. If for a specific drill interval (i.e., a 5-foot interval via direct-push or 18-inch interval via HSA), sample recovery is poor, insufficient volume may be present to collect enough material for all of the planned analyses. If there is insufficient volume to fill at least one sample jar, no samples will be collected, and the boring will be re-drilled. In case of insufficient sample volume to analyze for all constituents, the analyte list will be prioritized as shown in Table E.6 for each investigation area with instructions documented on the chain of custody form. The rationale for prioritization was developed by prioritizing known key contaminants based on knowledge of the historical and current uses of each investigation area. For logistical purposes due to the EPA 5035 method, sample volume for gasoline-range TPH and VOCs will be collected first in every investigation area.

E.2.4. Erodible Bank Soils

A site walk during a rain event will be conducted to confirm whether erodible bank soils are present at the SPM property. Erodible bank soils are defined as those soils along the SPM Property river banks above the mean higher-high water (MHHW) that could be eroded into the river by overland flow of stormwater and/or mass wasting (i.e., unstable slope angles susceptible to sloughing and sliding induced by gravity) and which are not protected by an engineered system such as rip rap or Ecology blocks. Condition of the riverbank will be documented during the site visit with photographs and field notes.

If erodible bank soils are observed, then one or more soil samples will be collected as follows:

- Using a decontaminated, stainless-steel spoon, soil will be collected from the bank soil surface (from surface to as deep as 1-foot) and placed in a stainless-steel bowl.
- Particles and organic debris larger than approximately 0.5-inch will be removed from the soil before sampling. In addition, the sample will be described using the USCS classification system and field screened by qualified personnel in accordance with the procedures for soil samples outlined in Section E.2.1.3.
- An aliquot of soil for gasoline-range TPH and VOC analyses will be collected from the material in the bowl using a laboratory-supplied, disposable, plastic syringe in accordance with EPA Method 5035A and placed in pre-weighed laboratory-supplied vials.

- Remaining soil will be removed from the stainless-steel bowl using a clean, stainless steel spoon and placed into certified-clean jars supplied by the analytical laboratory.

Table E.1 lists the chemical analyses for each soil sample to be collected during the Phase 1 RI. Due to the armored nature of the SPM shoreline, there is a possibility that no erodible soils are present. In case of insufficient sample volume to analyze for all constituents, the analyte list will be prioritized as described in Section E.2.3.3.3 and in Table E.6.

E.2.5. Catch Basin Solids Sampling

One catch basin solids sample will be collected from each of three catch basins: CB-2, CB-6, and SWRX-Pre (the pump vault downstream from CB-9). These sampling locations were selected to represent different property subbasins and potential contributions to the two active property outfalls to the river (UOF-1 and SPM Outfall).

Prior to collecting catch basin solids samples, field staff will confirm with SPM operations that the catch basins have not been cleaned within the previous 6 months. Each catch basin solids sample will be collected and handled in accordance with the procedures described below using equipment decontaminated between each sample location:

- Solids samples will be collected from material accumulated in the sump and/or pipes at each catch basin. A telescoping extension pole with a stainless-steel cup attachment will be utilized for scooping solids material. If entering catch basins is required to collect samples, confined space entry (CSE) procedures will be followed by a trained individual as prescribed in OSHA 1910.146. During CSE, solids materials will be collected by hand using stainless steel spoons and scoops. Sample material from each station will be placed into a stainless-steel bowl for sampling.
- Particles and organic debris larger than approximately 0.5-inch will be noted in field documentation and then removed from the material before sampling. In addition, the sample color, odor, texture, VOC content and presence of sheen will be noted based on visual, olfactory, and tactile observations.
- An aliquot of solids material for gasoline-range TPH and VOC analyses will be collected from the material in the bowl using a laboratory-supplied, disposable, plastic syringe in accordance with EPA Method 5035A and placed in pre-weighed laboratory-supplied vials. If sampling conditions do not allow sample collection using EPA Method 5035A techniques, alternative collection techniques (e.g., a packed glass jar) will be used[1].

[1] Catch basin solids are continuously exposed to the atmosphere, and thus volatilization may have already occurred. This condition is consistent with the lack of VOCs detected in catch basin solid samples collected by Ecology and also is a consideration in why these analytes are lowest priority if insufficient sample volume is available.

- Solids material will then be homogenized in the bowl using a decontaminated stainless-steel spoon and placed into certified-clean jars supplied by the analytical laboratory.

Catch basin solids samples will be analyzed for the chemical analyses summarized in Table E.1. Due to the catch basins' small size and periodic cleaning, there is a possibility that insufficient sample material will be present to analyze for all proposed analyte groups. In case of insufficient sample volume to analyze for all constituents, the analyte list will be prioritized as listed in Table E.6 with instructions documented on the chain of custody form. The rationale for prioritization was developed based on knowledge of the historical and current uses of the property with emphasis on the known key contaminants that potentially may contribute to contaminant loading in the LDW via stormwater discharge. For sampling logistical purposes due to the EPA 5035 method, gasoline-range TPH and VOCs will be collected first from every investigation area.

E.2.6. Monitoring Well Installation and Development

E.2.6.1. Monitoring Well Installation

Monitoring wells will be constructed by Holt Services Inc., a Washington state-licensed, resource protection well driller, in accordance with Chapter 173-160 WAC. A qualified individual with field experience will oversee and document installation of each monitoring well, under the direction of a Licensed Geologist in Washington State. Documentation will completion of an As-Built Well Completion Diagram and construction details.

As described in E.2.1, soil samples will be logged continuously (or at 2.5-foot intervals if using HSA) from the ground surface to the maximum depth of each boring. During soil logging, the following intervals of interest will be carefully noted:

- The apparent depth to water (if present) in the Fill Unit
- The depths to the top and the bottom of the Silt Unit
- The apparent depth to water in the Alluvial Unit

A soil sample representative of the screen interval will be collected, if enough material is available, and archived for potential future grain size analysis, if needed. Wells will only be installed in the Fill Unit if at least 2 feet of saturation is observed. If a well is not installed in the Fill Unit, one will be installed in the Alluvial Unit, assuming an aquitard of some kind is present separating fill from underlying alluvial sands. If these conditions are not present, the well will be installed across the water table or at a depth interval deemed appropriate by the field geologist and commensurate with the criteria outlined below. New monitoring wells will be constructed with 2-inch-diameter threaded Schedule 40 PVC slotted screen and blank casing. If field conditions prevent driving larger-diameter casing to install the 2-inch casing, ¾-inch well screens may be used. Well screens will be 5-foot-long 0.010-inch (10 slot) slotted screen with an artificial filter pack consisting of 20/40 silica sand. The following steps will determine the exact screen interval:

- If greater than 5 feet of saturated zone is present in the Fill Unit, the top of the screen will be placed 1.5 feet above the water table and 3.5 feet below to allow for seasonal fluctuations.
- If less than 5 feet of but greater than 2 feet of groundwater saturation is present in the Fill Unit at the time of drilling, the 5-foot screen will be placed within the Fill Unit directly on top of the Silt Unit.
- If 2 feet or more of saturation is not present in the Fill Unit, the screen will be placed in the Alluvial Sand Unit at a depth interval such that a minimum of 2 feet of bentonite annular seal is present between the top of the screen's filter pack and the top of the Silt Unit.
- If there is an unsaturated zone in the Alluvial Unit greater than 5 feet thick, the top of the screen will be placed approximately 2 feet above the water table to allow for seasonal fluctuations.

An annular seal consisting of bentonite chips will be placed above the filter pack. A concrete surface seal will be set at grade for each new monitoring well. The finished monitoring wells will be protected with steel flush-mount monument (truck rated), embedded in the concrete surface seal. The top of the monitoring well casing will be marked (through either a notch or other permanent mark) to indicate the location from which depth-to-water measurements will be collected and for surveying top of casing elevation.

E.2.6.2. Monitoring Well Development

Following installation, each new monitoring well will be developed to remove fine-grained material from inside the well casing and filter pack to the extent practical, and to improve hydraulic communication between the well screen and the surrounding water-bearing formation. Well development will be performed by means of a surge block and a 12-volt submersible pump. During development, the surge block will be gently surged through the entire length of the well screen. Each well will be developed until visual turbidity is reduced to minimal levels (below 10 nephelometric turbidity units [NTU] if practical) or until a maximum of 15 casing volumes of water has been removed. Well development will be recorded on the forms included in Attachment A.

E.2.7. Groundwater Sampling Procedures

Prior to sampling, a down-hole Van Essen Instruments, CTD-Diver® data-logger capable of measuring pressure, temperature, and conductivity will be installed in monitoring wells MW-04, MW-07, MW-09, MW-11, MW-12, and MW-14 for a minimum of 72 hours to determine the effects of tidal influence on groundwater conductivity (surrogate for salinity) at the SPM Property. The data collected by the data-loggers will be used to calculate the optimal window for collecting groundwater samples when conductivity measurements are at their lowest. The lowest conductivity and water level measurements at each well will be correlated with the low tide recorded at the National Oceanographic and Atmospheric Administration's (NOAA) station number 9447029, which is located approximately 1/2-mile downstream on the LDW. For each well, the average lag time between the tidal minimums observed at the NOAA gauge and the conductivity and water level minimums in each well will be used to determine the optimal timing of future groundwater sampling events. Each well will have a specific lag time relative to low tide/low conductivity, and groundwater sampling will be conducted within a 3-hour window bracketing this specific lag time.

Groundwater samples will be collected from monitoring wells and analyzed as summarized in Table E.3. Table E.4 presents a list of containers to be used for sample collection. Groundwater samples will be collected and handled in accordance with the procedures described below:

- Groundwater sampling at any new or recently developed monitoring wells will occur 1 week after development to allow for equilibration and settling of any suspended solids that may remain inside the well casing.
- Groundwater samples from wells located within 100 feet of the Lower Duwamish Waterway (LDW) shoreline will be sampled within during low-tide during the 3-hour window bracketing the lowest conductivity measured during the conductivity analysis.
- The locking well cap will be removed, and the well will be allowed to equilibrate with atmospheric pressure for at least 15 minutes. Once equilibrated, the depth-to-groundwater will be measured from the surveyed location (marked on the casing with a “V” notch or black mark) to the nearest 0.01 foot using an electronic water level measuring device. If there are indications of light non-aqueous phase liquid (NAPL) during the drilling of the wells, an oil-water interface probe will be used to measure water levels and evaluate the presence of separate-phase product. If separate-phase product is present, the monitoring wells will still be sampled to determine the composition of the NAPL.
- Each monitoring well will be purged at a low-flow rate using a peristaltic pump and new, clean tubing. For all analyses other than PCB congeners, dedicated tubing will consist of polyethylene tubing down well with a short length of silicon tubing through the pump head. For PCB congener groundwater sampling, new tubing will be used at each monitoring well and will consist of non-recycled, thin-walled, flexible copper tubing down well with platinum-cured silicone tubing through the pump head in accordance with the sampling methodology established in Leidos, 2016 and 2017. The tubing intake will be placed just below the center of the saturated section of well screen.
- VOC loss will be minimized by regulating flowrate to prevent the entrainment of air bubbles in the tubing. The flowrate will be adjusted to minimize drawdown; however, a minimum purge flowrate of 100 milliliters per minute (mL/min) will be maintained throughout purging and sampling.
- During well purging, field parameters (temperature, pH, specific electrical conductance, dissolved oxygen [DO], and oxygen reduction potential [ORP]) will be monitored using a YSI meter and flow-through cell, or equivalent. Additionally, turbidity will be recorded using a turbidimeter and the depth-to-water will be recorded during purging. These field parameters and depth-to-water will be recorded at 2- to 5-minute intervals on the groundwater sampling form

(Attachment A) throughout well purging until they stabilize. Stabilization is defined as three successive readings where:

  - o The water level is stable, in accordance to EPA's low-flow groundwater guidance (i.e. water level drawdown is less than 0.33 foot below the initial water level reading),
  - o Temperature varies by less than 0.1 degree Celsius,
  - o Specific conductance varies by less than 3%,
  - o Dissolved oxygen varies by less than 10% (or 0.5 milligrams per liter [mg/L] if the readings are below 1 mg/L),
  - o pH varies by less than 0.1,
  - o ORP varies by less than 10 mV, and
  - o Turbidity varies by less than 10% (or if three consecutive readings are less than 10 NTU).
  - o However, no more than three well casing volumes will be purged prior to groundwater sample collection.

- Samples with a field-measured specific electrical conductance greater than 1,000 microseimens per centimeter (µS/cm) or turbidity greater than 25 NTU will be denoted as such on the chain-of-custody (COC) form, so that the laboratory can employ appropriate sample preparation techniques to avoid analytical interferences for specific analyses (refer to Section E.3.3.2).
- Once purging is complete, the groundwater samples will be collected using the same low-flow rate from the dedicated tubing upstream of the flow-through cell to avoid potential cross-contamination and directly into laboratory-supplied sample containers for analysis of parameters presented in Table E.3.
  - o Samples for dissolved metals analysis will be field filtered using a 0.45-micron filter attached to the discharge end of the dedicated tubing. All other analytes will be unfiltered.
- If the monitoring well is completely dewatered during purging or drawdown is significant even with a 100 mL/min purge rate, the well will be dewatered and samples will be collected when sufficient recharge has occurred to allow all sample containers to be filled. If the well does not recharge sufficiently to fill all the required sample bottles for the analyses identified in Table E.3, the sample bottle filling and analyte list will be prioritized according to Table E.6. In accordance with standard groundwater sampling standard of care, bottles for volatile analytes (e.g., gasoline-range TPH and VOCs) will be collected first.
- QC groundwater samples (e.g., field duplicates, and trip blanks) will be collected at the respective frequencies prescribed in Section E.3.6.1.
- After sample collection is complete, the depth to the bottom of the monitoring well will also be measured to evaluate siltation of the monitoring well. If there are indications of dense NAPL during drilling, an oil-water interface probe will be

used to gauge siltation and whether separate-phase product is present at the bottom of the monitoring well.

- Following sampling, the well cap and monument cap will be secured. Damaged or defective well caps or monuments will be noted and scheduled for replacement, if necessary.

E.2.8. Stormwater Sampling Procedures

Stormwater samples will be collected from SPM drainage structures, including catch basins and the pre-and post-StormwateRx™ treatment system. All samples will be analyzed as summarized in Table E.3. Table E.4 presents a list of containers to be used for sample collection. Stormwater samples will be collected and handled in accordance with the procedures described below:

- Sampling events will be targeted during periods with weather forecasts that predict at least 0.2 inches of rainfall over a minimum of 3 hours and less than 2 inches over a period of 24 hours[2]. In addition, sampling will occur after a 24-hour antecedent dry period (less than 0.1 inch of rainfall) prior to the onset of precipitation.
  - Forecasts from the National Weather Service will be used to track and document weather forecast data leading up to sampling events.
  - Precipitation data will be obtained from the on-Property rain gauge installed and maintained by TIG Environmental.
- Tidal fluctuations in the LDW will not affect stormwater sampling since sampling locations will be from catch basins and other structures on the SPM Property that are above high tide elevation.
- Stormwater samples will be collected as discrete grab samples using a peristaltic pump or an extension pole with a clean sample container attached. Laboratory bottles will be filled directly as much as possible. For samples that require adding a field preservative or need to not have headspace left in the bottle, a clean HPDE or glass container will be used to collect the sample, which will be then be transferred to the laboratory container with preservative in the field.
  - Sampling at catch basins will be done after removing CB lids/grates, filter fabric, and/or strainer baskets, which will be replaced each time after sampling. Stormwater samples will be collected from standing water within each catch basin.
  - If overland flow is observed on the boat ramp during the wet weather site walk and sufficient volume is observed, an overland flow stormwater sample may be collected from the boat ramp area. If drainage to the boat

[2] The purpose of this maximum criteria is to ensure that the collected sample represents the entire storm hydrograph and to avoid sampling during less frequent high-precipitation storms that would significantly dilute the presence of any contaminants. This value represents the 2-year, 24-hour rain event for Seattle as calculated using NOAA's Precipitation Frequency Estimate tool.

ramp is predominantly from the SPM Property, then a stormwater sample will be collected for Site source control evaluation. If overland flow occurs to the boat ramp, and a component of that flow is observed to originate from off-property (e.g., 14th Ave S and/or Thistle Street), then a stormwater sample will not be collected from the boat ramp.

- In conjunction with the stormwater samples, field measurements will be made of pH, specific conductivity, temperature, turbidity, DO concentration and ORP, using a calibrated water quality sonde and turbidimeter at each sampling location during each sampling event. These measurements will be made from an aliquot of sample water collected into a decontaminated sample cup, jar, or bowl, or with a flow-through cell if using a peristaltic pump.
- Visual observations will also be noted at the sampling locations during sampling events, including for the presence of floatable materials, visible sheen, discoloration, turbidity, settled solids (if any), and odor.
- Field notes will be collected during each sampling event with the date, time, site and general runoff conditions, water quality field measurements, and other observations.
- QC stormwater samples will be collected at the respective frequencies prescribed in Section E.3.6.1.

Stormwater samples will be analyzed for the chemical analyses summarized in Table E.3. Due to the unpredictability of stormwater runoff, even while targeting storm events, there is a possibility that insufficient water will be present to analyze for all proposed analyte groups. In case of insufficient sample volume to analyze for all constituents, the analyte list will be prioritized as shown in Table E.6 with instructions documented on the chain of custody form. The rationale for prioritization was developed based on knowledge of the historical and current uses of the property with emphasis on the known key contaminants that potentially may contribute to contaminant loading in the LDW via stormwater discharge.

E.2.9. Sample Nomenclature and Labeling

Sample nomenclature for each type of sample to be collected during the Phase 1 RI data collection program is described below. The symbology used for the different types of samples to be collected in Phase 1 will include:

- SB = soil boring
- HA = hand auger
- EB = erodible bank
- BR = boat ramp
- GW = groundwater
- CB = catch basin
- SW = stormwater

- TB = trip blank
- EB = equipment Blank

E.2.9.1. Soil Samples from Borings, Monitoring Wells, and Hand Auger Locations

Each soil sample collected from a boring for chemical analysis will be assigned a unique sample identification number, including the boring number and the depth from which the sample was collected. For example, the soil sample collected from boring SB-27 at a depth of 7 to 8 feet bgs would be identified as SB-27-7-8. A hand auger sample from HA-01 at a depth of 0 to 1 foot bgs would be identified as HA-01-0-1. If erodible bank soils are observed and sufficient quantity of soil exists for collection, the samples will be identified by the moniker EB and numbered sequentially. Therefore, the first erodible bank soil sample collected would be labeled EB-01. See Table E.1 and Figure E.1 for proposed boring locations and names.

E.2.9.2. Catch Basin Solid Samples

Each catch basin solids sample will be assigned a unique sample identification number that includes the sample location abbreviation, and the 6-digit date on which the sample was collected. For example, a catch basin solids sample collected from catch basin CB-02 on May 30, 2021, would be identified as CB-02-210530. See Table E.1 and Figure E.1 for proposed catch basin solids sampling locations and names.

E.2.9.3. Groundwater Samples

Each groundwater sample will be assigned a unique sample identification number that includes the well number, the 6-digit date on which the sample was collected. For example, a groundwater sample collected from monitoring well MW-04 on May 30, 2021, would be identified as MW-04-210530. See Table E.3 and Figure E.1 for proposed monitoring well locations and names.

E.2.9.4. Stormwater Samples

Each stormwater sample will be assigned a unique sample identification number that includes the sample location abbreviation, “SW” for stormwater media type, and the 6-digit date on which the sample was collected. For example, a stormwater sample collected from catch basin CB-02 on May 30, 2021, would be identified as CB-02-SW-210530. For example, if a stormwater sample was collected from the boat ramp on May 30, 2021, it would be identified as SW-BR-210530. See Table E.2 and Figure E.1 for proposed stormwater sampling locations and names.

E.2.9.5. Field Quality Control Samples

Each field quality control sample will be assigned a unique sample identification number that includes the quality control type abbreviation in addition to other identifying information as described below. See Section E.4.6.1 for further information on the field quality control program.

E.2.9.5.1. Field Duplicates

Sample nomenclature for field duplicates will include the same nomenclature as the parent sample ID with the addition of "FD" indicating this is a field duplicate. Examples for each media are as follows:

- Soil example: SB-27-FD-7-8
- Catch basin solids: CB-02-FD-210530
- Stormwater: CB-02-SW-FD-210530
- Groundwater example: MW-4-FD-210530

E.2.9.5.2. Equipment Blank

Equipment blanks will be identified by an "EB" and will be numbered sequentially. For example, the first equipment blank sample collected during Phase 1, collected on May 30, 2021 would be labeled: EB-01-210530.

E.2.9.5.3. Trip Blank

Trip blanks will be identified by an "TB" and will be numbered sequentially. For example, the first trip blank accompanying samples to the laboratory on May 30, 2021 would be labeled: TB-01-210530.

E.2.10. Sample Custody and Field Documentation

E.2.10.1. Sample Custody

The collected sample containers will be sealed inside clean, unused Ziploc bags and placed upright in a cooler. Ice will be placed in each cooler to ensure samples maintain the preservation requirements summarized in Table E.4. Inert cushioning material will be placed in the remaining space inside the cooler as needed to limit movement of the sample containers. If the sample coolers are shipped (not hand carried) to the laboratory, the COC form will be placed in a waterproof bag within the cooler for shipment.

After collection, samples will be maintained in Aspect's custody until formally transferred to the analytical laboratory, courier, or the shipper. For purposes of this work, custody of the samples is defined as follows:

- In plain view of the field representatives;
- Inside a cooler that is in plain view of the field representative; or
- Inside any locked space such as a locker, car, or truck to which the field representative has the only immediately available key(s).

A COC record provided by the laboratory will be initiated at the time of sampling for all samples collected. The record will be signed by the field representative and others who subsequently take custody of the sample. Couriers or other professional shipping representatives are not required to sign the COC form; however, shipping receipts will be collected and maintained in project files as a part of custody documentation. A copy of the COC form with appropriate signatures will be kept by Aspect's project coordinator.

Upon sample receipt, the laboratory will fill out a cooler receipt form to document sample delivery conditions. A designated sample custodian will accept custody of the shipped samples and will verify that the COC form matches the samples received. The laboratory will notify the Aspect project coordinator as soon as possible of any issues noted with the sample shipment or custody.

E.2.10.2. Field Documentation

While conducting field work, the field representative will document pertinent observations and events specific to each activity on field forms (Attachment 1) and/or in a field notebook, and, when warranted, provide photographic documentation of specific sampling efforts. Field notes will include a description of the field activity, sample descriptions, and associated details such as the date, time, and field conditions.

E.2.11. Surveying of Exploration Locations

For each exploration location, a short description of relative location will be recorded (e.g., 5 feet north of NE corner of shed). Horizontal coordinates for each soil sampling location not completed as a monitoring well will be recorded using a hand-held GPS instrument with real-time differential correction at the time of sample collection.

The horizontal coordinates and elevations of new monitoring wells will be surveyed by a professional land surveyor relative to the Washington State Plane South horizontal coordinate system and the North American Vertical Datum of 1988 (NAVD88) vertical datum. Monitoring well top-of-casing elevations will be surveyed to the nearest 0.01 foot, and horizontal coordinates to the nearest 0.1 foot, or better. Each well will be surveyed at the marked spot (i.e., notch in the PVC casing, or permanent ink mark, etc.) on the top of the PVC well casing from which depth-to-water measurements are collected.

E.2.12. Equipment Decontamination

All non-disposable sampling equipment (e.g., stainless steel spoons and bowls) will be decontaminated before collection of each sample. The decontamination sequence consists of a scrub with a non-phosphate detergent (Alconox) solution, followed by a distilled water rinse.

E.2.13. Investigative-Derived Waste Management

Investigation-derived waste (IDW) water generated during equipment decontamination and monitoring well development and sampling will be placed in labeled United States Department of Transportation-(DOT) approved drums pending the analytical results to determine appropriate disposal. The drums will be temporarily consolidated on-site, profiled based on available analytical data, and disposed appropriately at a permitted off-site disposal facility.

Soil cuttings from borings will be placed in labeled DOT-approved drums pending the analytical results to determine appropriate disposal. The drums will be temporarily consolidated on-site, profiled based on available analytical data, and disposed appropriately at a permitted off-site disposal facility. Documentation for off-site disposal of IDW will be maintained in Aspect's project file.

PPE, gloves, paper towels, baggies, and other disposable field supplies will be placed in a garbage bag, sealed, and placed in a municipal dumpster.

Excess stormwater sample will be poured back into the structure from where it was collected. No additional potential contamination to stormwater will occur from the sampling activities.

E.3. Quality Assurance Project Plan

This QAPP identifies QC procedures and criteria required to ensure that data collected during the Phase 1 RI are of known quality and acceptable to achieve project objectives. Specific protocols and criteria are also set forth in this QAPP for a data quality evaluation, upon the completion of data collection to determine the level of completeness and usability of the data. It is the responsibility of the project personnel performing or overseeing the sampling and analysis activities to adhere to the requirements of the SAP and this QAPP.

E.3.1. Purpose of the QAPP

As stated in Ecology's *Guidelines for Preparation of Quality Assurance Project Plans for Environmental Studies* (Ecology Publication No. 04-03-030, revised December 2016), the specific goals of this QAPP are as follows:

- Focus the project coordinator and project team to factors affecting data quality during the planning stage of the project.
- Facilitate communication among field, laboratory, and management staff as the project progresses.
- Document the planning, implementation, and assessment procedures for QA/QC activities for the investigation.
- Ensure that the Data Quality Objectives (DQOs) are achieved.
- Provide a record of the project to facilitate final report preparation.

The DQOs for the project include both qualitative and quantitative objectives, which define the appropriate type of data and specify the tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support the environmental assessment. This QAPP describes both quantitative and qualitative measures of data and details aspects of data collection including analytical methods, QA/QC procedures, and data quality reviews to ensure that the DQOs are achieved. DQOs dictate data collection rationale, sampling and analysis designs that are presented in the main body of the Work Plan, and sample collection procedures that are presented in the SAP (Section E.2).

E.3.2. Project Organization and Responsibilities

The project consultant team involved with data generation includes representatives from Aspect and, under subcontract to Aspect, EcoChem Inc. (data validation), and ARI Inc. (laboratory analysis) of Seattle, Washington. ARI Inc. is the analytical laboratory for the RI data collection program and will subcontract specific chemical analyses to Vista Analytical in California (Vista). Key individuals and their roles on this project are as follows, and contact information is listed in Table E.7:

Project Coordinator for PLP Group – Jeremy Porter, PE, Aspect. The project coordinator is responsible for the successful completion of all aspects of this project, including day-to-day management, production of reports, liaison with the Port and South Park Marina, and coordination with the project team members. The project coordinator is also responsible for resolution of non-conformance issues, is the lead author on project plans and reports, and will provide regular, up-to-date progress reports and other requested project information to the PLP Group and Ecology.

RI Lead – Kirsi Longley, PMP, Aspect. The RI lead is responsible for overseeing the field sampling program outlined in this plan, including collecting representative samples and ensuring that they are handled properly prior to transfer of custody to the project laboratory and overseeing the field manager.

Field Manager – Andrew Yonkofski, LHG, Aspect. The field manager will manage procurement of necessary field supplies, assure that monitoring equipment is operational and calibrated in accordance with the specifications provided herein, and act as the Site Health and Safety Officer.

Data Management Lead – Lea Beard, Aspect. The data management lead is responsible for overseeing the management, validation, and submission of data between the analytical laboratory and delivery to Ecology.

Data Validation Manager – Chris Ransom, Ecochem. The data validation manager is responsible for conducting QA validation of the analytical data reports received from the project laboratory.

Laboratory Project Manager – Amanda Volgardsen Johnson, ARI Inc. The laboratory project manager is responsible for ensuring that all laboratory analytical work for soil and water media complies with project requirements. The laboratory project manager also, while acting as liaison with the project coordinator, field manager, and data quality manager, fulfills project needs on the analytical laboratory work. This responsibility applies to work the laboratory project manager subcontracts to another laboratory.

Table E.7. Project Personnel Contact Information

Person	Role	Phone Number	E-mail Address
Jeremy Porter	PLP Coordinator	206.790.2129	jporter@aspectconsulting.com
Kirsi Longley	RI Lead	206.390.2831	klongley@aspectconsulting.com
Andrew Yonkofski	Field Manager	404.272.3488	ayonkofski@aspectconsulting.com
Lea Beard	Data Manager	206.780.7749	lbeard@aspectconsulting.com
Chris Ransom	Data Validator	206.508.2109	cransom@ecochem.net
Amanda Volgardsen	Lab Manager	206.695.6200	amanda.voldgardsen@arilabs.com

E.3.3. Analytical Methods and Reporting Limits

Analytical methodologies applied to the analyses of samples collected during Phase 1 of the RI are in accordance with the following documents:

- EPA SW Methods – EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), and VI (2017-2019).
- EPA Clean Water Act (CWA) Methods – 40 CFR, Part 136
- Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 20th Edition, 1995.
- Ecology Analytical Methods for Petroleum Hydrocarbons, Publication No. ECY 97-602, June 1997.

Table E.4 lists the laboratory analytical methods for soil, solids, and water analyses to be performed during the RI, along with samples containers, preservation, and analytical holding times for each analysis.

E.3.4. Method Detection Limit and Method Reporting Limit

The method detection limit (MDL) is the minimum concentration of a compound that can be measured and reported with a 99 percent confidence that the analyte concentration is greater than zero. MDLs are established by the laboratory using prepared samples, not samples of environmental media.

The method reporting limit (MRL) is defined as the lowest concentration at which a chemical can be accurately and reproducibly quantified, within specified limits of precision and accuracy, for a given environmental sample. The MRL can vary from sample to sample depending on sample size, sample dilution, matrix interferences, moisture content, and other sample-specific conditions. As a minimum requirement for organic analyses, the MRL should be equal to or greater than the concentration of the lowest calibration standard in the initial calibration curve and equal to or, preferably less than, the project screening levels. The expected MRLs are summarized in Tables E.8 and E.9 for water and soil samples, respectively.

The most stringent RI screening levels for water and soil are compared relative to MRLs in Tables E.8 and E.9. MRLs greater than screening levels are highlighted in the tables. MRLs are operationally equivalent to practical quantitation limits (PQLs) as defined in MTCA.

E.3.4.1. Sample Preparation for Metals Analysis of Brackish and/or Turbid Water Samples

Saline water samples may create analytical interferences for trace metals analyses due to the high levels of dissolved solids in the samples. Saline groundwater samples are indicated by their elevated specific electrical conductance. ARI Inc. employs an ICP-MS which has Universal Cell Technology (UCT) that assists with sodium interference in the analyses. Nonetheless, to assist the laboratory in identifying saline groundwater samples so that analytical adjustments may be taken, the field-measured specific conductance for each groundwater sample with conductance greater than 1,000 µS/cm will be recorded on the corresponding COC document.

Turbid water samples may create high bias not representative of groundwater quality for analyses of hydrophobic compounds (e.g., high molecular weight PAHs, PCBs, dioxins/furans). To limit potential for turbidity bias, groundwater samples with field-measured turbidities greater than 25 NTU will be recorded on the corresponding chain of custody and will be centrifuged in the laboratory prior to analysis for PAHs or PCBs.

E.3.5. Measurement Quality Objectives

Measurement quality objectives (MQOs), including the Measurement Quality Indicators (MQIs)—precision, accuracy, representativeness, comparability, completeness, and sensitivity (namely PARCCS parameters)—and sample-specific reporting limits (RLs) are dictated by the project requirements and intended uses of the data. For this project, the analytical data must be of sufficient technical quality to determine whether contaminants are present and, if present, whether their concentrations are greater than or less than applicable screening levels as adjusted for PQLs.

The quality of data generated through this RI will be assessed against the MQIs set forth in this QAPP. Specific QC parameters associated with each of the PARCCS are summarized in Table E.10. Specific MQI goals and evaluation criteria (i.e., percent recovery (%R) for accuracy measurements, relative percent difference (RPD) for precision measurements, are defined in Tables E.8and E.9 along with the MRLs. Definitions of these parameters and the applicable QC procedures are presented below.

E.3.5.1. Precision

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared with their average values. Analytical precision is measured through matrix spike/matrix spike duplicate (MS/MSD) samples and laboratory control samples/laboratory control sample duplicate (LCS/LCSD) for organic analysis and through laboratory duplicate samples for inorganic analyses.

Analytical precision is quantitatively expressed as the RPD between the LCS/LCSD, MS/MSD, or laboratory duplicate pairs, and is calculated with the following formula:

$$RPD\ (\%) = 100 \times \frac{|S - D|}{(S + D)/2}$$

where:
S = analyte concentration in sample
D = analyte concentration in duplicate sample

Analytical precision measurements will be carried out at a minimum frequency of 1 per 20 samples for each matrix sampled, or 1 per laboratory analysis group. Laboratory precision will be evaluated against laboratory quantitative RPD performance criteria provided with the laboratory's analytical data report. If the control criteria are not met, the laboratory will supply a justification of why the limits were exceeded and implement the appropriate corrective actions. The RPD will be evaluated during data review and validation. The data reviewer will note deviations from the specified limits and will comment on the effect of the deviations on reported data.

E.3.5.2. Accuracy

Accuracy measures the closeness of the measured value to the true value. The accuracy of chemical test results is assessed by “spiking” samples with known standards (surrogates, blank spikes, labeled compounds, or matrix spikes) and establishing the recovery. Accuracy is quantified as the %R. The closer the %R is to 100 percent, the more accurate the data.

Surrogate, LCS/LCSD, and labeled compound recovery will be calculated as follows:

$$\text{Recovery}\,(\%) = \frac{MC}{SC} \times 100$$

where:
SC = spiked concentration
MC = measured concentration

MS/MSD percent recovery will be calculated as follows:

$$\text{Recovery}\,(\%) = \frac{MC - USC}{SC} \times 100$$

where:
SC = spiked concentration
MC = measured concentration
USC = unspiked sample concentration

Accuracy measurements on MS samples will be carried out at a minimum frequency of 1 in 20 samples per matrix analyzed, as applicable to the method. Some methods, such as dioxins/furans, do not require MS/MSD analyses. Blank spikes will also be analyzed at a minimum frequency of 1 in 20 samples per matrix analyzed. Surrogate recoveries for organic compounds will be determined for each sample analyzed for respective compounds. Laboratory accuracy will be evaluated against the laboratory’s quantitative MS and surrogate spike recovery performance criteria as provided with the laboratory’s analytical data report. Labeled compound recoveries for HRMS methods will be evaluated against the method criteria. If the control criteria are not met, the laboratory will supply a justification of why the limits were exceeded and implement the appropriate corrective actions. Percent recoveries will be evaluated during data review and validation, and the data reviewer will comment on the effect of the deviations on the reported data.

E.3.5.3. Representativeness

Representativeness measures how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the matrix sampled. The SAP sampling techniques and sample handling protocols (e.g., homogenizing, storage, preservation, and use of duplicates and blanks) have been developed to ensure representative samples. Sampling locations for RI activities are described in Section 9 of the Work Plan. The RI field sampling procedures are described in the SAP (Section E.2) of this SAP.

E.3.5.4. Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. This goal will be achieved through the use of standard techniques to collect samples, EPA-approved standard methods to analyze samples, and consistent units to report analytical results. Data comparability also depends on data quality. Data of unknown quality cannot be compared.

E.3.5.5. Completeness

Completeness is defined as the percentage of measurements made that are judged to be valid. Results will be considered valid if the precision, accuracy, and representativeness objectives are met and if RLs are sufficient for the intended uses of the data. Completeness is calculated as follows:

$$Completeness\ (\%) = \frac{V}{P} \times 100$$

where:
V = number of valid measurements
P = number of measurements taken

Valid and invalid data (i.e., data qualified with the R flag [rejected]) will be identified during data validation. The target completeness goal for this project is 95 percent.

E.3.5.6. Sensitivity

Sensitivity depicts the level of ability an analytical system (i.e., sample preparation and instrumental analysis) has in detecting a target component in a given sample matrix with a defined level of confidence. Factors affecting the sensitivity of an analytical system include: analytical system background (e.g., laboratory artifact or method blank contamination), sample matrix (e.g., mass spectrometry ion ratio change, co-elution of peaks, or baseline elevation), and instrument instability.

E.3.6. Quality Control Procedures

Field and laboratory QC procedures are outlined below.

E.3.6.1. Field Quality Control

Beyond use of standard sampling and decontamination protocols defined in the SAP, field QC procedures include maintaining the field instruments. Field instruments (e.g., PID for evaluating presence of VOCs in soil samples, and the YSI or equivalent meter for measuring field parameters during groundwater and stormwater sampling) are maintained and calibrated regularly prior to use, in accordance with manufacturer recommendations.

In addition, field QC samples will be collected and submitted for analyses to monitor the precision and accuracy associated with field procedures. Field QC samples to be collected and analyzed for this RI include trip blanks, field duplicates, and equipment rinsate blanks. The definition and sampling requirements for field QC samples are presented below.

E.3.6.1.1. Trip Blank

Trip blank samples will be used to monitor possible VOC and PCB cross-contamination occurring during sample handling and transport. Trip blank samples will be prepared and supplied by the laboratory; organic-free reagent-grade water will be placed into a VOC vial and glass sample bottle prior to the collection of field samples. The trip blank sample vials will be placed with and accompany the VOC and gasoline-range TPH samples through the entire transporting process from the laboratory to the field and back to the laboratory. One trip blank will be placed in each cooler containing samples where VOC or gasoline-range TPH analyses are conducted. Similarly, the trip blank sample bottles will be placed with and accompany the PCB samples throughout the entire process.

In case a target compound is present in a trip blank, results for all samples shipped with this trip blank will be evaluated and data qualified accordingly if determined that the results are affected.

E.3.6.1.2. Field Duplicates

Field duplicate samples are used to check for sampling and analysis reproducibility; however, the field duplicate sample results include variability introduced during both field sampling and laboratory preparation and analysis, and EPA data validation guidance provides no specific evaluation criteria for field duplicate samples. Advisory evaluation criteria are set forth at 35 percent for RPD (if both results are greater than five times the RL) and two times the RLs for concentration difference (if either result is less than five times the RL) between the original and field duplicate results.

Field duplicates will be submitted “blind” to the laboratory as discrete samples (i.e., given unique sample identifiers to keep the duplicate identity unknown to the laboratory), but will be clearly identified in the field log. Field duplicate samples will be collected at a frequency of 5 percent (1 per 20) of the field samples for each matrix and analytical method, but not less than one duplicate per sampling event per matrix.

If a given soil sample depth interval lacks sufficient volume (recovery) to supply material for a planned analysis and its field duplicate analysis, the field duplicate aliquot will be collected for that analysis from another depth interval in that same location if practical.

E.3.6.1.3. Equipment Rinsate Blank

Equipment rinsate blanks are collected to determine the potential of cross-contamination introduced by equipment that is used and decontaminated at multiple sample locations (e.g., stainless steel spoons used for placing soil samples in jars). Deionized water (obtained from the laboratory) is rinsed through the decontaminated sampling equipment and collected into adequate sample containers for analysis of semivolatile organic compounds (SVOCs) (including phthalates), diesel- and oil-range TPH, organochlorine pesticides, PCB Aroclors, PCB congeners, dioxins/furans, and metals. The equipment rinsate blank is then handled in a manner identical to the primary samples collected with that piece of equipment. The blank is then processed, analyzed, and reported as a regular field sample. Equipment rinsate blanks will be collected at a frequency of 5 percent (1 per 20) of the field samples for each matrix and analytical method, but not less than one duplicate per sampling event per matrix. When dedicated equipment is used (e.g., during water sampling), these blanks are not needed.

E.3.6.2. Laboratory Quality Control

The laboratories' (ARI, Inc. and their subcontracted laboratory) analytical procedures must meet requirements specified in the respective analytical methods or approved laboratory standard operating procedures (SOPs), e.g., instrument performance check, initial calibration, calibration check, blanks, surrogate spikes, internal standards, and/or labeled compound spikes. Specific laboratory QC analyses required for this project will consist of the following at a minimum:

- Instrument tuning, instrument initial calibration, and calibration verification analyses as required in the analytical methods and the laboratory SOPs.
- Laboratory and/or instrument method blank measurements at a minimum frequency of 5 percent (1 per 20 samples) or in accordance with method requirements, whichever is more frequent.
- Accuracy and precision measurements as defined in Table E.10, at a minimum frequency of 5 percent (1 per 20 samples) or in accordance with method requirements, whichever is more frequent. In cases where a pair of MS/MSD or MS/laboratory duplicate analyses are not performed on a project sample, a set of LCS/LCSD analyses will be performed to provide sufficient measures for analytical precision and accuracy evaluation.

The laboratory's QA officers are responsible for ensuring that the laboratory implements the internal QC and QA procedures detailed in ARI Inc.'s (or their subcontracted laboratory's) Quality Assurance Manual.

E.3.7. Corrective Actions

If routine QC audits by the laboratory result in detection of unacceptable conditions or data, actions specified in the laboratory SOPs will be taken. Specific corrective actions are outlined in each SOP used and can include the following:

- Identifying the source of the violation
- Reanalyzing samples if holding time criteria permit
- Resampling and analyzing
- Evaluating and amending sampling and analytical procedures
- Accepting but qualifying data to indicate the level of uncertainty

If unacceptable conditions occur, the laboratory will contact Aspect's project coordinator to discuss the issues and determine the appropriate corrective action. Corrective actions taken by the laboratory during analysis of samples for this project will be documented by the laboratory in the case narrative associated with the affected samples.

In addition, the project data quality manager will review the laboratory data generated for this investigation to ensure that project DQOs are met. If the review indicates that non-conformances in the data have resulted from field sampling or documentation procedures or laboratory analytical or documentation procedures, the impact of those non-conformances on the overall project data usability will be assessed. Appropriate actions, including re-sampling and/or re-analysis of samples may be recommended to the project coordinator to achieve project objectives.

E.3.8. Data Reduction, Quality Review, and Reporting

All data will undergo a QA/QC evaluation at the laboratory, which will then be reviewed by the Aspect database manager and the project data quality manager. Initial data reduction, evaluation, and reporting at the laboratory will be carried out in full compliance with the method requirement and laboratory SOPs. The laboratory internal review will include verification (for correctness and completeness) of electronic data deliverable (EDD) accompanied with each laboratory report. The Aspect database manager will verify the completeness and correctness of all laboratory deliverables (i.e., laboratory report and EDDs) before releasing the deliverables for data validation.

E.3.9. Minimum Data Reporting Requirements

The following sections specify general and specific requirements for analytical data reporting to provide sufficient deliverables for project documentation and data quality assessment.

E.3.9.1. General Requirements

The following requirements apply to laboratory reports for all types of analyses:

- A laboratory report will include a cover page signed by the laboratory director, the laboratory QA officer, or his/her designee to certify the eligibility of the reported contents and the conformance with applicable analytical methodology.
- Definitions of abbreviations, data flags, and data qualifiers used in the report.
- Cross reference of field sample names and laboratory sample identity for all samples in the sample delivery group (SDG).
- Completed COC document signed and dated by parties who acquired and received the samples.
- Completed sample receipt document with record of cooler temperature and sample conditions upon receipt at the laboratory. Anomalies such as inadequate sample preservation, inconsistent bottle counts, and sample container breakage, and the communication record and corrective actions in response to the anomalies will be documented and incorporated in the sample receipt document. The document will be initialed and dated by personnel that complete the document.
- Case narrative that addresses any anomalies or QC outliers in relation to sample receiving, sample preparation, and sample analysis on samples in the SDG. The

narrative will be presented separately for each analytical method and each sample matrix.

- All pages in the report are to be paginated. Any insertion of pages after the laboratory report is issued will be paginated with starting page number suffixed with letters (e.g., pages inserted between pages 134 and 135 should be paginated as 134A, 134B, etc.)
- Any resubmitted or revised report pages will be submitted to Aspect with a cover page stating the reason(s) and scope of the resubmission or revision, and signed by the laboratory director, QA officer, or the designee.

E.3.9.2. Specific Requirements

The following presents specific requirements for laboratory reports:

- **Sample results:** Sample results will be evaluated and reported down to the MDLs. Detections at levels greater than the MDLs but less than the MRLs will be reported and flagged with “J”. Results less than the MDLs (or estimated detection limits [EDLs] for dioxin/furans) will be reported at the MDLs and flagged with “U”. All soil sample results will be reported on a dry-weight basis. The report pages for sample results (namely Form 1s) will, at a minimum, include sample results, MRLs, unit, proper data flags, dates of sample collection, preparation, and analysis, dilution factor, percent moisture (for solid samples), and sample volume (used for analysis).
- **Instrument run log:** The run log will list, in chronological order, all analytical runs on field samples, QC samples, calibrations, and calibration verification analyses in the SDG with data file name (and/or legible laboratory codes) and analysis date/time for each analytical run.
- **Original sample preparation and analyst worksheet:** The worksheet will be initialed and dated by analyst and reviewer.
- **Gas Chromatography/Mass Spectrometry (GC/MS) and inductively coupled plasma (ICP)/MS tune report:** The report will include ion abundance ratios and criteria for all required ions.
- **Initial calibration summary:** The summary will include the data file name for each calibration standard file; response factor (RF) or calibration factor (CF) for each calibration standard and each target and surrogate compound; average RF or CF, percent relative standard deviation (%RSD), correlation coefficient, or coefficient of determination; and absolute and relative retention times and ion ratios for high-resolution GC/MS (HRGC/HRMS) methods for each target compound and surrogate (labeled) compounds.
- **Calibration verification summary:** The summary will include the true amount, calculated amount, and percent difference (%D), or percent drift (%D_f) as applicable for target compounds.
- **Method blank results** will be included.

- **LCS and LCSD (if MSD analysis is not performed) results** with laboratory acceptance criteria for %R and RPD.
- **Surrogate spike and labeled compound results** with laboratory acceptance criteria for %R.
- **MS and MSD results with laboratory acceptance criteria for %R and RPD.** In cases where MS/MSD analyses were not performed on a project sample, LCS/LCSD analyses should be performed and reported instead.
- **Laboratory duplicate results with RPD and acceptance criteria**
- **Internal standard (as applicable) results:** Internal standard response areas in field samples, QC analyses, and associated calibration verification analyses.
- **Interference check standards**
- **Serial dilutions (metals)**
- **All instrument printouts (raw data)** for tests receiving EPA Stage 4 data validation (PCB congener analysis).

E.3.10. Data Quality Verification and Validation

Reported analytical results will be qualified by the laboratory to identify QC concerns in accordance with the specifications of the analytical methods. Additional laboratory data qualifiers may be defined and reported by the laboratory to more completely explain QC concerns regarding a particular sample result. All data qualifiers will be defined in the laboratory's narrative reports associated with each case.

Ecochem Inc., under subcontract to Aspect, will conduct an independent Level 4 validation (as defined in EPA, 2009) on any dioxins/furans and PCB congener analytical data collected, and will perform Level 2b validation on the remaining analytical data. Data validation will be conducted following the guidance below:

- EPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, Office of Superfund Remediation and Technical Innovation, U.S. Environmental Protection Agency, January 2017, EPA-540-R-21017-001
- EPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, Office of Superfund Remediation and Technical Innovation, U.S. Environmental Protection Agency, January 2017, EPA-540-R-2017-002
- EPA R10 [Region 10] Data Validation and Review Guidelines for Polychlorinated Dibenzo-p-Dioxin and Polychlorinated Dibenzofuran data (PCDD/PCDF) Using Method 1613B, and SW846 Method 8290A, May 2014, EPA-910-R-14-003
- EPA, National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016, EPA 542-B-16-001

In the event that Region 10 guidance for dioxins/furans differs from the Natural Functional Guidelines, the Region 10 guidance will be followed.

The data validation will examine and verify the following parameters against the method requirements and laboratory control limits specified in Tables E.8 and E.9 for water and soil analyses, respectively:

- Sample management and holding times
- Instrument performance check, calibration, and calibration verification
- Laboratory and field blank results
- Detection and reporting limits
- Laboratory replicate results
- MS/MSD results
- LCS and/or standard reference material results
- Field duplicate results
- Surrogate spike recovery (organic analyses only)
- Internal standard recovery (internal calibration methods only)
- Inter-element interference check (inductively coupled plasma analyses only)
- Serial dilution (metals only)
- Labeled compound recovery (isotope dilution methods only)
- Ion ratios for detected compounds (HRGC/HRMS methods only)

Data qualifiers will be assigned based on the outcome of the data validation. Data qualifiers are limited to and defined as follows:

- **U** - The analyte was analyzed for but was determined to be non-detect above the reported sample quantitation limit, or the quantitation limit was raised to the concentration found in the sample due to blank contamination.
- **J** - The analyte was positively identified at levels greater than the MDLs but less than the RLs; the associated numerical value is an estimate of the concentration of the analyte in the sample.
- **UJ** - The analyte was not detected above the reported 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.
- **H –** The sample was analyzed outside the method specified holding time requirement.
- **R** - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.

- **DNR -** Do not report from this analysis; the result for this analyte is to be reported from an alternative analysis.

In cases of multiple analyses (such as an undiluted and a diluted analysis) performed on one sample, the most representative result will be determined and only the determined result will be reported for the sample.

The scope and findings of the data validation will be documented and discussed in the Data Validation Report(s). The Data Validation Report(s) will be included as an appendix to the RI report.

E.3.11. Preventative Maintenance Procedures and Schedules

Preventative maintenance in the laboratory will be the responsibility of the laboratory personnel and analysts. This maintenance includes routine care and cleaning of instruments and inspection and monitoring of carrier gases, solvents, and glassware used in analyses. Details of the maintenance procedures are addressed in the respective laboratory SOPs.

Precision and accuracy data are examined for trends and excursions beyond control limits to determine evidence of instrument malfunction. Maintenance will be performed when an instrument begins to change as indicated by the degradation of peak resolution, shift in calibration curves, decrease in sensitivity, or failure to meet one or another of the method-specific QC criteria.

Maintenance and calibration of instruments used in the field for sampling (e.g., PID for evaluating presence of VOCs in soil samples, and the YSI meter for measuring field parameters during groundwater sampling) will be conducted regularly in accordance with manufacturer recommendations prior to use.

E.3.12. Performance and System Audits

The Aspect project coordinator has responsibility for reviewing the performance of the laboratory QA program; this review will be achieved through regular contact with the analytical laboratory’s project manager. To ensure comparable data, all samples of a given matrix to be analyzed by each specified analytical method will be processed consistently by the same analytical laboratory.

E.3.13. Data and Records Management

Records will be maintained documenting all activities and data related to field sampling and chemical analyses.

E.3.13.1. Field Documentation

The Aspect field manager will ensure that the field team receives and understands the final approved version of this QAPP, the Site Health and Safety Plan (Appendix F of the RI Work Plan), and the SAP prior to initiation of field activities and that all approved plans are followed at all times. Field documents will be maintained in the project file.

E.3.13.2. Analytical Data Management

Raw data received from the analytical laboratory in electronic data deliverable (EDD) format will be reviewed, entered into a computerized database, and verified for consistency and correctness. The database will be updated based on data review and independent validation if necessary.

The following data will be included in the database:

- Laboratory analytical results, including laboratory data qualifiers
- Data validator qualifiers
- Sample location name and coordinates
- Sample media (i.e., groundwater or soil)
- Sample date
- Sample ID
- Sampling depth interval for soil samples
- Sample fraction (e.g. total or dissolved phase)
- Sample type (e.g. parent, field duplicate, trip blank, rinsate blank, or dilution)
- Calculated values, such as the total toxic equivalency for carcinogenic PAHs, PCBs, and dioxins/furans.

Data will be submitted to Ecology's Environmental Information Management (EIM) database once data have been reviewed and validated.

E.4. References

American Public Health Association, Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 20th Edition, 1995.

Leidos, Inc. (Leidos), 2016, Technical Memorandum: Potential for PCB Contamination from Sampling Equipment Tubing Materials, dated November 23, 2016.

Leidos, Inc. (Leidos), 2017, Lower Duwamish Waterway Groundwater Sampling for PCB Congeners and Aroclors Data Report, dated July 2017.

United States Environmental Protection Agency (EPA), USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), and VI (2017-2019).

United States Environmental Protection Agency (EPA), 2009, Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, Office of Solid Waste and Emergency Response, EPA 540-R-08-005, dated January 13, 2009.

United States Environmental Protection Agency (EPA), 2014, R10 [Region 10] Data Validation Review Guidelines for Polychlorinated Dibenzo-p-Dioxin and Polychlorinated Dibenzofuran Data (PCDD/PCDF) Using Method 1613B, and

SW846 Method 8290A, Office of Environmental Assessment, EPA-910-R-14-003, dated May 2014.

United States Environmental Protection Agency (EPA), 2016, National Functional Guidelines for High Resolution Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation, EPA-542-B-16-001, dated April 2016.

United States Environmental Protection Agency (EPA), 2017a, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, Office of Superfund Remediation and Technology Innovation, EPA-540-R-2017-001, dated January 2017.

United States Environmental Protection Agency (EPA), 2017b, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, Office of Superfund Remediation and Technology Innovation, EPA-540-R-2017-002, dated January 2017.

Washington State Department of Ecology (Ecology), 1997, Ecology Analytical Methods for Petroleum Hydrocarbons, Publication No. ECY 97-602, June 1997.

Washington State Department of Ecology (Ecology), 2016, Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies, Ecology, No. 04-03-030.

TABLES

Table E.1. Phase 1 Field Investigation Soil and Catch Basin Solids Sampling Matrix

Project No. 190293, South Park Marina, Seattle, Washington

Investigation Area	Soil Exploration	Planned Exploration Depth (ft bgs)[1]	Northing/ Easting[2]		Objective	Analyses										
						Metals	Tributyl Tin	TPH	VOCs	SVOCs	Low-Level PAHs (SIM)	Organochlorine Pesticides	PCBs Aroclors	PCBs Congeners[3]	Dioxins / Furans[4]	TOC[5]
Former A&B Barrel Area	SB-26	0 - 20	1275076	195747	Lateral extent of former pond.	x		x	x	x	x	x	x			x
	MW-04	0 - 20	1275107	195753	Sheet pile wall area groundwater-to-surface water sediment pathway.	x		x	x	x	x	x	x			x
	MW-05	0 - 30	1275098	195771	Vertical extent of former pond contamination.	x	x	x	x	x	x	x	x	x	One location	x
	MW-06	0 - 20	1275096	195794	Sheet pile wall area groundwater-to-surface water sediment pathway.	x		x	x	x	x	x	x			x
	MW-07	0 - 20	1275056	195829	Migration from pond area and groundwater-to-surface water sediment pathway.	x		x	x	x	x	x	x			x
Historical Boat Manufacturing Area	SB-27	0 - 20	1274993	195869	Nature and extent of contamination from historical boat manufacturing.	x	x	x	x	x	x		x			x
	SB-28	0 - 20	1274935	195890	Nature and extent of contamination from historical boat manufacturing.	x	x	x	x	x	x		x			x
	MW-08	0 - 20	1274975	195899	Migration from historical boat manufacturing area and groundwater-to-surface water sediment pathway.	x	x	x	x	x	x	x	x	x		x
Former Service Station / Former Radiator Repair / Current Repair Shop Area	SB-29	0 - 20	1274644	195986	Nature and extent of contamination from current repair shop.	x	x	x	x	x	x	x	x			x
	SB-30	0 - 20	1274564	195873	Nature and extent of contamination from historical gasoline station.	x		x	x		x		x			x
	SB-31	0 - 20	1274518	195900	Nature and extent of contamination from historical gasoline station.	x		x	x		x		x			x
	MW-12	0 - 20	1274618	196046	Assess potential migration from former gasoline station and current repair shop area.	x		x	x		x		x			x
	MW-13	0 - 20	1274530	195878	Nature and extent of contamination from historical gasoline station and potential on-Property migration from dry cleaner.	x		x	x		x		x	x		x
	SB-34	0 - 20	1274626	195917	Assess potential migration from former radiator repair shop.	x		x	x		x		x			x
Shoreline	MW-09	0 - 1	1274873	195986	Assess surface soil to characterize erodible soil and direct contact pathways.	x	x	x	x	x	x	x	x			x
	MW-10	0 - 1	1274725	196126	Assess surface soil to characterize erodible soil and direct contact pathways.	x	x	x	x	x	x		x	x		x
	MW-11	0 - 1	1274632	196212	Assess surface soil to characterize erodible soil and direct contact pathways.	x	x	x	x	x	x		x			x
Former / Current Boat Maintenance Area	MW-14	0 - 20	1274745	195834	Assess surface soil to characterize direct contact and transport to stormwater-to-surface water sediment pathways. Nature and extent of contamination from historical and current boat maintenance activities.	x	x	x	x	x	x		x			x
	MW-15	0 - 20	1274878	195776	Assess surface soil to characterize direct contact and transport to stormwater-to-surface water sediment pathways. Nature and extent of contamination from historical and current boat maintenance activities.	x	x	x	x	x	x	x	x		One location	x
	SB-32	0 - 20	1274721	196055	Assess surface soil to characterize direct contact and transport to stormwater-to-surface water sediment pathways. Nature and extent of contamination from historical and current boat maintenance activities.	x	x	x	x	x	x		x	x		x
	SB-33	0 -20	1274769	195939	Assess surface soil to characterize direct contact and transport to stormwater-to-surface water sediment pathways. Nature and extent of contamination from historical and current boat maintenance activities.	x	x	x	x	x	x		x			x
T-117 Property Line	HA-01	0 - 3	1275051	195669	Assess surface soil to characterize direct contact and transport to stormwater-to-surface water sediment pathways. Nature and extent of contamination from neighboring T-117 Site.	x	x	x	x	x	x	x	x			x
	HA-02	0 - 3	1275079	195715	Assess surface soil to characterize direct contact and transport to stormwater-to-surface water sediment pathways. Nature and extent of contamination from neighboring T-117 Site.	x	x	x	x	x	x	x	x			x
Catch Basin Solids	CB-02	N/A	1274675	196004	Assess erodible soil to characterize transport to stormwater-to-surface water sediment pathways.	x	x	x	x	x	x	x	x			x
	CB-06	N/A	1274787	195957	Assess erodible soil to characterize transport to stormwater-to-surface water sediment pathways.	x	x	x	x	x	x	x	x		One location	x
	SWRX-Pre	N/A	1275080	195804	Assess erodible soil to characterize transport to stormwater-to-surface water sediment pathways.	x	x	x	x	x	x	x	x			x
Erodible Bank Soils[6]	TBD	0 - 1	TBD		Assess erodible soil to characterize transport to stormwater-to-surface water sediment pathways.	x	x	x	x	x	x	x	x			x

Notes:

(1) - Targeted depths for sample collection, analysis, and archival can be found in Table E.2.

(2) - These are approximate locations for planning purposes. Actual investigation locations will be documented using a hand-held GPS unit during field work. Coordinates provided in NAD83 State Plan Washington North, feet.

(3) - At each location, only one soil sample from the depth with the highest Aroclor results will be submitted for congener analysis. If not detected, samples for analysis will be selected from locations based on Site history including historical PCB data.

(4) - At each of these investigation areas, one soil sample from the location and depth with the highest chlorinated PCB concentrations will be submitted for dioxin/furan analysis. If not detected, samples for analysis will be selected from locations based on Site history including historical PCB and D/F data.

(5) - TOC analysis will be conducted for one sample of unsaturated soil and one sample of saturated soil from each location to be determined in the field.

(6) - Potential erodible bank soils will be evaluated. If present, a sample will be collected for the analysis shown.

Metals - As, Cd, Cu, Cr, Pb, Hg, Ni, Zn

TPH - total petroleum hydrocarbons, including gasoline-, diesel-, and oil-ranges

VOCs - volatile organic compounds

SVOCs - semivolatile organic compounds

PAHs - polycyclic aromatic hydrocarbons

PCBs - polychlorinated biphenyls

TOC - total organic carbon

TSS - total suspended solids

See Appendix E for additional details on sampling protocol, procedures, and analytical methods.

Table E.2. Phase 1 Field Investigation Targeted Depth Intervals for Laboratory Analysis

FINAL

Project No. 190293, South Park Marina, Seattle, Washington

	Investigation Area	Former A&B Barrel Area	Historical Boat Manufacturing	Former Service Station / Former Radiator Repair / Current Repair Shop	Shoreline	Former / Current Boat Maintenance	T-117 Property Line	Contingent Analyses
Targeted Sample Number	**Soil Exploration**	SB-26, MW-04, MW-05, MW-06, & MW-07	SB-27, SB-28, & MW-08	SB-29, SB-30, SB-31, SB-34, MW-12, & MW-13	MW-09, MW-10, & MW-11	SB-32, SB-33, MW-14, & MW-15	HA-01 & HA-02	Borings with Indications of Contamination
1 (analysis)		0- to 1-foot depth bgs	0- to 1-foot depth bgs	0- to 1-foot depth bgs	0- to 1-foot depth bgs	0- to 1-foot depth bgs	0- to 1-foot depth bgs	Zone of highest indications
2 (analysis)		1-foot zone straddling water table	1-foot zone straddling water table	3- to 5-foot depth bgs	1-foot zone straddling water table	3- to 5-foot depth bgs	2- to 3-foot depth bgs	No indications of contamination below sample #1
3 (archival)		3- to 5-foot depth bgs	3- to 5-foot depth bgs	1-foot zone straddling water table	3- to 5-foot depth bgs	1-foot zone straddling water table	1- to 2-foot depth bgs	> 1 foot below sample #2
4 (archival)		Bottom of Boring	Bottom of boring	Bottom of boring	Bottom of boring	Bottom of boring	N/A	Bottom of boring

Notes:

Sampling depth indicates the targeted range from which soil samples will be submitted for laboratory analysis. Additional samples will be collected and archived from the length of boring in accordance with the procedures identified in Appendix E, Section E.2.1.3.3 and identified above. Archived samples may be released for laboratory analysis if laboratory analysis of other samples at that exploration detect compounds exceeding screening levels. If field screening indications of contamination are present at the bottom of any boring, the boring will be extended until no evidence of contamination is observed (to a maximum of 30 feet bg

Table E.3. Phase 1 Field Investigation Groundwater and Stormwater Sampling Matrix

Project No. 190293, South Park Marina, Seattle, Washington

Investigation Area	Location(1)	Northing/ Easting(2)		Objective	Analyses: Metals(3)	Tributyl Tin(4)	TPH	VOCs	SVOCs	Low-Level PAHs	Organochlorine Pesticides	PCBs: Aroclors	PCBs: Congeners(5)	TOC	TSS
Former A&B Barrel Area	MW-04	1275107	195753	Sheet pile wall area groundwater-to-surface water sediment	x	x	x	x	x	x	x	x		x	x
	MW-05	1275098	195771	Leaching of former pond contamination to groundwater.	x	x	x	x	x	x	x	x		x	x
	MW-06	1275096	195794	Sheet pile wall area groundwater-to-surface water sediment pathway.	x	x	x	x	x	x	x	x		x	x
	MW-07	1275056	195829	Migration from pond area and groundwater-to-surface water sediment pathway.	x	x	x	x	x	x	x	x		x	x
Shoreline (Including Historical Boat Manufacturing Well)	MW-08	1274975	195899	Migration from historical boat manufacturing area and groundwater-to-surface water sediment pathway.	x	x	x	x	x	x	x	x		x	x
	MW-09	1274873	195986	Assess the groundwater-to-surface water sediment pathway.	x	x	x	x	x	x		x		x	x
	MW-10	1274725	196126	Assess the groundwater-to-surface water sediment pathway.	x	x	x	x	x	x		x	Four locations	x	x
	MW-11	1274632	196212	Assess the groundwater-to-surface water sediment pathway.	x	x	x	x	x	x		x		x	x
Former Service Station / Former Radiator Repair / Current Repair Shop	MW-12	1274618	196046	Assess potential migration from former gasoline station and current repair shop area.	x		x	x		x		x		x	x
	MW-13	1274530	195878	Nature and extent of contamination from historical gasoline station and potential on-Property migration from dry cleaner.	x		x	x		x		x		x	x
Groundwater Flow Direction / Boat Maitenance	MW-14	1274745	195834	Assess property-wide groundwater flow direction and groundwater quality in center of property	x	x	x	x	x	x		x		x	x
	MW-15	1274878	195776	Assess property-wide groundwater flow direction and groundwater quality in center of property	x	x	x	x	x	x	x	x		x	x
Stormwater	CB-02	1274675	196004	Evaluate the stormwater-to-surface water sediment pathway.	x	x	x		x	x		x		x	x
	CB-06	1274787	195957	Evaluate the stormwater-to-surface water sediment pathway.	x	x	x		x	x		x	One location	x	x
	SWRX-Pre	1275080	195804	Evaluate the stormwater-to-surface water sediment pathway.	x	x	x		x	x		x		x	x

Notes:

(1) - MW locations represent groundwater samples; CB and SWRX locations represent stormwater samples.

(2) - These are approximate locations for planning purposes. Actual well locations will be surveyed by a licensed surveyor upon completion. Coordinates provided in NAD83 State Plan Washington North, feet.

(3) - Metals include both total and dissolved concentrations.

(4) - Tributyl Tin (TBT) will only be analyzed from locations where it was detected in soil and/or from locations downgradient of soil detections.

(5) - Locations for PCB congener analysis will be selected based on Aroclor results.

Metals - As, Cd, Cu, Cr, Pb, Hg, Ni, Zn

TPH - total petroleum hydrocarbons, including gasoline-, diesel-, and oil-ranges

VOCs - volatile organic compounds

SVOCs - semivolatile organic compounds

PAHs - polycyclic aromatic hydrocarbons

PCBs - polychlorinated biphenyls

TOC - total organic carbon

TSS - total suspended solids

SWRX-Pre - Vault located downstream from CB-09, from which water is pumped into the StormwateRx system for treatment.

See Appendix E for additional details on analytical methods and sampling procedures.

Table E.4. Analytical Methods, Sample Containers, Preservation, and Holding Times

Project No. 190293, South Park Marina, Seattle, Washington

Sample Matrix	Analytical Parameter	Analytical Method	Sample Container	No. Containers	Preservation Requirements	Holding Time
Soil and Catch Basin Solids	Metals Other than Mercury	EPA 6020A	4 ounce jar	1	Cool 0 - 6ºC	6 Months
	Mercury by CVAA	EPA 7471B	4 ounce jar	1	None	28 Days
	Tributyl Tins	EPA 8270D-SIM	8 ounce jar	1	Cool 0 - 6ºC	14 Days
	Diesel-and Oil-Range TPH	NWTPH-Dx	8 ounce jar	1	Cool 0 - 6ºC	14 Days
	Gasoline-Range TPH	NWTPH-Gx	Method 5035, 40 mL vials	2	Cool 0 - 6ºC, Methanol	14 Days
	VOCs	EPA 5035 and EPA 8260D	Method 5035, Two 40 mL vials	3	Cool 0 - 6ºC, NaHSO4	14 Days
	SVOCs excluding PAHs	EPA 8270E	8 ounce jar	1	Cool 0 - 6ºC	14 Days
	PAHs (low level)	EPA 8270E-SIM	8 ounce jar	1	Cool 0 - 6ºC	14 Days
	Organochlorine Pesticides	EPA 8081B	8 ounce jar	1	Cool 0 - 6ºC	14 Days
	PCB Aroclors (4 ug/kg)	EPA 8082A	8 ounce jar	1	Cool 0 - 6ºC	1 Year
	PCB Congeners	EPA 1668	8 ounce jar	1	Cool 0 - 6ºC	1 Year
	Chlorinated Dioxins/Furans by HRGC/HRMS	EPA 1613B	8 ounce amber jar	1	Freeze	1 Year
	TOC	SW9060	4 ounce jar	1	Cool 0 - 6ºC	28 Days
Groundwater and Stormwater	Metals other than Mercury - Total	Method 6020	500 mL HDPE	1	pH <2 with 1:1 HNO_3, Cool 0 - 6ºC	6 Months
	Metals other than Mercury - Dissolved (field filtered)*	Method 6020	500 mL HDPE	1	pH <2 with 1:1 HNO_3, Cool 0 - 6ºC	6 Months
	Total Mercury by CVAA	EPA 7470A	500 mL HDPE	1	5 mL 1:1 HNO_3	28 Days
	Dissolved Mercury by CVAA (Low Level)*	EPA 7470A	500 mL HDPE	1	5 mL 1:1 HNO_3	28 Days
	Tributyl Tins	EPA 8270D-SIM	500 mL glass amber	2	Cool 0 - 6ºC	7 Days
	Diesel- and Oil-Range TPH	NWTPH-Dx	500 mL glass amber	2	Cool 0 - 6ºC w/ 1:1 HCl	14 Days
	Gasoline-Range TPH	NWTPH-Gx	40 mL vials	1	HCl to pH < 2.0, Cool 0 - 6ºC	14 Days
	VOCs	EPA 8260D	40 mL vials	1	HCl to pH < 2.0, Cool 0 - 6ºC	14 Days
	SVOCs excluding PAHs (20 ug/kg - 0.2 ug/L Sep F)	EPA 8270E	500 mL glass amber	2	Cool 0 - 6ºC	7 Days
	PAHs - low level	EPA 8270E-SIM	500 mL glass amber	2	Cool 0 - 6ºC	7 Days
	Organochlorine Pesticides	EPA 8081B	500 mL glass amber	2	Cool 0 - 6ºC	7 Days
	Organochlorine Pesticides (low level)	EPA 8081B	500 mL glass amber	2	Cool 0 - 6ºC	7 Days
	PCB Aroclors (0.01 ug/L)	EPA 8082A	1 L glass amber	2	Cool 0 - 6ºC	7 Days
	PCB Congeners	EPA 1668	500 mL glass amber	2	Cool 0 - 6ºC	7 Days
	TOC	EPA 9060A / SM5310 B-00	250 mL glass amber	1	Cool 0 - 6ºC + pH <2 with 2 mL 9N H_2SO_4	28 days
	TSS, Residue Non-Filterable	EPA 160.2	1 L HDPE	1	Cool 0 - 6ºC	7 Days

Notes:

* If groundwater analyzed for dissolved metals is not field filtered, use unpreserved 500 mL HDPE.
EPA - United States Environmental Protection Agency
HCl - hydrochloric acid
HNO_3 - nitric acid
H_2SO_4 - sulfuric acid
HDPE - high density polyethylene
CVAA - cold vapor atomic absorption spectroscopy
VOC - volatile organic compounds
SVOCs - semi-volatile organic compounds
PAHs - polycyclic aromatic hydrocarbons
PCB - polychlorinated biphenyl
HRGC/HRMS - high-resolution gas chromatography/high-resolution mass spectrometry
SIM - secondary ion mass spectrometry
Plumb, 1981 - Plumb, R.H. Jr., *Procedures for Handling and Chemical Analysis of Sediment and Water Samples,* May 1981, USACE Publication AD/A103788.
PSEP - Puget Sound Estuary Protocol
mL - milliliters
L - liters

Table E.6. Analytical Priority for Low Volume Samples

Project No. 190293, South Park Marina, Seattle, Washington

Media	Investigation Area	Exploration / Locations	Analysis Priority										
			1 [(a)]	2	3	4	5	6	7	8	9	10	11
Soil	Former A&B Barrel Area	SB-26, MW-04 through MW-07	TPHg, VOCs	PCBs	Pesticides	TPHd/o	D/F	PAHs	Metals	SVOCs	TBT	TOC	QC Dups
	Historical Boat Manufacturing Area	SB-27, SB-28, & MW-08	TPHg, VOCs	PCBs	Metals	TBT	PAHs	SVOCs	Pesticides	TPHd/o	TOC	QC Dups	--
	Former Service Station / Former Radiator Repair / Current Repair Shop Area	SB-29, SB-30, SB-31, SB-34, MW-12, & MW-13	TPHg, VOCs	TPHd/o	PCBs	Metals	PAHs	SVOCs	TBT	Pesticides	TOC	QC Dups	--
	Shoreline	MW-09 through MW-10	TPHg, VOCs	PCBs	Pesticides	Metals	TBT	PAHs	SVOCs	TPHd/o	TOC	QC Dups	--
	Former / Current Boat Maintenance Area	MW-14, MW-15, SB-32 & SB-33	TPHg, VOCs	TBT	PCBs	Metals	TPHd/o	PAHs	SVOCs	Pesticides	D/F	TOC	QC Dups
	T-117 Property Line	HA-01 & HA-02	TPHg, VOCs	PCBs	Pesticides	TPHd/o	PAHs	Metals	SVOCs	TBT	TOC	QC Dups	--
	Erodible Bank Soils	TBD	TPHg, VOCs	PCBs	Metals	TBT	PAHs	TPHd/o	SVOCs	Pesticides	TOC	QC Dups	--
Catch Basin Solids	Catch Basins	CB-02, CB-06, SWRX-Pre	TPHg, VOCs	TBT	PCBs	Metals	TOC	TPHd/o	PAHs	SVOCs	Pesticides	D/F	QC Dups
Groundwater	Former A&B Barrel Area	MW-04 through MW-07	TPHg, VOCs	PCBs	Pesticides	TPHd/o	PAHs	Metals	SVOCs	TBT	TOC	TSS	QC Dups
	Shoreline (incl. Historical Boat Manufacturing Area)	MW-08 through MW-11	TPHg, VOCs	PCBs	Metals	TBT	Pesticides	PAHs	TPHd/o	SVOCs	TOC	TSS	QC Dups
	Former Service Station / Current Repair Shop Area	MW-12 & MW-13	TPHg, VOCs	TPHd/o	PCBs	Metals	PAHs	TOC	TSS	QC Dups	--	--	--
	Former / Current Boat Maintenance Area	MW-14 & MW-15	TPHg, VOCs	TBT	PCBs	Metals	TPHd/o	PAHs	SVOCs	Pesticides	TOC	TSS	QC Dups
Stormwater	Stormwater System	CB-02, CB-06, SWRX-Pre	TBT	PCBs	Metals	TOC	TPHd/o	PAHs	SVOCs	TSS	QC Dups	--	--

Notes:

[(a)] - In accordance with EPA method 5035 and standard groundwater sampling standard of care, bottles for volatile analytes (e.g. gasoline-range TPH and VOCs) will be collected first.

VOCs = volatile organic compounds
TPHg = gasoline-range total petroleum hydrocarbons
PCBs = polychlorinated biphenyl Aroclors
TPHd/o = diesel- and oil-range total petroleum hydrocarbons
PAHs = polycyclic aromatic hydrocarbons
TBT = tributyl tin
TOC = total organic carbon
SVOCs = semivolatile organic compounds
D/F = Dioxin/Furans
TSS = total suspended solids
QC Dupes = quality control duplicates

Table E.8. Measurement Quality Objectives for Water Samples

Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (µg/L)	Most Stringent PCUL for Non-Potable Water (µg/L)	Most Stringent PCUL for Non-Potable Water (pg/L)	% calculated	MDL[A]	LCS/LCS %R[A]	MS/MSD %R[A]	RPD (%)	Surrogate %R[A]
Chlorinated Dioxin/Furans by 1613B (pg/L)											
2,3,7,8-TCDD	10	pg/L	1.00E-05	5.10E-09	5.10E-03	1	1.10	67-158	67-158	25	-
1,2,3,7,8-PeCDD	10	pg/L	1.00E-05	na	na	0	1.90	70-142	-	25	-
1,2,3,4,7,8-HxCDD	10	pg/L	1.00E-05	na	na	0	1.60	70-164	-	25	-
1,2,3,4,7,8-HxCDF	10	pg/L	1.00E-05	na	na	0	1.70	72-134	-	25	-
1,2,3,6,7,8-HxCDD	10	pg/L	1.00E-05	na	na	0	1.50	76-134	-	25	-
1,2,3,7,8,9-HxCDD	10	pg/L	1.00E-05	na	na	0	1.70	64-162	-	25	-
1,2,3,4,6,7,8-HpCDD	10	pg/L	1.00E-05	na	na	0	1.90	70-140	-	25	-
OCDD	50	pg/L	5.00E-05	na	na	0	34.0	78-144	-	25	-
2,3,7,8-TCDF	10	pg/L	1.00E-05	na	na	0	0.600	75-158	-	25	-
1,2,3,7,8-PeCDF	10	pg/L	1.00E-05	na	na	0	2.10	80-134	-	25	-
2,3,4,7,8-PeCDF	10	pg/L	1.00E-05	na	na	0	2.00	68-160	-	25	-
1,2,3,6,7,8-HxCDF	10	pg/L	1.00E-05	na	na	0	2.20	84-130	-	25	-
1,2,3,7,8,9-HxCDF	10	pg/L	1.00E-05	na	na	0	2.00	78-130	-	25	-
2,3,4,6,7,8-HxCDF	10	pg/L	1.00E-05	na	na	0	1.30	70-156	-	25	-
1,2,3,4,6,7,8-HpCDF	10	pg/L	1.00E-05	na	na	0	2.20	82-122	-	25	-
1,2,3,4,7,8,9-HpCDF	10	pg/L	1.00E-05	na	na	0	2.10	78-138	-	25	-
OCDF	20	pg/L	2.00E-05	na	na	0	5.40	63-170	-	25	-
Total HpCDD	10	pg/L	1.00E-05	na	na	0	0	-	-	-	-
Total HpCDF	10	pg/L	1.00E-05	na	na	0	0	-	-	-	-
Total HxCDD	10	pg/L	1.00E-05	na	na	0	0	-	-	-	-
Total HxCDF	10	pg/L	1.00E-05	na	na	0	0	-	-	-	-
Total PeCDD	10	pg/L	1.00E-05	na	na	0	0	-	-	-	-
Total PeCDF	10	pg/L	1.00E-05	na	na	0	0	-	-	-	-
Total TCDD	10	pg/L	1.00E-05	na	na	0	0	-	-	-	-
Total TCDF	10	pg/L	1.00E-05	na	na	0	0	-	-	-	-
Total chlorinated dioxins			1.15E-07	na	na						
Total chlorinated furans			7.51E-06	na	na						
Total dioxin/furan TEQ			7.62E-06	5.10E-09	5.10E-03						
Polychlorinated Biphenyl (PCB) Congeners by 1668 (pg/L)											
PCB-1	1.3	pg/L	1.30E-06	na	na						
PCB-2	1.57	pg/L	1.57E-06	na	na						
PCB-3	1.36	pg/L	1.36E-06	na	na						
PCB-4/10	2.27	pg/L	2.27E-06	na	na						
PCB-5/8	2.05	pg/L	2.05E-06	na	na						
PCB-6	1.71	pg/L	1.71E-06	na	na						
PCB-7/9	2.31	pg/L	2.31E-06	na	na						
PCB-11	6.05	pg/L	6.05E-06	na	na						
PCB-12/13	3.65	pg/L	3.65E-06	na	na						
PCB-14	1.44	pg/L	1.44E-06	na	na						
PCB-15	1.12	pg/L	1.12E-06	na	na						
PCB-16/32	1.9	pg/L	1.90E-06	na	na						
PCB-17	1.48	pg/L	1.48E-06	na	na						
PCB-18	1.97	pg/L	1.97E-06	na	na						
PCB-19	1.55	pg/L	1.55E-06	na	na						
PCB-20/21/33	7.79	pg/L	7.79E-06	na	na						
PCB-22	2.78	pg/L	2.78E-06	na	na						
PCB-23	3	pg/L	3.00E-06	na	na						
PCB-24/27	3.15	pg/L	3.15E-06	na	na						
PCB-25	2.64	pg/L	2.64E-06	na	na						
PCB-26	2.45	pg/L	2.45E-06	na	na						
PCB-28	3.36	pg/L	3.36E-06	na	na						
PCB-29	1.92	pg/L	1.92E-06	na	na						
PCB-30	1.66	pg/L	1.66E-06	na	na						
PCB-31	2.42	pg/L	2.42E-06	na	na						
PCB-34	1.08	pg/L	1.08E-06	na	na						
PCB-35	2.14	pg/L	2.14E-06	na	na						
PCB-36	2.02	pg/L	2.02E-06	na	na						
PCB-37	1.71	pg/L	1.71E-06	na	na						
PCB-38	1.97	pg/L	1.97E-06	na	na						
PCB-39	2.21	pg/L	2.21E-06	na	na						
PCB-40	2.65	pg/L	2.65E-06	na	na						
PCB-41/64/71/72	7.11	pg/L	7.11E-06	na	na						
PCB-42/59	3.1	pg/L	3.10E-06	na	na						
PCB-43/49	4.28	pg/L	4.28E-06	na	na						
PCB-44	2.98	pg/L	2.98E-06	na	na						
PCB-45	1.82	pg/L	1.82E-06	na	na						
PCB-46	1.79	pg/L	1.79E-06	na	na						
PCB-47	2.52	pg/L	2.52E-06	na	na						
PCB-48/75	4.61	pg/L	4.61E-06	na	na						
PCB-50	1.91	pg/L	1.91E-06	na	na						
PCB-51	1.36	pg/L	1.36E-06	na	na						
PCB-52/69	3.88	pg/L	3.88E-06	na	na						
PCB-53	2.19	pg/L	2.19E-06	na	na						
PCB-54	2.17	pg/L	2.17E-06	na	na						
PCB-55	2.1	pg/L	2.10E-06	na	na						
PCB-56/60	4.08	pg/L	4.08E-06	na	na						
PCB-57	2.31	pg/L	2.31E-06	na	na						
PCB-58	3.01	pg/L	3.01E-06	na	na						
PCB-61/70	3.78	pg/L	3.78E-06	na	na						
PCB-62	1.98	pg/L	1.98E-06	na	na						
PCB-63	1.52	pg/L	1.52E-06	na	na						
PCB-65	2.61	pg/L	2.61E-06	na	na						
PCB-66/76	3.95	pg/L	3.95E-06	na	na						
PCB-67	2.69	pg/L	2.69E-06	na	na						
PCB-68	2.49	pg/L	2.49E-06	na	na						
PCB-73	1.69	pg/L	1.69E-06	na	na						
PCB-74	2.32	pg/L	2.32E-06	na	na						
PCB-77	2.76	pg/L	2.76E-06	na	na						
PCB-78	1.95	pg/L	1.95E-06	na	na						
PCB-79	2.34	pg/L	2.34E-06	na	na						
PCB-80	2.47	pg/L	2.47E-06	na	na						
PCB-81	2.76	pg/L	2.76E-06	na	na						
PCB-82	0.878	pg/L	8.78E-07	na	na						
PCB-83	1.16	pg/L	1.16E-06	na	na						
PCB-84/92	3.81	pg/L	3.81E-06	na	na						
PCB-85/116	2.25	pg/L	2.25E-06	na	na						
PCB-86	3.08	pg/L	3.08E-06	na	na						
PCB-87/117/125	6.11	pg/L	6.11E-06	na	na						
PCB-88/91	6.75	pg/L	6.75E-06	na	na						
PCB-89	1.55	pg/L	1.55E-06	na	na						
PCB-90/101	4.58	pg/L	4.58E-06	na	na						
PCB-93	1.86	pg/L	1.86E-06	na	na						
PCB-94	2.17	pg/L	2.17E-06	na	na						

Table E.8. Measurement Quality Objectives for Water Samples

Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (µg/L)	Most Stringent PCUL for Non-Potable Water (µg/L)	Most Stringent PCUL for Non-Potable Water (pg/L)	% calculated	MDL(A)	LCS/LCS %R(A)	MS/MSD %R(A)	RPD (%)	Surrogate %R(A)
PCB-95/98/102	4.86	pg/L	4.86E-06	na	na						
PCB-96	1.13	pg/L	1.13E-06	na	na						
PCB-97	3.04	pg/L	3.04E-06	na	na						
PCB-99	2.2	pg/L	2.20E-06	na	na						
PCB-100	1.54	pg/L	1.54E-06	na	na						
PCB-103	1.72	pg/L	1.72E-06	na	na						
PCB-104	1.42	pg/L	1.42E-06	na	na						
PCB-105	1.5	pg/L	1.50E-06	na	na						
PCB-106/118	3.19	pg/L	3.19E-06	na	na						
PCB-107/109	2.07	pg/L	2.07E-06	na	na						
PCB-108/112	3.49	pg/L	3.49E-06	na	na						
PCB-110	0.8	pg/L	8.00E-07	na	na						
PCB-111/115	3.35	pg/L	3.35E-06	na	na						
PCB-113	3.03	pg/L	3.03E-06	na	na						
PCB-114	2.84	pg/L	2.84E-06	na	na						
PCB-119	1.57	pg/L	1.57E-06	na	na						
PCB-120	1.82	pg/L	1.82E-06	na	na						
PCB-121	4.01	pg/L	4.01E-06	na	na						
PCB-122	3.56	pg/L	3.56E-06	na	na						
PCB-123	1.93	pg/L	1.93E-06	na	na						
PCB-124	2.4	pg/L	2.40E-06	na	na						
PCB-126	0.793	pg/L	7.93E-07	na	na						
PCB-127	1.02	pg/L	1.02E-06	na	na						
PCB-128/162	2.81	pg/L	2.81E-06	na	na						
PCB-129	2.41	pg/L	2.41E-06	na	na						
PCB-130	0.764	pg/L	7.64E-07	na	na						
PCB-131/133	2.56	pg/L	2.56E-06	na	na						
PCB-132/161	3.39	pg/L	3.39E-06	na	na						
PCB-134/143	2.82	pg/L	2.82E-06	na	na						
PCB-135	2.19	pg/L	2.19E-06	na	na						
PCB-136	1.63	pg/L	1.63E-06	na	na						
PCB-137	1.59	pg/L	1.59E-06	na	na						
PCB-138/163/164	4	pg/L	4.00E-06	na	na						
PCB-139/149	3.61	pg/L	3.61E-06	na	na						
PCB-140	2.14	pg/L	2.14E-06	na	na						
PCB-141	1.54	pg/L	1.54E-06	na	na						
PCB-142	1.65	pg/L	1.65E-06	na	na						
PCB-144	4.16	pg/L	4.16E-06	na	na						
PCB-145	3.32	pg/L	3.32E-06	na	na						
PCB-146/165	3.07	pg/L	3.07E-06	na	na						
PCB-147	4.01	pg/L	4.01E-06	na	na						
PCB-148	4.82	pg/L	4.82E-06	na	na						
PCB-150	1.07	pg/L	1.07E-06	na	na						
PCB-151	2.42	pg/L	2.42E-06	na	na						
PCB-152	2.69	pg/L	2.69E-06	na	na						
PCB-153	1.82	pg/L	1.82E-06	na	na						
PCB-154	4.28	pg/L	4.28E-06	na	na						
PCB-155	2.44	pg/L	2.44E-06	na	na						
PCB-156	1.76	pg/L	1.76E-06	na	na						
PCB-157	1.14	pg/L	1.14E-06	na	na						
PCB-158/160	2.43	pg/L	2.43E-06	na	na						
PCB-159	1.75	pg/L	1.75E-06	na	na						
PCB-166	1.36	pg/L	1.36E-06	na	na						
PCB-167	1.7	pg/L	1.70E-06	na	na						
PCB-168	1.04	pg/L	1.04E-06	na	na						
PCB-169	2.27	pg/L	2.27E-06	na	na						
PCB-170	3.33	pg/L	3.33E-06	na	na						
PCB-171	1.55	pg/L	1.55E-06	na	na						
PCB-172	2.68	pg/L	2.68E-06	na	na						
PCB-173	2.52	pg/L	2.52E-06	na	na						
PCB-174	1.94	pg/L	1.94E-06	na	na						
PCB-175	2.18	pg/L	2.18E-06	na	na						
PCB-176	2.57	pg/L	2.57E-06	na	na						
PCB-177	2.38	pg/L	2.38E-06	na	na						
PCB-178	2.6	pg/L	2.60E-06	na	na						
PCB-179	2.6	pg/L	2.60E-06	na	na						
PCB-180	1.52	pg/L	1.52E-06	na	na						
PCB-181	1.85	pg/L	1.85E-06	na	na						
PCB-182/187	3.48	pg/L	3.48E-06	na	na						
PCB-183	1.79	pg/L	1.79E-06	na	na						
PCB-184	1.4	pg/L	1.40E-06	na	na						
PCB-185	1.02	pg/L	1.02E-06	na	na						
PCB-186	2.69	pg/L	2.69E-06	na	na						
PCB-188	1.98	pg/L	1.98E-06	na	na						
PCB-189	1.49	pg/L	1.49E-06	na	na						
PCB-190	2.11	pg/L	2.11E-06	na	na						
PCB-191	0.95	pg/L	9.50E-07	na	na						
PCB-192	1.79	pg/L	1.79E-06	na	na						
PCB-193	1.42	pg/L	1.42E-06	na	na						
PCB-194	1.33	pg/L	1.33E-06	na	na						
PCB-195	1.48	pg/L	1.48E-06	na	na						
PCB-196/203	5.56	pg/L	5.56E-06	na	na						
PCB-197	2.45	pg/L	2.45E-06	na	na						
PCB-198	4.5	pg/L	4.50E-06	na	na						
PCB-199	3.98	pg/L	3.98E-06	na	na						
PCB-200	3.32	pg/L	3.32E-06	na	na						
PCB-201	1.65	pg/L	1.65E-06	na	na						
PCB-202	1.24	pg/L	1.24E-06	na	na						
PCB-204	2.47	pg/L	2.47E-06	na	na						
PCB-205	1.82	pg/L	1.82E-06	na	na						
PCB-206	2.18	pg/L	2.18E-06	na	na						
PCB-207	1.32	pg/L	1.32E-06	na	na						
PCB-208	0.887	pg/L	8.87E-07	na	na						
PCB-209	2.28	pg/L	2.28E-06	na	na						
Total PCB congeners			4.16E-04	7.00E-06	7.00E+00						
Total Dioxin-like PCB TEQ			1.49E-07	4.43E-09	4.43E-03						
Polychlorinated biphenyl (PCB) Aroclors by 8082A (ug/L)											
Aroclor 1016	0.01	ug/L	0.01	na		0	0.00248	54-120	54-120	30	-
Aroclor 1221	0.01	ug/L	0.01	na		0	0.00248	-	-	30	-
Aroclor 1232	0.01	ug/L	0.01	na		0	0.00248	-	-	30	-
Aroclor 1242	0.01	ug/L	0.01	na		0	0.00248	-	-	30	-
Aroclor 1248	0.01	ug/L	0.01	na		0	0.00248	-	-	30	-
Aroclor 1254	0.01	ug/L	0.01	na		0	0.00248	-	-	30	-
Aroclor 1260	0.01	ug/L	0.01	na		0	0.00276	51-128	51-128	30	-

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Aroclor 1262	0.01	ug/L	0.01	na		0	0.00276	-	-	30	-
Aroclor 1268	0.01	ug/L	0.01	na		0	0.00276	-	-	30	-
Total PCB Aroclors			0.09	7.00E-06							
Metals (other than Mercury) by 6020A (ug/L)											
Barium-135	0.5	ug/L	0.5	200		0	0.0560	80-120	75-125	20	-
Chromium-52	0.5	ug/L	0.5	na		0	0.130	80-120	75-125	20	-
Lead-208	0.1	ug/L	0.1	8.1		0	0.0680	80-120	75-125	20	-
Silver-107	0.2	ug/L	0.2	1.9		0	0.0170	80-120	75-125	20	-
Arsenic-75a	0.2	ug/L	0.2	8		0	0.0220	80-120	75-125	20	-
Cadmium-111	0.1	ug/L	0.1	1.2		0	0.0300	80-120	75-125	20	-
Selenium-78	0.5	ug/L	0.5	71		0	0.440	80-120	75-125	20	-
Zinc-66	4	ug/L	4	85			0.82	80-120	75-125	20	-
Copper-63	0.5	ug/L	0.5	13.7			0.34	80-120	75-125	20	-
Nickel-60	0.5	ug/L	0.5	8.2			0.05	80-120	75-125	20	-
Mercury by 7471B (mg/L)											
Mercury	2.00E-05	mg/L	2.00E-02	2.5E-02		0	0.0000100	80-120	75-125	20	-
Organochlorine Pesticides by 8081B (ug/L)											
2,4'-DDD	1.25E-03	ug/L	1.25E-03	na		0	0.00125	30-160	30-160	30	-
2,4'-DDE	1.25E-03	ug/L	1.25E-03	na		0	0.00125	30-160	30-160	30	-
2,4'-DDT	1.25E-03	ug/L	1.25E-03	na		0	0.00125	30-160	30-160	30	-
4,4'-DDD	1.25E-03	ug/L	1.25E-03	7.90E-06		1	0.000181	30-160	30-160	30	-
4,4'-DDE	1.25E-03	ug/L	1.25E-03	8.80E-07		1	0.000276	30-160	30-160	30	-
4,4'-DDT	1.25E-03	ug/L	1.25E-03	1.20E-06		1	0.000385	30-160	30-160	30	-
Aldrin	6.25E-04	ug/L	6.25E-04	4.10E-08		1	0.000153	30-160	30-160	30	-
alpha-BHC	6.25E-04	ug/L	6.25E-04	4.80E-05		1	0.0000940	30-160	30-160	30	-
beta-BHC	6.25E-04	ug/L	6.25E-04	1.40E-03		0	0.000144	30-160	30-160	30	-
Chlordane (NOS)	5.00E-03	ug/L	5.00E-03	2.20E-05		1	0.00500	-	-	-	-
Chlordane, technical	5.00E-03	ug/L	5.00E-03	na		0	0.00500	30-160	30-160	30	-
cis-Chlordane (alpha-chlordane)	6.25E-04	ug/L	6.25E-04	1.03E-04		1	0.000130	30-160	30-160	30	-
cis-Nonachlor	1.25E-03	ug/L	1.25E-03	na		0	0.00125	30-160	30-160	30	-
delta-BHC	6.25E-04	ug/L	6.25E-04	na		0	0.000105	30-160	30-160	30	-
Dieldrin	1.25E-03	ug/L	1.25E-03	1.20E-06		1	0.000356	30-160	30-160	30	-
Endosulfan I	6.25E-04	ug/L	6.25E-04	8.70E-03		0	0.000131	30-160	30-160	30	-
Endosulfan II	1.25E-03	ug/L	1.25E-03	8.70E-03		0	0.000211	30-160	30-160	30	-
Endosulfan Sulfate	1.25E-03	ug/L	1.25E-03	1.00E+01		0	0.000261	30-160	30-160	30	-
Endrin	1.25E-03	ug/L	1.25E-03	2.00E-03		0	0.000131	30-160	30-160	30	-
Endrin Aldehyde	1.25E-03	ug/L	1.25E-03	3.50E-02		0	0.000364	30-160	30-160	30	-
Endrin Ketone	1.25E-03	ug/L	1.25E-03	na		0	0.000261	30-160	30-160	30	-
gamma-BHC (Lindane)	6.25E-04	ug/L	6.25E-04	1.26E-01		0	0.000134	30-160	30-160	30	-
Heptachlor	6.25E-04	ug/L	6.25E-04	3.40E-07		1	0.000171	30-160	30-160	30	-
Heptachlor Epoxide	6.25E-04	ug/L	6.25E-04	2.40E-06		1	0.000175	30-160	30-160	30	-
Methoxychlor	6.25E-03	ug/L	6.25E-03	2.00E-02		0	0.00207	30-160	30-160	30	-
Mirex	1.25E-03	ug/L	1.25E-03	1.00E-03		1	0.00125	30-160	30-160	30	-
Oxychlordane	1.25E-03	ug/L	1.25E-03	na		0	0.00125	30-160	30-160	30	-
Toxaphene	6.25E-02	ug/L	6.25E-02	3.20E-05		1	0.0625	30-160	30-160	30	-
trans-Chlordane (beta-Chlordane)	6.25E-04	ug/L	6.25E-04	1.03E-04		1	0.000233	30-160	30-160	30	-
trans-Nonachlor	1.25E-03	ug/L	1.25E-03	na		0	0.00125	30-160	30-160	30	-
Volatile Organic Compounds (VOCs) by 8260C (ug/L)											
1,1,1,2-Tetrachloroethane	0.2	ug/L	2.00E-01	7.36E+00		0	0.0396	80-120	80-120	30	-
1,1,1-Trichloroethane	0.2	ug/L	2.00E-01	5.46E+03		0	0.0408	79-123	79-123	30	-
1,1,2,2-Tetrachloroethane	0.2	ug/L	2.00E-01	3.00E-01		0	0.0598	77-123	77-123	30	-
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.2	ug/L	2.00E-01	1.83E+02		0	0.0429	76-129	76-129	30	-
1,1,2-Trichloroethane	0.2	ug/L	2.00E-01	9.00E-01		0	0.129	80-121	80-121	30	-
1,1-Dichloroethane	0.2	ug/L	2.00E-01	1.11E+01		0	0.0533	76-124	76-124	30	-
1,1-Dichloroethene	0.2	ug/L	2.00E-01	1.29E+02		0	0.0540	69-135	69-135	30	-
1,1-Dichloropropene	0.2	ug/L	2.00E-01	na		0	0.0340	80-120	80-120	30	-
1,2,3-Trichlorobenzene	0.5	ug/L	5.00E-01	na		0	0.110	49-133	49-133	30	-
1,2,3-Trichloropropane	0.5	ug/L	5.00E-01	na		0	0.131	76-125	76-125	30	-
1,2,4-Trichlorobenzene	0.5	ug/L	5.00E-01	3.70E-02		1	0.107	64-124	64-124	30	-
1,2,4-Trimethylbenzene	0.2	ug/L	2.00E-01	2.39E+02		0	0.0243	80-127	80-127	30	-
1,2-Dibromo-3-chloropropane	0.5	ug/L	5.00E-01	na		0	0.366	62-123	62-123	30	-
1,2-Dibromoethane	0.2	ug/L	2.00E-01	2.71E-01		0	0.0745	80-121	80-121	30	-
1,2-Dichlorobenzene	0.2	ug/L	2.00E-01	4.61E+00		0	0.0365	80-120	80-120	30	-
1,2-Dichloroethane	0.2	ug/L	2.00E-01	4.22E+00		0	0.0717	75-123	75-123	30	-
1,2-Dichloropropane	0.2	ug/L	2.00E-01	3.10E+00		0	0.0352	80-120	80-120	30	-
1,3,5-Trimethylbenzene	0.2	ug/L	2.00E-01	na		0	0.0150	80-129	80-129	30	-
1,3-Dichlorobenzene	0.2	ug/L	2.00E-01	2.00E+00		0	0.0362	80-120	80-120	30	-
1,3-Dichloropropane	0.2	ug/L	2.00E-01	na		0	0.0622	80-120	80-120	30	-
1,4-Dichlorobenzene	0.2	ug/L	2.00E-01	4.93E+00		0	0.0397	80-120	80-120	30	-
2,2-Dichloropropane	0.2	ug/L	2.00E-01	na		0	0.0518	78-125	78-125	30	-
2-Butanone	5	ug/L	5.00E+00	1.75E+06		0	0.814	61-140	61-140	30	-
2-Chloroethyl vinyl ether	1	ug/L	1.00E+00	na		0	0.250	74-127	74-127	30	-
2-Chlorotoluene	0.2	ug/L	2.00E-01	na		0	0.0236	78-122	78-122	30	-
2-Hexanone	5	ug/L	5.00E+00	na		0	0.902	69-133	69-133	30	-
2-Pentanone	5	ug/L	5.00E+00	na		0	5.00	69-134	69-134	30	-
4-Chlorotoluene	0.2	ug/L	2.00E-01	na		0	0.0159	80-121	80-121	30	-
4-Isopropyl Toluene	0.2	ug/L	2.00E-01	na		0	0.0263	79-130	79-130	30	-
4-Methyl-2-Pentanone	5	ug/L	5.00E+00	4.70E+05		0	0.974	67-133	67-133	30	-
Acetone	5	ug/L	5.00E+00	na		0	2.06	58-142	58-142	30	-
Acrolein	5	ug/L	5.00E+00	1.10E+00		1	2.48	52-144	52-144	30	-
Acrylonitrile	1	ug/L	1.00E+00	2.80E-02		1	0.604	64-134	64-134	30	-
Benzene	0.2	ug/L	2.00E-01	1.60E+00		0	0.0266	80-120	80-120	30	-
Bromobenzene	0.2	ug/L	2.00E-01	na		0	0.0605	80-120	80-120	30	-
Bromochloromethane	0.2	ug/L	2.00E-01	na		0	0.0607	80-121	80-121	30	-
Bromodichloromethane	0.2	ug/L	2.00E-01	1.82E+00		0	0.0506	80-121	80-121	30	-
Bromoethane	0.2	ug/L	2.00E-01	na		0	0.0412	78-128	78-128	30	-
Bromoform	0.2	ug/L	2.00E-01	1.20E+01		0	0.0618	51-134	51-134	30	-
Bromomethane	1	ug/L	1.00E+00	1.29E+01		0	0.252	72-131	72-131	30	-
Carbon Disulfide	0.2	ug/L	2.00E-01	3.99E+02		0	0.0370	78-125	78-125	30	-
Carbon tetrachloride	0.2	ug/L	2.00E-01	3.50E-01		0	0.0439	53-137	53-137	30	-
Chlorobenzene	0.2	ug/L	2.00E-01	2.00E+02		0	0.0230	80-120	80-120	30	-
Chloroethane	0.2	ug/L	2.00E-01	1.85E+04		0	0.0861	60-155	60-155	30	-
Chloroform	0.2	ug/L	2.00E-01	1.19E+00		0	0.0273	80-122	80-122	30	-
Chloromethane	0.5	ug/L	5.00E-01	1.53E+02		0	0.0948	60-138	60-138	30	-
cis-1,2-Dichloroethene	0.2	ug/L	2.00E-01	na		0	0.0427	80-121	80-121	30	-
cis-1,3-Dichloropropene	0.2	ug/L	2.00E-01	2.00E+00		0	0.0610	80-124	80-124	30	-
Dibromochloromethane	0.2	ug/L	2.00E-01	2.20E+00		0	0.0481	65-135	65-135	30	-
Dibromomethane	0.2	ug/L	2.00E-01	na		0	0.145	80-120	80-120	30	-
Dichlorodifluoromethane	0.2	ug/L	2.00E-01	5.65E+00		0	0.0521	48-147	48-147	30	-
Ethylbenzene	0.2	ug/L	2.00E-01	3.10E+01		0	0.0371	80-120	80-120	30	-
Hexachloro-1,3-Butadiene	0.5	ug/L	5.00E-01	1.00E-02		1	0.0734	58-123	58-123	30	-
Iodomethane	1	ug/L	1.00E+00	na		0	0.227	56-147	56-147	30	-
Isopropyl Benzene	0.2	ug/L	2.00E-01	na		0	0.0212	80-128	80-128	30	-
m,p-Xylene	0.4	ug/L	4.00E-01	na		0	0.0522	80-121	80-121	30	-

Table E.8. Measurement Quality Objectives for Water Samples

Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (µg/L)	Most Stringent PCUL for Non-Potable Water (µg/L)	Most Stringent PCUL for Non-Potable Water (pg/L)	% calculated	MDL[(A)]	LCS/LCS %R[(A)]	MS/MSD %R[(A)]	RPD (%)	Surrogate %R[(A)]
Methyl tert-butyl Ether	0.5	ug/L	5.00E-01	6.05E+02		0	0.0729	71-132	71-132	30	-
Methylene Chloride	1	ug/L	1.00E+00	1.00E+02		0	0.485	65-135	65-135	30	-
n-Butylbenzene	0.2	ug/L	2.00E-01	na		0	0.0248	74-129	74-129	30	-
n-Hexane	0.2	ug/L	2.00E-01	na		0	0.100	70-130	70-130	30	-
n-Propylbenzene	0.2	ug/L	2.00E-01	na		0	0.0235	78-130	78-130	30	-
o-Xylene	0.2	ug/L	2.00E-01	na		0	0.0349	80-121	80-121	30	-
s-Butylbenzene	0.2	ug/L	2.00E-01	na		0	0.0237	78-129	78-129	30	-
Styrene	0.2	ug/L	2.00E-01	8.19E+03		0	0.0454	80-124	80-124	30	-
t-Butylbenzene	0.2	ug/L	2.00E-01	na		0	0.0256	78-125	78-125	30	-
Tetrachloroethene	0.2	ug/L	2.00E-01	2.90E+00		0	0.0474	80-120	80-120	30	-
Toluene	0.2	ug/L	2.00E-01	1.30E+02		0	0.0399	80-120	80-120	30	-
trans-1,2-Dichloroethene	0.2	ug/L	2.00E-01	1.00E+03		0	0.0485	78-128	78-128	30	-
trans-1,3-Dichloropropene	0.2	ug/L	2.00E-01	2.00E+00		0	0.0815	71-127	71-127	30	-
trans-1,4-Dichloro 2-Butene	1	ug/L	1.00E+00	na		0	0.324	55-129	55-129	30	-
Trichloroethene	0.2	ug/L	2.00E-01	7.00E-01		0	0.0489	80-120	80-120	30	-
Trichlorofluoromethane	0.2	ug/L	2.00E-01	1.20E+02		0	0.0375	80-129	80-129	30	-
Vinyl Acetate	0.2	ug/L	2.00E-01	7.81E+03		0	0.0688	55-138	55-138	30	-
Vinyl Chloride	0.2	ug/L	2.00E-01	1.80E-01		1	0.0572	66-133	66-133	30	-
Xylenes, total	0.6	ug/L	6.00E-01	3.32E+02		0	0.0871	76-127	76-127	30	-
Semivolatile Organic Compounds (SVOCs) by 8270D (ug/L)											
1,2,4,5-Tetrachlorobenzene	1	ug/L	1.00E+00	na		0	0.0830	0-200	0-200	30	-
1,4-Dioxane	2	ug/L	2.00E+00	na		0	0.211	0-200	0-200	30	-
1-Methylnaphthalene	1	ug/L	1.00E+00	na		0	0.270	46.9-120	46.9-120	30	-
2,2'-Oxybis(1-chloropropane)	0.2	ug/L	2.00E-01	9.00E+02		0	0.0280	30-160	30-160	30	-
2,3,4,6-Tetrachlorophenol	1	ug/L	1.00E+00	na		0	0.134	60.9-120	60.9-120	30	-
2,4,5-Trichlorophenol	1	ug/L	1.00E+00	6.00E+02		0	0.130	30-160	30-160	30	-
2,4,6-Trichlorophenol	1	ug/L	1.00E+00	2.80E-01		1	0.160	30-160	30-160	30	-
2,4-Dichlorophenol	1	ug/L	1.00E+00	1.00E+01		0	0.100	30-160	30-160	30	-
2,4-Dimethylphenol	1	ug/L	1.00E+00	6.34E+00		0	0.270	30-160	30-160	30	-
2,4-Dinitrophenol	2	ug/L	2.00E+00	1.00E+02		0	0.220	30-160	30-160	30	-
2,4-Dinitrotoluene	1	ug/L	1.00E+00	1.80E-01		1	0.110	30-160	30-160	30	-
2,5-Dinitrophenol	25	ug/L	2.50E+01	na		0	2.79	-	-	-	-
2,6-Dinitrotoluene	3	ug/L	3.00E+00	2.97E+02		0	1.17	78.2-141	61-141	30	-
2-Chloronaphthalene	0.2	ug/L	2.00E-01	1.00E+02		0	0.0300	30-160	30-160	30	-
2-Chlorophenol	0.2	ug/L	2.00E-01	1.70E+01		0	0.0290	30-160	30-160	30	-
2-Methylnaphthalene	0.2	ug/L	2.00E-01	na		0	0.0290	30-160	30-160	30	-
2-Methylphenol	1	ug/L	1.00E+00	2.70E+01		0	0.332	47.8-120	47.8-120	30	-
2-Nitroaniline	1	ug/L	1.00E+00	na		0	0.170	30-160	30-160	30	-
2-Nitrophenol	1	ug/L	1.00E+00	na		0	0.0360	30-160	30-160	30	-
3 & 4-Methylphenol	2	ug/L	2.00E+00	na		0	1.00	0-200	0-200	30	-
3,3'-Dichlorobenzidine	1	ug/L	1.00E+00	3.30E-03		1	0.340	30-160	30-160	30	-
3,4,5-Trichloroguaiacol	1	ug/L	1.00E+00	na		0	0.178	0-200	0-200	30	-
3,4,6-Trichloroguaiacol	1	ug/L	1.00E+00	na		0	0	0-200	0-200	30	-
3,4-Dichloroguaiacol	1	ug/L	1.00E+00	na		0	0	30-160	30-160	30	-
3-Nitroaniline	3	ug/L	3.00E+00	na		0	1.72	41.2-120	41.2-123	30	-
4,5,6-Trichloroguaiacol	1	ug/L	1.00E+00	na		0	0.0930	0-200	0-200	30	-
4,5-Dichloroguaiacol	1	ug/L	1.00E+00	na		0	0	30-160	30-160	30	-
4,6-Dichloroguaiacol	1	ug/L	1.00E+00	na		0	0	30-160	30-160	30	-
4,6-Dinitro-2-methylphenol	2	ug/L	2.00E+00	7.00E+00		0	0.360	30-160	30-160	30	-
4-Bromophenyl phenyl ether	0.2	ug/L	2.00E-01	na		0	0.0190	30-160	30-160	30	-
4-Chloro-3-Methylphenol	1	ug/L	1.00E+00	3.60E+01		0	0.130	30-160	30-160	30	-
4-Chloroaniline	1	ug/L	1.00E+00	2.30E+03		0	0.0420	30-160	30-160	30	-
4-Chloroguaiacol	1	ug/L	1.00E+00	na		0	0	30-160	30-160	30	-
4-Chlorophenylphenyl ether	0.2	ug/L	2.00E-01	na		0	0.0200	30-160	30-160	30	-
4-Methylphenol	2	ug/L	2.00E+00	na		0	0.439	52.3-120	52.3-120	30	-
4-Nitroaniline	1	ug/L	1.00E+00	na		0	0.170	30-160	30-160	30	-
4-Nitrophenol	1	ug/L	1.00E+00	na		0	0.0560	30-160	30-160	30	-
alpha-Terpineol	1	ug/L	1.00E+00	na		0	0.155	0-200	0-200	30	-
Aniline	1	ug/L	1.00E+00	na		0	0.912	22.1-120	22.1-125	30	-
Azobenzene (1,2-DP-Hydrazine)	1	ug/L	1.00E+00	na		0	0.269	55.9-120	55.9-120	30	-
Benzoic acid	20	ug/L	2.00E+01	5.89E+02		0	3.44	38.2-120	38.2-120	30	-
Benzyl Alcohol	2	ug/L	2.00E+00	na		0	0.971	27.4-120	27.4-120	30	-
Bis(2-Chloroethoxy)methane	0.2	ug/L	2.00E-01	na		0	0.0300	30-160	30-160	30	-
bis(2-chloroethyl) ether	0.2	ug/L	2.00E-01	6.00E-02		1	0.0280	30-160	30-160	30	-
bis(2-Ethylhexyl)phthalate	0.2	ug/L	2.00E-01	4.60E-02		1	0.163	30-160	30-160	30	-
Butyl Diphenyl Phosphate	1	ug/L	1.00E+00	na		0	0.190	65.4-120	65.4-140	30	-
Butylated Hydroxytoluene	1	ug/L	1.00E+00	na		0	0.210	30-160	30-160	40	-
Butylbenzylphthalate	0.2	ug/L	2.00E-01	1.30E-02		1	0.0660	30-160	30-160	30	-
Carbazole	0.2	ug/L	2.00E-01	na		0	0.0370	30-160	30-160	30	-
Dibenzofuran	0.2	ug/L	2.00E-01	na		0	0.0200	30-160	30-160	30	-
Dibutyl Phenyl Phosphate	1	ug/L	1.00E+00	na		0	0.120	30-160	30-160	40	-
Diethyl phthalate	1	ug/L	1.00E+00	9.26E+01		0	0.423	68.1-120	68.1-120	30	-
Dimethylphthalate	1	ug/L	1.00E+00	6.00E+02		0	0.393	65.2-125	65.2-125	30	-
Di-n-Butylphthalate	0.2	ug/L	2.00E-01	8.00E+00		0	0.0510	30-160	30-160	30	-
Di-n-Octylphthalate	0.2	ug/L	2.00E-01	3.92E-03		1	0.0450	30-160	30-160	30	-
Guaiacol	1	ug/L	1.00E+00	na		0	0.119	0-200	0-200	30	-
Hexachlorobenzene	0.2	ug/L	2.00E-01	5.00E-06		1	0.0360	30-160	30-160	30	-
Hexachlorocyclopentadiene	1	ug/L	1.00E+00	1.00E+00		0	0.140	30-160	30-160	30	-
Hexachloroethane	0.2	ug/L	2.00E-01	2.00E-02		1	0.0370	30-160	30-160	30	-
Isophorone	0.2	ug/L	2.00E-01	1.10E+02		0	0.0310	30-160	30-160	30	-
Nitrobenzene	0.2	ug/L	2.00E-01	1.00E+02		0	0.0270	30-160	30-160	30	-
N-Nitrosodiethylamine	2	ug/L	2.00E+00	na		0	0.217	0-200	-	-	-
N-Nitrosodimethylamine	3	ug/L	3.00E+00	3.40E-01		1	0.935	17.7-120	17.7-120	30	-
N-Nitroso-di-n-butylamine	1	ug/L	1.00E+00	na		0	0.0400	0-200	-	-	-
N-Nitroso-di-n-Propylamine	0.2	ug/L	2.00E-01	5.80E-02		1	0.0350	30-160	30-160	30	-
N-Nitrosodiphenylamine	0.2	ug/L	2.00E-01	6.90E-01		0	0.0250	30-160	30-160	30	-
N-Nitrosopyrrolidine	1	ug/L	1.00E+00	na		0	0.121	0-200	-	-	-
Nonylphenol (mixed)	1	ug/L	1.00E+00	na		0	0.178	0-200	-	-	-
Pentachlorobenzene	1	ug/L	1.00E+00	na		0	0.111	0-200	-	-	-
Pentachlorophenol	1	ug/L	1.00E+00	2.00E-03		1	0.140	30-160	30-160	30	-
Phenol	0.2	ug/L	2.00E-01	3.65E+02		0	0.0100	30-160	30-160	30	-
Pyridine	5	ug/L	5.00E+00	na		0	1.31	33.6-120	33.6-120	30	-
Retene	1	ug/L	1.00E+00	na		0	1.00	0-200	0-200	30	-
Tetrachloroguaiacol	2	ug/L	2.00E+00	na		0	0.248	0-200	0-200	30	-
Tributyl Phosphate	1	ug/L	1.00E+00	na		0	0.160	30-160	30-160	40	-
Triphenyl Phosphate	1	ug/L	1.00E+00	na		0	0.174	77.1-120	77.1-120	30	-
Low-Level Polycyclic Aromatic Hydrocarbons (PAHs) by 8270D-SIM (ug/L)											
Naphthalene	0.01	ug/L	1.00E-02	1.40E+00		0	0.00131	37-120	37-120	30	-
Acenaphthene	0.01	ug/L	1.00E-02	5.34E+00		0	0.00289	41-120	41-120	30	-
Acenaphthylene	0.01	ug/L	1.00E-02	na		0	0.00185	41-120	41-120	30	-
Anthracene	0.01	ug/L	1.00E-02	2.15E+00		0	0.00116	40-120	40-120	30	-
Benzo(a)anthracene	0.01	ug/L	1.00E-02	1.60E-04		1	0.000750	42-120	42-120	30	-
Benzo(a)pyrene	0.01	ug/L	1.00E-02	1.60E-05		1	0.00248	35-120	35-120	30	-
Benzo(b)fluoranthene	0.01	ug/L	1.00E-02	1.60E-04		1	0.000460	44-120	44-120	30	-

Table E.8. Measurement Quality Objectives for Water Samples

Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (µg/L)	Most Stringent PCUL for Non-Potable Water (µg/L)	Most Stringent PCUL for Non-Potable Water (pg/L)	% calculated	MDL$^{(A)}$	LCS/LCS %R$^{(A)}$	MS/MSD %R$^{(A)}$	RPD (%)	Surrogate %R$^{(A)}$
Benzo(g,h,i)perylene	0.01	ug/L	1.00E-02	na		0	0.00142	38-120	38-120	30	-
Benzo(k)fluoranthene	0.01	ug/L	1.00E-02	1.60E-03		1	0.00321	50-120	50-120	30	-
Chrysene	0.01	ug/L	1.00E-02	1.60E-02		0	0.000900	44-120	44-120	30	-
Dibenzo(a,h)anthracene	0.01	ug/L	1.00E-02	1.60E-05		1	0.00134	34-120	34-120	30	-
Fluoranthene	0.01	ug/L	1.00E-02	1.82E+00		0	0.00171	45-120	45-120	30	-
Fluorene	0.01	ug/L	1.00E-02	3.67E+00		0	0.00152	43-120	43-120	30	-
Indeno(1,2,3-cd)pyrene	0.01	ug/L	1.00E-02	1.60E-04		1	0.00101	37-120	37-120	30	-
Phenanthrene	0.01	ug/L	1.00E-02	na		0	0.00130	41-120	41-120	30	-
Pyrene	0.01	ug/L	1.00E-02	2.01E+00		0	0.00118	41-120	41-120	30	-
1-Methylphenanthrene	0.1	ug/L	1.00E-01	na		0	0.0207	30-160	30-160	30	-
2,3,5-Trimethylnaphthalene	0.01	ug/L	1.00E-02	na		0	0.00140	30-160	30-160	30	-
2,6-Dimethylnaphthalene	0.01	ug/L	1.00E-02	na		0	0.00110	30-160	30-160	30	-
Benzo(e)pyrene	0.01	ug/L	1.00E-02	na		0	0.00134	30-160	30-160	30	-
Benzo(j)fluoranthene	0.01	ug/L	1.00E-02	na		0	0.00187	39-160	39-160	30	-
Biphenyl	0.01	ug/L	1.00E-02	na		0	0.00131	30-160	30-160	30	-
Dibenzothiophene	0.01	ug/L	1.00E-02	na		0	0.00133	30-160	30-160	30	-
Total cPAH TEQ			1.51E-02	1.60E-05							
Tributyl Tins by 8270D-SIM (ug/L)											
Butyltin Ion	0.006	ug/L	6.00E-03	na		0	0.00580	30-160	30-160	30	-
Dibutyltin Ion	0.0077	ug/L	7.70E-03	na		0	0.00690	30-160	30-160	30	-
Tetrabutyltin	0.03	ug/L	3.00E-02	na		0	0.0300	30-180	30-160	30	-
Tributyltin Ion	0.0052	ug/L	5.20E-03	7.40E-03		0	0.00220	30-160	30-160	30	-
Diesel- and oil-range total petroleum hydrocarbons (TPH) by NWTPH-Dx (ug/L)											
Diesel Range Organics (C12-C24)	0.1	mg/L	1.00E+02	na		0	0.0330	56-120	56-120	30	-
Motor Oil Range Organics (C24-C38)	0.2	mg/L	2.00E+02	na		0	0.0560	30-160	30-160	30	-
Gasoline-range TPH by NWTPH-Gx (ug/L)											
Gasoline Range Organics (Tol-Nap)	100	ug/L	1.00E+02	na		0	13.6	72-128	72-128	30	-

Notes:

(A) – Based on current laboratory control criteria. Some values may vary slightly between instruments and can be subject to change as the laboratory updates the charted values periodically.

%R – percent recovery

LCS/LCSD – laboratory control samples and laboratory control sample duplicate

MDL – method detection limit

MRL – method reporting limit

MS/MSD - Matrix Spike and Matrix Spike Duplicate

na – screening level not available

RPD – relative percent difference

(--) – No value identified

TEQ - total toxic equivalent concentration calculated in accordance with MTCA.

ug/L -- microgram per liter

Red highlight indicates that the MRL is higher than the most stringent screening level.

Table E.9. Measurement Quality Objectives for Soil Samples

Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (mg/kg)	Most Stringent Screening Level for Soil (mg/kg)	MDL(A)	LCS/LCS %R(A)	MS/MSD %R(A)	RPD (%)	Surrogate %R(A)
Chlorinated Dioxin/Furans by 1613B (mg/kg)									
2,3,7,8-TCDD	1.00	ng/kg dry wt	1.00E-06	1.3E-05	0.140	67-158	-	25	-
1,2,3,7,8-PeCDD	1.00	ng/kg dry wt	1.00E-06	na	0.180	70-142	-	25	-
1,2,3,4,7,8-HxCDD	1.00	ng/kg dry wt	1.00E-06	na	0.180	70-164	-	25	-
1,2,3,6,7,8-HxCDD	1.00	ng/kg dry wt	1.00E-06	na	0.150	76-134	-	25	-
1,2,3,7,8,9-HxCDD	1.00	ng/kg dry wt	1.00E-06	na	0.220	64-162	-	25	-
1,2,3,4,6,7,8-HpCDD	2.50	ng/kg dry wt	2.50E-06	na	0.560	70-140	-	25	-
OCDD	10.00	ng/kg dry wt	1.00E-05	na	4.30	78-144	-	25	-
2,3,7,8-TCDF	1.00	ng/kg dry wt	1.00E-06	na	0.0630	75-158	-	25	-
1,2,3,7,8-PeCDF	1.00	ng/kg dry wt	1.00E-06	na	0.150	80-134	-	25	-
2,3,4,7,8-PeCDF	1.00	ng/kg dry wt	1.00E-06	na	0.150	68-160	-	25	-
1,2,3,4,7,8-HxCDF	1.00	ng/kg dry wt	1.00E-06	na	0.140	72-134	-	25	-
1,2,3,6,7,8-HxCDF	1.00	ng/kg dry wt	1.00E-06	na	0.180	84-130	-	25	-
2,3,4,6,7,8-HxCDF	1.00	ng/kg dry wt	1.00E-06	na	0.110	70-156	-	25	-
1,2,3,7,8,9-HxCDF	1.00	ng/kg dry wt	1.00E-06	na	0.210	78-130	-	25	-
1,2,3,4,6,7,8-HpCDF	1.00	ng/kg dry wt	1.00E-06	na	0.210	82-122	-	25	-
1,2,3,4,7,8,9-HpCDF	1.00	ng/kg dry wt	1.00E-06	na	0.160	78-138	-	25	-
OCDF	2.50	ng/kg dry wt	2.50E-06	na	1.10	63-170	-	25	-
Total TCDF	1.00	ng/kg dry wt	1.00E-06	na	0	-	-	-	-
Total TCDD	1.00	ng/kg dry wt	1.00E-06	na	0	-	-	-	-
Total PeCDF	1.00	ng/kg dry wt	1.00E-06	na	0	-	-	-	-
Total PeCDD	1.00	ng/kg dry wt	1.00E-06	na	0	-	-	-	-
Total HxCDF	1.00	ng/kg dry wt	1.00E-06	na	0	-	-	-	-
Total HxCDD	1.00	ng/kg dry wt	1.00E-06	na	0	-	-	-	-
Total HpCDF	1.00	ng/kg dry wt	1.00E-06	na	0	-	-	-	-
Total HpCDD	1.00	ng/kg dry wt	1.00E-06	na	0	-	-	-	-
13C12-1,2,3,4-TCDD	0.00	ng/kg dry wt	0.00E+00	na	0	-	-	-	-
13C12-1,2,3,7,8,9-HxCDD	0.00	ng/kg dry wt	0.00E+00	na	0	-	-	-	-
Total chlorinated dioxins			2.33E-06	2.0E-06					
Total chlorinated furans			8.51E-07	2.0E-06					
Total dioxin/furan TEQ			3.18E-06	5.2E-06					
Polychlorinated Biphenyl (PCB) Congeners by 1668 (mg/kg)									
PCB-1	0.564	pg/g dry wt	5.64E-07	na					
PCB-2	0.719	pg/g dry wt	7.19E-07	na					
PCB-3	0.473	pg/g dry wt	4.73E-07	na					
PCB-4/10	0.845	pg/g dry wt	8.45E-07	na					
PCB-5/8	1.08	pg/g dry wt	1.08E-06	na					
PCB-6	1.24	pg/g dry wt	1.24E-06	na					
PCB-7/9	0.75	pg/g dry wt	7.50E-07	na					
PCB-11	9.05	pg/g dry wt	9.05E-06	na					
PCB-12/13	1.04	pg/g dry wt	1.04E-06	na					
PCB-14	0.417	pg/g dry wt	4.17E-07	na					
PCB-15	0.624	pg/g dry wt	6.24E-07	na					
PCB-16/32	1.43	pg/g dry wt	1.43E-06	na					
PCB-17	0.669	pg/g dry wt	6.69E-07	na					
PCB-18	1.38	pg/g dry wt	1.38E-06	na					
PCB-19	1.11	pg/g dry wt	1.11E-06	na					
PCB-20/21/33	2.51	pg/g dry wt	2.51E-06	na					
PCB-22	0.845	pg/g dry wt	8.45E-07	na					
PCB-23	1.08	pg/g dry wt	1.08E-06	na					
PCB-24/27	1.2	pg/g dry wt	1.20E-06	na					
PCB-25	0.89	pg/g dry wt	8.90E-07	na					
PCB-26	0.655	pg/g dry wt	6.55E-07	na					
PCB-28	3.05	pg/g dry wt	3.05E-06	na					
PCB-29	0.982	pg/g dry wt	9.82E-07	na					
PCB-30	0.638	pg/g dry wt	6.38E-07	na					
PCB-31	1.99	pg/g dry wt	1.99E-06	na					
PCB-34	1.28	pg/g dry wt	1.28E-06	na					
PCB-35	1.15	pg/g dry wt	1.15E-06	na					
PCB-36	1.08	pg/g dry wt	1.08E-06	na					
PCB-37	0.464	pg/g dry wt	4.64E-07	na					
PCB-38	0.823	pg/g dry wt	8.23E-07	na					
PCB-39	1.34	pg/g dry wt	1.34E-06	na					
PCB-40	1.11	pg/g dry wt	1.11E-06	na					
PCB-41/64/71/72	3.07	pg/g dry wt	3.07E-06	na					
PCB-42/59	0.825	pg/g dry wt	8.25E-07	na					
PCB-43/49	1.94	pg/g dry wt	1.94E-06	na					
PCB-44	1.18	pg/g dry wt	1.18E-06	na					
PCB-45	0.603	pg/g dry wt	6.03E-07	na					
PCB-46	0.544	pg/g dry wt	5.44E-07	na					
PCB-47	1.5	pg/g dry wt	1.50E-06	na					
PCB-48/75	0.712	pg/g dry wt	7.12E-07	na					
PCB-50	0.769	pg/g dry wt	7.69E-07	na					
PCB-51	0.804	pg/g dry wt	8.04E-07	na					
PCB-52/69	1.46	pg/g dry wt	1.46E-06	na					
PCB-53	1.08	pg/g dry wt	1.08E-06	na					
PCB-54	0.639	pg/g dry wt	6.39E-07	na					
PCB-55	0.516	pg/g dry wt	5.16E-07	na					
PCB-56/60	1.18	pg/g dry wt	1.18E-06	na					
PCB-57	0.859	pg/g dry wt	8.59E-07	na					
PCB-58	0.83	pg/g dry wt	8.30E-07	na					
PCB-61/70	1.49	pg/g dry wt	1.49E-06	na					
PCB-62	1.23	pg/g dry wt	1.23E-06	na					
PCB-63	0.532	pg/g dry wt	5.32E-07	na					
PCB-65	0.982	pg/g dry wt	9.82E-07	na					
PCB-66/76	0.566	pg/g dry wt	5.66E-07	na					
PCB-67	1.13	pg/g dry wt	1.13E-06	na					
PCB-68	0.773	pg/g dry wt	7.73E-07	na					
PCB-73	0.581	pg/g dry wt	5.81E-07	na					
PCB-74	0.903	pg/g dry wt	9.03E-07	na					
PCB-77	0.799	pg/g dry wt	7.99E-07	na					

Table E.9. Measurement Quality Objectives for Soil Samples
Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (mg/kg)	Most Stringent Screening Level for Soil (mg/kg)	MDL[(A)]	LCS/LCS %R[(A)]	MS/MSD %R[(A)]	RPD (%)	Surrogate %R[(A)]
PCB-78	0.628	pg/g dry wt	6.28E-07	na					
PCB-79	1.16	pg/g dry wt	1.16E-06	na					
PCB-80	1.07	pg/g dry wt	1.07E-06	na					
PCB-81	0.659	pg/g dry wt	6.59E-07	na					
PCB-82	1.24	pg/g dry wt	1.24E-06	na					
PCB-83	0.45	pg/g dry wt	4.50E-07	na					
PCB-84/92	0.876	pg/g dry wt	8.76E-07	na					
PCB-85/116	1.99	pg/g dry wt	1.99E-06	na					
PCB-86	1.27	pg/g dry wt	1.27E-06	na					
PCB-87/117/125	1.47	pg/g dry wt	1.47E-06	na					
PCB-88/91	2.27	pg/g dry wt	2.27E-06	na					
PCB-89	0.786	pg/g dry wt	7.86E-07	na					
PCB-90/101	0.449	pg/g dry wt	4.49E-07	na					
PCB-93	1.35	pg/g dry wt	1.35E-06	na					
PCB-94	0.844	pg/g dry wt	8.44E-07	na					
PCB-95/98/102	2.28	pg/g dry wt	2.28E-06	na					
PCB-96	0.796	pg/g dry wt	7.96E-07	na					
PCB-97	1.06	pg/g dry wt	1.06E-06	na					
PCB-99	1.34	pg/g dry wt	1.34E-06	na					
PCB-100	0.617	pg/g dry wt	6.17E-07	na					
PCB-103	0.576	pg/g dry wt	5.76E-07	na					
PCB-104	0.838	pg/g dry wt	8.38E-07	na					
PCB-105	0.497	pg/g dry wt	4.97E-07	na					
PCB-106/118	1.45	pg/g dry wt	1.45E-06	na					
PCB-107/109	0.766	pg/g dry wt	7.66E-07	na					
PCB-108/112	1.65	pg/g dry wt	1.65E-06	na					
PCB-110	0.876	pg/g dry wt	8.76E-07	na					
PCB-111/115	1.62	pg/g dry wt	1.62E-06	na					
PCB-113	1.17	pg/g dry wt	1.17E-06	na					
PCB-114	0.801	pg/g dry wt	8.01E-07	na					
PCB-119	0.56	pg/g dry wt	5.60E-07	na					
PCB-120	0.932	pg/g dry wt	9.32E-07	na					
PCB-121	1.12	pg/g dry wt	1.12E-06	na					
PCB-122	0.516	pg/g dry wt	5.16E-07	na					
PCB-123	0.551	pg/g dry wt	5.51E-07	na					
PCB-124	0.944	pg/g dry wt	9.44E-07	na					
PCB-126	0.475	pg/g dry wt	4.75E-07	na					
PCB-127	0.709	pg/g dry wt	7.09E-07	na					
PCB-128/162	1.28	pg/g dry wt	1.28E-06	na					
PCB-129	0.89	pg/g dry wt	8.90E-07	na					
PCB-130	0.941	pg/g dry wt	9.41E-07	na					
PCB-131/133	0.901	pg/g dry wt	9.01E-07	na					
PCB-132/161	0.905	pg/g dry wt	9.05E-07	na					
PCB-134/143	1.04	pg/g dry wt	1.04E-06	na					
PCB-135	0.709	pg/g dry wt	7.09E-07	na					
PCB-136	1.22	pg/g dry wt	1.22E-06	na					
PCB-137	0.525	pg/g dry wt	5.25E-07	na					
PCB-138/163/164	1.32	pg/g dry wt	1.32E-06	na					
PCB-139/149	2.36	pg/g dry wt	2.36E-06	na					
PCB-140	0.828	pg/g dry wt	8.28E-07	na					
PCB-141	0.632	pg/g dry wt	6.32E-07	na					
PCB-142	1.26	pg/g dry wt	1.26E-06	na					
PCB-144	0.942	pg/g dry wt	9.42E-07	na					
PCB-145	1.29	pg/g dry wt	1.29E-06	na					
PCB-146/165	0.875	pg/g dry wt	8.75E-07	na					
PCB-147	1.22	pg/g dry wt	1.22E-06	na					
PCB-148	0.937	pg/g dry wt	9.37E-07	na					
PCB-150	0.561	pg/g dry wt	5.61E-07	na					
PCB-151	0.692	pg/g dry wt	6.92E-07	na					
PCB-152	0.866	pg/g dry wt	8.66E-07	na					
PCB-153	0.225	pg/g dry wt	2.25E-07	na					
PCB-154	1.74	pg/g dry wt	1.74E-06	na					
PCB-155	0.665	pg/g dry wt	6.65E-07	na					
PCB-156	0.378	pg/g dry wt	3.78E-07	na					
PCB-157	0.604	pg/g dry wt	6.04E-07	na					
PCB-158/160	0.882	pg/g dry wt	8.82E-07	na					
PCB-159	0.378	pg/g dry wt	3.78E-07	na					
PCB-166	0.823	pg/g dry wt	8.23E-07	na					
PCB-167	0.595	pg/g dry wt	5.95E-07	na					
PCB-168	0.594	pg/g dry wt	5.94E-07	na					
PCB-169	0.731	pg/g dry wt	7.31E-07	na					
PCB-170	0.575	pg/g dry wt	5.75E-07	na					
PCB-171	1.2	pg/g dry wt	1.20E-06	na					
PCB-172	1.09	pg/g dry wt	1.09E-06	na					
PCB-173	1.37	pg/g dry wt	1.37E-06	na					
PCB-174	1.1	pg/g dry wt	1.10E-06	na					
PCB-175	1.14	pg/g dry wt	1.14E-06	na					
PCB-176	0.648	pg/g dry wt	6.48E-07	na					
PCB-177	1.13	pg/g dry wt	1.13E-06	na					
PCB-178	0.521	pg/g dry wt	5.21E-07	na					
PCB-179	0.43	pg/g dry wt	4.30E-07	na					
PCB-180	0.731	pg/g dry wt	7.31E-07	na					
PCB-181	0.917	pg/g dry wt	9.17E-07	na					
PCB-182/187	1.38	pg/g dry wt	1.38E-06	na					
PCB-183	1.23	pg/g dry wt	1.23E-06	na					
PCB-184	0.764	pg/g dry wt	7.64E-07	na					
PCB-185	0.567	pg/g dry wt	5.67E-07	na					
PCB-186	0.592	pg/g dry wt	5.92E-07	na					
PCB-188	0.705	pg/g dry wt	7.05E-07	na					
PCB-189	0.704	pg/g dry wt	7.04E-07	na					
PCB-190	0.89	pg/g dry wt	8.90E-07	na					

Table E.9. Measurement Quality Objectives for Soil Samples

Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (mg/kg)	Most Stringent Screening Level for Soil (mg/kg)	MDL(A)	LCS/LCS %R(A)	MS/MSD %R(A)	RPD (%)	Surrogate %R(A)
PCB-191	0.681	pg/g dry wt	6.81E-07	na					
PCB-192	0.632	pg/g dry wt	6.32E-07	na					
PCB-193	0.669	pg/g dry wt	6.69E-07	na					
PCB-194	0.666	pg/g dry wt	6.66E-07	na					
PCB-195	0.397	pg/g dry wt	3.97E-07	na					
PCB-196/203	2.5	pg/g dry wt	2.50E-06	na					
PCB-197	0.73	pg/g dry wt	7.30E-07	na					
PCB-198	2.52	pg/g dry wt	2.52E-06	na					
PCB-199	1.25	pg/g dry wt	1.25E-06	na					
PCB-200	1.06	pg/g dry wt	1.06E-06	na					
PCB-201	1.21	pg/g dry wt	1.21E-06	na					
PCB-202	1.09	pg/g dry wt	1.09E-06	na					
PCB-204	1.54	pg/g dry wt	1.54E-06	na					
PCB-205	0.826	pg/g dry wt	8.26E-07	na					
PCB-206	1.21	pg/g dry wt	1.21E-06	na					
PCB-207	0.887	pg/g dry wt	8.87E-07	na					
PCB-208	0.63	pg/g dry wt	6.30E-07	na					
PCB-209	1.83	pg/g dry wt	1.83E-06	na					
Total PCB congeners			1.76E-04	2.2E-06					
Total Dioxin-like PCB TEQ			6.99E-08	1.4E-09					
Polychlorinated biphenyls (PCB) Aroclors by 8082A (mg/kg)									
Aroclor 1016	4.00	ug/kg dry wt	4.00E-03	na	1.56	56-120	56-120	30	-
Aroclor 1221	4.00	ug/kg dry wt	4.00E-03	na	1.56	-	-	30	-
Aroclor 1232	4.00	ug/kg dry wt	4.00E-03	na	1.56	-	-	30	-
Aroclor 1242	4.00	ug/kg dry wt	4.00E-03	na	1.56	-	-	30	-
Aroclor 1248	4.00	ug/kg dry wt	4.00E-03	na	1.56	-	-	30	-
Aroclor 1254	4.00	ug/kg dry wt	4.00E-03	na	1.56	-	-	30	-
Aroclor 1260	4.00	ug/kg dry wt	4.00E-03	na	0.589	58-120	58-120	30	-
Aroclor 1262	4.00	ug/kg dry wt	4.00E-03	na	0.589	-	-	30	-
Aroclor 1268	4.00	ug/kg dry wt	4.00E-03	na	0.589	-	-	30	-
Total PCB Aroclors			3.60E-02	2.2E-06					
Metals (other than Mercury) by 6020A (mg/kg)									
Barium-135	0.50	mg/kg dry wt	5.0E-01	8.3E+00	0.0560	80-120	75-125	20	-
Chromium-52	0.50	mg/kg dry wt	5.0E-01	4.8E+01	0.130	80-120	75-125	20	-
Lead-208	0.10	mg/kg dry wt	1.0E-01	5.0E+01	0.0680	80-120	75-125	20	-
Silver-107	0.2	mg/kg dry wt	2.0E-01	1.6E-02	0.0170	80-120	75-125	20	-
Arsenic-75a	0.2	mg/kg dry wt	2.0E-01	7.0E+00	0.0220	80-120	75-125	20	-
Cadmium-111	0.1	mg/kg dry wt	1.0E-01	3.0E-01	0.0300	80-120	75-125	20	-
Selenium-78	0.5	mg/kg dry wt	5.0E-01	3.0E-01	0.440	80-120	75-125	20	-
Zinc-66	4.00	mg/kg	4.0E+00	8.5E+01	0.8	80-120	75-125	20	-
Copper-63	0.50	mg/kg	5.0E-01	3.6E+01	0.34	80-120	75-125	20	-
Nickel-60	0.50	mg/kg	5.0E-01	4.8E+01	0.05	80-120	75-125	20	-
Mercury by 7471B (mg/kg)									
Mercury	0.03	mg/kg dry wt	2.5E-02	7.0E-02	0.00525	80-120	75-125	20	-
Organochlorine Pesticides by 8081B (mg/kg)									
alpha-BHC	5.00E-01	ug/kg dry wt	5.0E-04	9.8E-08	0.0836	41-120	41-120	30	-
beta-BHC	5.00E-01	ug/kg dry wt	5.0E-04	3.4E-06	0.0915	42-120	42-120	30	-
gamma-BHC (Lindane)	5.00E-01	ug/kg dry wt	5.0E-04	2.1E-04	0.0677	49-120	49-120	30	-
delta-BHC	0.50	ug/kg dry wt	5.0E-04	6.0E+00	0.0655	19-140	19-140	30	-
Heptachlor	5.00E-01	ug/kg dry wt	5.0E-04	3.3E-09	0.0464	39-120	39-120	30	-
Aldrin	1.70E+00	ug/kg dry wt	1.7E-03	2.0E-09	0.218	40-120	40-120	30	-
Heptachlor Epoxide	5.00E-01	ug/kg dry wt	5.0E-04	2.0E-07	0.170	42-132	42-132	30	-
trans-Chlordane (beta-Chlordane)	1.70E+00	ug/kg dry wt	1.7E-03	5.3E-06	0.264	44-125	44-125	30	-
cis-Chlordane (alpha-chlordane)	5.00E-01	ug/kg dry wt	5.0E-04	5.3E-06	0.111	44-129	44-129	30	-
Endosulfan I	5.00E-01	ug/kg dry wt	5.0E-04	2.0E-05	0.0691	39-141	39-141	30	-
4,4'-DDE	1.00	ug/kg dry wt	1.0E-03	7.6E-08	0.135	57-143	57-143	30	-
Dieldrin	1.00E+00	ug/kg dry wt	1.0E-03	3.1E-08	0.115	44-135	44-135	30	-
Endrin	1.00	ug/kg dry wt	1.0E-03	2.2E-05	0.142	53-129	53-129	30	-
Endosulfan II	1.00E+00	ug/kg dry wt	1.0E-03	2.0E-05	0.313	32-139	32-139	30	-
4,4'-DDD	1.00E+00	ug/kg dry wt	1.0E-03	3.6E-07	0.320	55-124	55-124	30	-
Endrin Aldehyde	1.00	ug/kg dry wt	1.0E-03	na	0.390	13-120	13-120	30	-
4,4'-DDT	1.00E+00	ug/kg dry wt	1.0E-03	8.1E-07	0.325	45-133	45-133	30	-
Endosulfan Sulfate	1.00	ug/kg dry wt	1.0E-03	4.8E+02	0.123	16-152	16-152	30	-
Endrin Ketone	1.00	ug/kg dry wt	1.0E-03	na	0.282	26-144	26-144	30	-
Methoxychlor	5.00	ug/kg dry wt	5.0E-03	1.6E-03	0.298	43-125	43-125	30	-
2,4'-DDE	1.00	ug/kg dry wt	1.0E-03	na	0.249	30-160	30-160	30	-
2,4'-DDD	1.00	ug/kg dry wt	1.0E-03	na	0.195	30-160	30-160	30	-
2,4'-DDT	1.00	ug/kg dry wt	1.0E-03	na	0.187	30-160	30-160	30	-
Oxychlordane	1.00	ug/kg dry wt	1.0E-03	na	0.128	30-160	30-160	30	-
cis-Nonachlor	1.00	ug/kg dry wt	1.0E-03	na	0.210	30-160	30-160	30	-
trans-Nonachlor	1.00	ug/kg dry wt	1.0E-03	na	0.228	30-160	30-160	30	-
Mirex	1.00	ug/kg dry wt	1.0E-03	4.7E-02	0.644	30-160	30-160	30	-
Toxaphene	2.50E+01	ug/kg dry wt	2.5E-02	3.1E-06	4.48	30-160	30-160	30	-
Chlordane, technical	2.00	ug/kg dry wt	2.0E-03	na	2.00	30-160	30-160	30	-
Chlordane (NOS)	2.00E+00	ug/kg dry wt	2.0E-03	1.1E-06	2.00	-	-	-	-
Volatile Organic Compounds (VOCs) by 8260C (mg/kg)									
Chloromethane	1.00	ug/kg dry wt	1.0E-03	na	0.263	64-132	64-132	30	-
Vinyl Chloride	1.00E+00	ug/kg dry wt	1.0E-03	5.5E-05	0.235	74-135	74-135	30	-
Bromomethane	1.00	ug/kg dry wt	1.0E-03	7.9E-02	0.187	53-144	53-144	30	-
Chloroethane	1.00	ug/kg dry wt	1.0E-03	na	0.462	55-149	55-149	30	-
Trichlorofluoromethane	1.00	ug/kg dry wt	1.0E-03	2.4E+04	0.266	61-164	61-164	30	-
Acrolein	5.00	ug/kg dry wt	5.0E-03	4.0E+01	3.81	59-140	59-140	30	-
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.00	ug/kg dry wt	2.0E-03	2.4E+06	0.287	74-143	74-143	30	-
Acetone	5.00	ug/kg dry wt	5.0E-03	7.2E+04	0.482	48-137	48-137	30	-
1,1-Dichloroethene	1.00	ug/kg dry wt	1.0E-03	1.4E+00	0.336	77-134	77-134	30	-
Bromoethane	2.00	ug/kg dry wt	2.0E-03	na	0.440	65-145	65-145	30	-
Iodomethane	1.00	ug/kg dry wt	1.0E-03	na	0.215	31-162	31-162	30	-
Methylene Chloride	2.00	ug/kg dry wt	2.0E-03	3.0E-02	0.635	69-129	69-129	30	-
Acrylonitrile	5.00	ug/kg dry wt	5.0E-03	1.9E+00	1.03	69-134	69-134	30	-
Carbon Disulfide	1.00	ug/kg dry wt	1.0E-03	8.0E+03	0.559	71-137	71-137	30	-
trans-1,2-Dichloroethene	1.00	ug/kg dry wt	1.0E-03	3.2E-01	0.266	79-130	79-130	30	-

Table E.9. Measurement Quality Objectives for Soil Samples

Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (mg/kg)	Most Stringent Screening Level for Soil (mg/kg)	MDL(A)	LCS/LCS %R(A)	MS/MSD %R(A)	RPD (%)	Surrogate %R(A)
Vinyl Acetate	5.00	ug/kg dry wt	5.0E-03	8.0E+04	0.381	66-141	66-141	30	-
1,1-Dichloroethane	1.00	ug/kg dry wt	1.0E-03	1.8E+02	0.203	80-126	80-126	30	-
2-Butanone	5.00	ug/kg dry wt	5.0E-03	4.8E+04	0.513	70-132	70-132	30	-
2,2-Dichloropropane	1.00	ug/kg dry wt	1.0E-03	na	0.292	77-138	77-138	30	-
cis-1,2-Dichloroethene	1.00	ug/kg dry wt	1.0E-03	1.6E+02	0.240	80-125	80-125	30	-
Chloroform	1.00	ug/kg dry wt	1.0E-03	5.2E-02	0.234	80-126	80-126	30	-
Bromochloromethane	1.00	ug/kg dry wt	1.0E-03	na	0.323	80-129	80-129	30	-
1,1,1-Trichloroethane	1.00	ug/kg dry wt	1.0E-03	2.1E+01	0.226	78-133	78-133	30	-
1,1-Dichloropropene	1.00	ug/kg dry wt	1.0E-03	na	0.312	79-120	79-120	30	-
Carbon tetrachloride	1.00E+00	ug/kg dry wt	1.0E-03	1.5E-04	0.213	71-129	71-129	30	-
1,2-Dichloroethane	1.00	ug/kg dry wt	1.0E-03	2.4E-02	0.191	76-120	76-120	30	-
Benzene	1.00E+00	ug/kg dry wt	1.0E-03	5.6E-04	0.296	80-120	80-120	30	-
Trichloroethene	1.00E+00	ug/kg dry wt	1.0E-03	2.7E-04	0.212	80-120	80-120	30	-
1,2-Dichloropropane	1.00	ug/kg dry wt	1.0E-03	1.0E-03	0.162	79-120	79-120	30	-
Bromodichloromethane	1.00E+00	ug/kg dry wt	1.0E-03	9.6E-04	0.254	80-122	80-122	30	-
Dibromomethane	1.00	ug/kg dry wt	1.0E-03	8.0E+02	0.147	80-120	80-120	30	-
2-Chloroethyl vinyl ether	5.00	ug/kg dry wt	5.0E-03	na	0.276	51-129	51-129	30	-
4-Methyl-2-Pentanone	5.00	ug/kg dry wt	5.0E-03	6.4E+03	0.420	73-121	73-121	30	-
cis-1,3-Dichloropropene	1.00E+00	ug/kg dry wt	1.0E-03	6.3E-04	0.226	80-120	80-120	30	-
Toluene	1.00	ug/kg dry wt	1.0E-03	5.5E-02	0.151	75-120	75-120	30	-
trans-1,3-Dichloropropene	1.00E+00	ug/kg dry wt	1.0E-03	6.3E-04	0.216	80-124	80-124	30	-
2-Hexanone	5.00	ug/kg dry wt	5.0E-03	4.0E+02	0.439	68-122	68-122	30	-
1,1,2-Trichloroethane	1.00E+00	ug/kg dry wt	1.0E-03	3.3E-04	0.286	79-120	79-120	30	-
1,3-Dichloropropane	1.00	ug/kg dry wt	1.0E-03	na	0.209	78-120	78-120	30	-
Tetrachloroethene	1.00	ug/kg dry wt	1.0E-03	1.6E-03	0.257	74-124	74-124	30	-
Dibromochloromethane	1.00E+00	ug/kg dry wt	1.0E-03	7.7E-04	0.266	74-125	74-125	30	-
1,2-Dibromoethane	1.00	ug/kg dry wt	1.0E-03	5.0E-01	0.176	80-120	80-120	30	-
Chlorobenzene	1.00	ug/kg dry wt	1.0E-03	1.0E-01	0.219	78-120	78-120	30	-
Ethylbenzene	1.00	ug/kg dry wt	1.0E-03	1.5E-02	0.202	80-125	80-125	30	-
1,1,1,2-Tetrachloroethane	1.00	ug/kg dry wt	1.0E-03	3.8E+01	0.233	80-120	80-120	30	-
m,p-Xylene	2.00	ug/kg dry wt	2.0E-03	na	0.392	76-121	76-121	30	-
o-Xylene	1.00	ug/kg dry wt	1.0E-03	na	0.224	67-132	67-132	30	-
Xylenes, total	2.00	ug/kg dry wt	2.0E-03	1.6E+04	0.616	67-132	67-132	30	-
Styrene	1.00	ug/kg dry wt	1.0E-03	3.0E+02	0.138	80-120	80-120	30	-
Bromoform	1.00	ug/kg dry wt	1.0E-03	5.0E-03	0.297	64-128	64-128	30	-
1,1,2,2-Tetrachloroethane	1.00E+00	ug/kg dry wt	1.0E-03	1.1E-04	0.253	74-120	74-120	30	-
1,2,3-Trichloropropane	2.00	ug/kg dry wt	2.0E-03	3.3E-02	0.517	73-120	73-120	30	-
trans-1,4-Dichloro 2-Butene	5.00	ug/kg dry wt	5.0E-03	na	0.437	65-125	65-125	30	-
n-Propylbenzene	1.00	ug/kg dry wt	1.0E-03	8.0E+03	0.272	72-124	72-124	30	-
Bromobenzene	1.00	ug/kg dry wt	1.0E-03	6.4E+02	0.153	76-120	76-120	30	-
Isopropyl Benzene	1.00	ug/kg dry wt	1.0E-03	8.0E+03	0.233	74-121	74-121	30	-
2-Chlorotoluene	1.00	ug/kg dry wt	1.0E-03	1.6E+03	0.300	75-120	75-120	30	-
4-Chlorotoluene	1.00	ug/kg dry wt	1.0E-03	na	0.277	69-124	69-124	30	-
t-Butylbenzene	1.00	ug/kg dry wt	1.0E-03	8.0E+03	0.306	72-122	72-122	30	-
1,3,5-Trimethylbenzene	1.00	ug/kg dry wt	1.0E-03	8.0E+02	0.254	74-122	74-122	30	-
1,2,4-Trimethylbenzene	1.00	ug/kg dry wt	1.0E-03	8.0E+02	0.230	75-121	75-121	30	-
s-Butylbenzene	1.00	ug/kg dry wt	1.0E-03	8.0E+03	0.240	70-128	70-128	30	-
4-Isopropyl Toluene	1.00	ug/kg dry wt	1.0E-03	na	0.236	75-125	75-125	30	-
1,3-Dichlorobenzene	1.00	ug/kg dry wt	1.0E-03	na	0.227	75-120	75-120	30	-
1,4-Dichlorobenzene	1.00	ug/kg dry wt	1.0E-03	8.1E-03	0.232	73-120	73-120	30	-
n-Butylbenzene	1.00	ug/kg dry wt	1.0E-03	4.0E+03	0.262	73-130	73-130	30	-
1,2-Dichlorobenzene	1.00	ug/kg dry wt	1.0E-03	3.1E-03	0.293	76-120	76-120	30	-
1,2-Dibromo-3-chloropropane	5.00	ug/kg dry wt	5.0E-03	1.3E+00	0.586	65-126	65-126	30	-
1,2,4-Trichlorobenzene	5.00E+00	ug/kg dry wt	5.0E-03	7.2E-05	0.332	66-140	66-140	30	-
Hexachloro-1,3-Butadiene	5.00E+00	ug/kg dry wt	5.0E-03	5.4E-04	0.410	67-133	67-133	30	-
1,2,3-Trichlorobenzene	5.00	ug/kg dry wt	5.0E-03	2.0E+01	0.305	68-132	68-132	30	-
Dichlorodifluoromethane	1.00	ug/kg dry wt	1.0E-03	1.6E+04	0.207	67-142	67-142	30	-
Methyl tert-butyl Ether	1.00	ug/kg dry wt	1.0E-03	5.6E+02	0.231	79-127	79-127	30	-
n-Hexane	1.00	ug/kg dry wt	1.0E-03	na	1.00	30-160	30-160	30	-
2-Pentanone	250.00	ug/kg dry wt	2.5E-01	na	250	77-120	77-120	30	-
Cyclohexanone	50.00	ug/kg dry wt	5.0E-02	na	50.0	30-160	30-160	30	-
Semivolatile Organic Compounds (SVOCs) by 8270D (mg/kg)									
Phenol	67.00	ug/kg dry wt	6.7E-02	1.2E-01	16.1	37-120	37-120	30	-
bis(2-chloroethyl) ether	6.70E+01	ug/kg dry wt	6.7E-02	2.2E-05	16.9	43-120	43-120	30	-
2-Chlorophenol	6.70E+01	ug/kg dry wt	6.7E-02	1.1E-02	14.3	45-120	45-120	30	-
Benzyl Alcohol	3.30E+02	ug/kg dry wt	3.3E-01	5.7E-02	86.7	16-120	16-120	30	-
2,2'-Oxybis(1-chloropropane)	20.00	ug/kg dry wt	2.0E-02	3.2E+03	5.67	32-120	32-120	30	-
2-Methylphenol	6.70E+01	ug/kg dry wt	6.7E-02	1.0E-02	23.3	45-120	45-120	30	-
4-Methylphenol	67.00	ug/kg dry wt	6.7E-02	6.7E-01	22.4	47-120	47-120	30	-
Hexachloroethane	2.00E+01	ug/kg dry wt	2.0E-02	4.1E-05	5.65	38-120	38-120	30	-
N-Nitroso-di-n-Propylamine	2.00E+01	ug/kg dry wt	2.0E-02	1.8E-05	10.8	34-120	34-120	30	-
Nitrobenzene	6.70E+01	ug/kg dry wt	6.7E-02	4.1E-02	25.6	39-120	39-120	30	-
Isophorone	6.70E+01	ug/kg dry wt	6.7E-02	3.7E-02	13.4	57-120	57-120	30	-
2-Nitrophenol	20.00	ug/kg dry wt	2.0E-02	na	6.92	30-120	30-120	30	-
2,4-Dimethylphenol	6.70E+01	ug/kg dry wt	6.7E-02	3.1E-03	16.2	40-120	40-120	30	-
Bis(2-Chloroethoxy)methane	67.00	ug/kg dry wt	6.7E-02	na	17.3	49-120	49-120	30	-
2,4-Dichlorophenol	1.00E+02	ug/kg dry wt	1.0E-01	4.3E-03	32.0	28-120	28-120	30	-
Benzoic acid	6.70E+02	ug/kg dry wt	6.7E-01	1.7E-01	251	10-160	10-160	30	-
4-Chloroaniline	330.00	ug/kg dry wt	3.3E-01	8.1E-01	100	17-149	17-149	30	-
4-Chloro-3-Methylphenol	330.00	ug/kg dry wt	3.3E-01	na	115	54-120	54-120	30	-
2-Methylnaphthalene	67.00	ug/kg dry wt	6.7E-02	6.7E-01	24.4	54-120	54-120	30	-
Hexachlorocyclopentadiene	100.00	ug/kg dry wt	1.0E-01	2.0E-01	41.3	10-120	10-120	30	-
2,4,6-Trichlorophenol	3.30E+02	ug/kg dry wt	3.3E-01	1.9E-04	142	51-120	51-120	30	-
2,4,5-Trichlorophenol	330.00	ug/kg dry wt	3.3E-01	1.1E+00	150	52-120	52-120	30	-
2-Chloronaphthalene	67.00	ug/kg dry wt	6.7E-02	6.4E+03	21.3	48-120	48-120	30	-
2-Nitroaniline	330.00	ug/kg dry wt	3.3E-01	8.0E+02	120	51-120	51-120	30	-
Dimethylphthalate	67.00	ug/kg dry wt	6.7E-02	7.1E-02	26.5	56-120	56-120	30	-
2,6-Dinitrotoluene	100.00	ug/kg dry wt	1.0E-01	1.1E-01	26.7	33-123	33-123	30	-
3-Nitroaniline	330.00	ug/kg dry wt	3.3E-01	na	104	39-142	39-142	30	-
2,4-Dinitrophenol	2.00E+02	ug/kg dry wt	2.0E-01	2.9E-02	41.3	10-120	10-120	30	-
Dibenzofuran	67.00	ug/kg dry wt	6.7E-02	5.4E-01	18.2	55-120	55-120	30	-

Table E.9. Measurement Quality Objectives for Soil Samples

Project No. 190293, South Park Marina, Seattle, Washington

Analyte Name	MRL	Lab Reporting Units	MRL (mg/kg)	Most Stringent Screening Level for Soil (mg/kg)	MDL[A]	LCS/LCS %R[A]	MS/MSD %R[A]	RPD (%)	Surrogate %R[A]
4-Nitrophenol	100.00	ug/kg dry wt	1.0E-01	7.0E+00	44.4	15-138	15-138	30	-
2,4-Dinitrotoluene	1.00E+02	ug/kg dry wt	1.0E-01	6.9E-05	22.9	35-127	35-127	30	-
4-Chlorophenylphenyl ether	20.00	ug/kg dry wt	2.0E-02	na	6.96	32-120	32-120	30	-
Diethyl phthalate	6.70E+01	ug/kg dry wt	6.7E-02	3.4E-02	20.9	54-120	54-120	30	-
4-Nitroaniline	330.00	ug/kg dry wt	3.3E-01	3.2E+02	102	47-124	47-124	30	-
4,6-Dinitro-2-methylphenol	670.00	ug/kg dry wt	6.7E-01	na	122	10-157	10-157	30	-
N-Nitrosodiphenylamine	6.70E+01	ug/kg dry wt	6.7E-02	1.1E-03	16.9	54-138	54-138	30	-
4-Bromophenyl phenyl ether	67.00	ug/kg dry wt	6.7E-02	na	19.3	50-120	50-120	30	-
Hexachlorobenzene	6.70E+01	ug/kg dry wt	6.7E-02	4.0E-07	18.9	50-121	50-121	30	-
Pentachlorophenol	1.00E+02	ug/kg dry wt	1.0E-01	1.8E-06	31.3	16-120	16-120	30	-
Carbazole	67.00	ug/kg dry wt	6.7E-02	na	14.7	60-121	60-121	30	-
Di-n-Butylphthalate	6.70E+01	ug/kg dry wt	6.7E-02	1.5E-02	33.1	60-120	60-120	30	-
Pyrene	67.00	ug/kg dry wt	6.7E-02	1.4E-01	46.8	49-134	49-134	30	-
Butylbenzylphthalate	6.70E+01	ug/kg dry wt	6.7E-02	1.8E-04	24.6	44-144	44-144	30	-
3,3'-Dichlorobenzidine	1.00E+02	ug/kg dry wt	1.0E-01	3.3E-06	31.2	10-120	10-120	30	-
bis(2-Ethylhexyl)phthalate	6.70E+01	ug/kg dry wt	6.7E-02	5.1E-03	23.9	63-128	63-128	30	-
Di-n-Octylphthalate	67.00	ug/kg dry wt	6.7E-02	3.3E-01	19.1	59-120	59-120	30	-
1-Methylnaphthalene	67.00	ug/kg dry wt	6.7E-02	2.9E+01	28.8	55-120	55-120	30	-
N-Nitrosodimethylamine	4.00E+01	ug/kg dry wt	4.0E-02	1.7E-02	22.4	17-120	17-120	30	-
Aniline	100.00	ug/kg dry wt	1.0E-01	1.5E+02	16.9	10-134	10-134	30	-
Retene	20.00	ug/kg dry wt	2.0E-02	na	4.01	30-160	30-160	30	-
Benzidine	6.70E+02	ug/kg dry wt	6.7E-01	3.7E-03	210	57-120	57-120	30	-
Pyridine	100.00	ug/kg dry wt	1.0E-01	8.0E+01	86.6	10-147	10-147	30	-
Azobenzene (1,2-DP-Hydrazine)	20.00	ug/kg dry wt	2.0E-02	7.8E+00	4.61	35-120	35-120	30	-
Perylene	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
2,3,4,6-Tetrachlorophenol	20.00	ug/kg dry wt	2.0E-02	2.4E+03	5.37	30-160	30-160	30	-
N-Nitrosomethylethylamine	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
2,6-Dichlorophenol	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
alpha-Terpineol	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
Triphenyl Phosphate	67.00	ug/kg dry wt	6.7E-02	na	26.9	30-160	30-160	30	-
Butyl Diphenyl Phosphate	67.00	ug/kg dry wt	6.7E-02	na	24.1	30-160	30-160	30	-
Dibutyl Phenyl Phosphate	67.00	ug/kg dry wt	6.7E-02	na	28.8	30-160	30-160	30	-
Tributyl Phosphate	67.00	ug/kg dry wt	6.7E-02	na	32.5	30-160	30-160	30	-
Butylated Hydroxytoluene	67.00	ug/kg dry wt	6.7E-02	na	26.7	30-160	30-160	30	-
4-Chloroguaiacol	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
Tetrachloroguaiacol	40.00	ug/kg dry wt	4.0E-02	na	10.1	-	-	30	-
3,4,5-Trichloroguaiacol	20.00	ug/kg dry wt	2.0E-02	na	3.90	-	-	30	-
3,4-Dichloroguaiacol	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
3,4,6-Trichloroguaiacol	20.00	ug/kg dry wt	2.0E-02	na	0	-	-	30	-
4,5-Dichloroguaiacol	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
4,5,6-Trichloroguaiacol	20.00	ug/kg dry wt	2.0E-02	na	7.91	-	-	30	-
4,6-Dichloroguaiacol	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
Guaiacol	20.00	ug/kg dry wt	2.0E-02	na	6.47	-	-	30	-
1,2,4,5-Tetrachlorobenzene	67.00	ug/kg dry wt	6.7E-02	na	0	30-160	30-160	30	-
Low-Level Polycyclic Aromatic Hydrocarbons (PAHs) by 8270D-SIM (mg/kg)									
Naphthalene	0.60	ug/kg dry wt	6.0E-04	2.1E-03	0.439	30-160	30-160	30	-
Acenaphthylene	0.50	ug/kg dry wt	5.0E-04	1.3E+00	0.0640	30-160	30-160	30	-
Acenaphthene	0.50	ug/kg dry wt	5.0E-04	2.8E-02	0.0890	30-160	30-160	30	-
Fluorene	0.50	ug/kg dry wt	5.0E-04	2.9E-02	0.0680	30-160	30-160	30	-
Phenanthrene	0.50	ug/kg dry wt	5.0E-04	1.5E+00	0.114	30-160	30-160	30	-
Anthracene	0.50	ug/kg dry wt	5.0E-04	5.1E-02	0.0740	30-160	30-160	30	-
Fluoranthene	0.50	ug/kg dry wt	5.0E-04	9.0E-02	0.0810	30-160	30-160	30	-
Benzo(a)anthracene	5.00E-01	ug/kg dry wt	5.0E-04	5.7E-05	0.0720	30-160	30-160	30	-
Chrysene	0.50	ug/kg dry wt	5.0E-04	6.4E-03	0.0700	30-160	30-160	30	-
Benzo(b)fluoranthene	5.00E-01	ug/kg dry wt	5.0E-04	2.0E-04	0.0660	30-160	30-160	30	-
Benzo(k)fluoranthene	0.50	ug/kg dry wt	5.0E-04	2.0E-03	0.101	30-160	30-160	30	-
Benzo(a)pyrene	5.00E-01	ug/kg dry wt	5.0E-04	1.6E-05	0.0870	30-160	30-160	30	-
Indeno(1,2,3-cd)pyrene	0.50	ug/kg dry wt	5.0E-04	5.6E-04	0.0880	30-160	30-160	30	-
Dibenzo(a,h)anthracene	5.00E-01	ug/kg dry wt	5.0E-04	2.9E-05	0.105	30-160	30-160	30	-
Benzo(g,h,i)perylene	0.50	ug/kg dry wt	5.0E-04	6.7E-01	0.0850	30-160	30-160	30	-
Biphenyl	0.50	ug/kg dry wt	5.0E-04	na	0.378	30-160	30-160	30	-
2,6-Dimethylnaphthalene	0.50	ug/kg dry wt	5.0E-04	na	0.0970	30-160	30-160	30	-
2,3,5-Trimethylnaphthalene	0.50	ug/kg dry wt	5.0E-04	na	0.0910	-	-	-	-
Dibenzothiophene	0.50	ug/kg dry wt	5.0E-04	na	0.0610	-	-	-	-
1-Methylphenanthrene	0.50	ug/kg dry wt	5.0E-04	na	0.0830	30-160	30-160	30	-
Benzo(j)fluoranthene	0.50	ug/kg dry wt	5.0E-04	na	0.0970	30-160	30-160	30	-
Benzo(e)pyrene	0.50	ug/kg dry wt	5.0E-04	na	0.0960	30-160	30-160	30	-
Total cPAH TEQ			7.55E-04	1.6E-05					
Tributyl Tins by 8270D-SIM (ug/kg)									
Tributyltin Ion	3.86	ug/kg dry wt	3.86E-03	1.2E-01	0.450	30-160	30-160	30	-
Dibutyltin Ion	5.78	ug/kg dry wt	5.78E-03	na	1.73	30-160	30-160	30	-
Butyltin Ion	4.08	ug/kg dry wt	4.08E-03	na	1.89	30-160	30-160	30	-
Tetrabutyltin	5.00	ug/kg dry wt	5.00E-03	na	5.00	-	-	-	-
Diesel- and oil-range total petroleum hydrocarbons (TPH) by NWTPH-Dx (mg/kg)									
Diesel Range Organics (C12-C24)	5.00	mg/kg dry wt	5.0E+00	2.6E+02	2.34	63-120	63-120	30	-
Motor Oil Range Organics (C24-C38)	10.00	mg/kg dry wt	1.0E+01	na	2.99	30-160	30-160	30	-
Gasoline-range TPH by NWTPH-Gx (mg/kg)									
Gasoline Range Organics (Tol-Nap)	5000.00	ug/kg dry wt	5.0E+00	1.2E+02	2500	70-121	28-162	30	-

Notes:

[A] – Based on current laboratory control criteria. Some values may vary slightly between instruments and can be subject to change as the laboratory updates the charted values periodically.

%R – percent recovery

LCS/LCSD – laboratory control samples and laboratory control sample duplicate

MDL – method detection limit

MRL – method reporting limit

MS/MSD - Matrix Spike and Matrix Spike Duplicate

na – screening level not available

RPD – relative percent difference

(--) – No value identified

TEQ - total toxic equivalent concentration calculated in accordance with MTCA.

mg/kg -- milligram per kilogram

Red highlight indicates that the MRL is higher than the most stringent screening level.

Table E.10. QC Parameters Associated with PARCCS

Project No. 190293, South Park Marina, Seattle, Washington

Data Quality Indicators	QC Parameters
Precision	RPD values of:
	(1) Blank Spikes
	(2) MS/MSD
	(3) Field Duplicates
Accuracy/Bias	Percent Recovery (%R) or Relative Percent Difference (%RPD) values of:
	(1) Initial Calibration and Calibration Verification
	(2) Blank Spikes
	(3) MS
	(4) Surrogate Spikes
	Results of:
	(1) Instrument and Calibration Blank
	(2) Method (Preparation) Blank
	(3) Trip Blank
	(4) Equipment Rinsate Blank (if appropriate)
Representativeness	Results of All Blanks
	Sample Integrity (Chain-of-Custody and Sample Receipt Forms)
	Holding Times
Comparability	Sample-specific Reporting Limits
	Sample Collection Methods
	Laboratory Analytical Methods
Completeness	Data Qualifiers
	Laboratory Deliverables
	Requested/Reported Valid Results
Sensitivity	MDLs and MRLs

Notes:

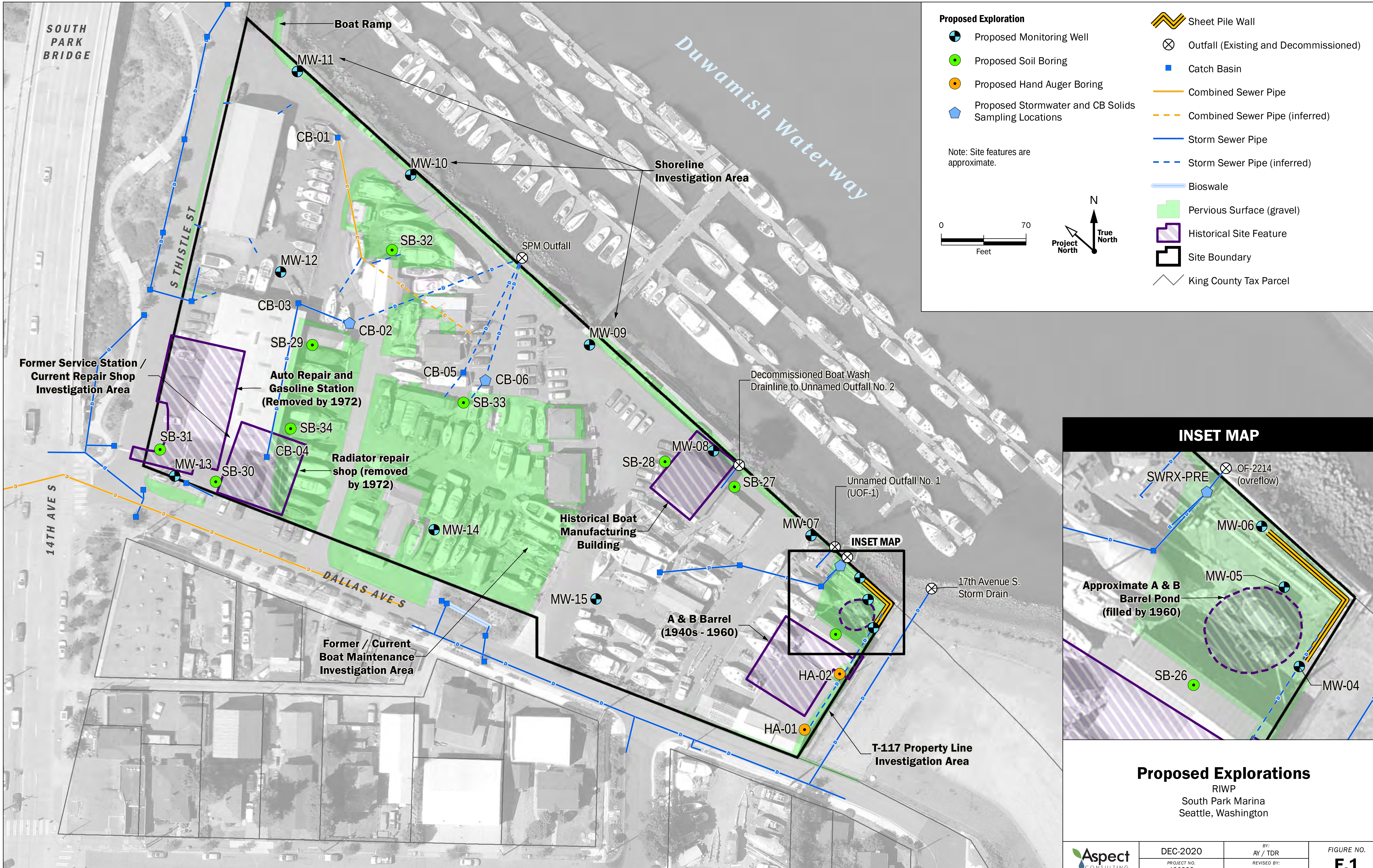
MDL – method detection limit

MRL – method reporting limit

MS/MSD – matrix spike/matrix spike duplicate

QC - quality control

FIGURES



Proposed Explorations
RIWP
South Park Marina
Seattle, Washington

Aspect CONSULTING | DEC-2020 | BY: AY / TDR | FIGURE NO. E.1
PROJECT NO. 190293 | REVISED BY: - - -

ATTACHMENT 1

Field Forms

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BORING LOG

SHEET ______OF _______

LOCATION OF BORING	PROJECT NO.	BORING NO.
	PROJECT NAME	

SKETCH OF LOCATION	DRILLING METHOD:
	LOGGED BY:
	DRILLER:
	SAMPLING METHOD:
	HAMMER WEIGHT/SAMPLER DIAMETER

OBSERVATION WELL INSTALL YES ______ NO ______					START	FINISH
WATER LEVEL					TIME	TIME
TIME						
DATE					DATE	DATE
CASING DEPTH						

DATUM	GRADE ELEV.

SURFACE CONDITION

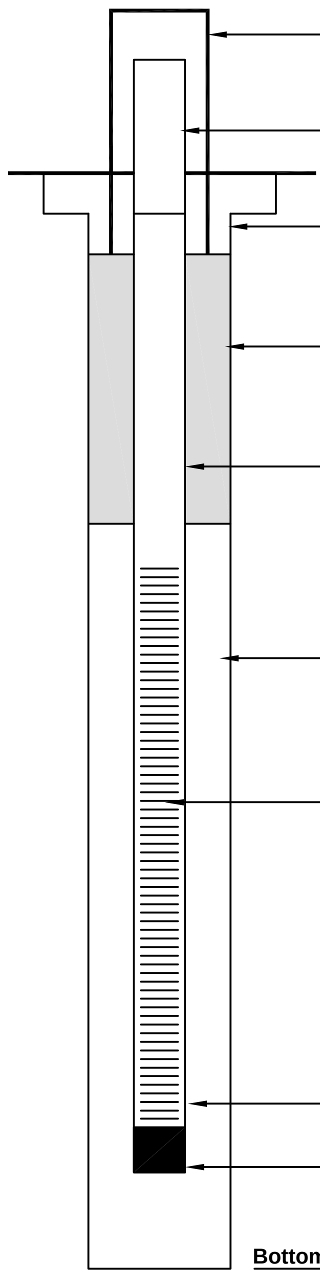
FIELDSCREENING									
ENV. SAMPLE TIME	PID (ppm)	SHEEN	SAMPLE NO. / SAMPLE TYPE	SAMPLE DEPTH	INCHES DRIVEN / INCHES RECV'D	DEPTH IN FEET	PENETRATION RESISTANCE	USCS SUMMARY	DESCRIPTION: Density, moisture, color, minor, MAJOR CONSTITUENT. NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc. DRILL ACTION
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

As-Built Well Completion Diagram

Project Number:	Boring/Monitoring Well Number: Sheet: of:
Project:	Location:
Elevation:	Drilling Contractor:
Drilling Method and Equipment Used:	Logged By:
Water Levels:	Completion Start: Finish:

Ecology Well ID ________________

Soil Type/ Depth | **Completion Depths**



Monument Type/Height ____________________

Well Cap Type ____________________

Surface Seal Material ____________________

Seal Material ____________________
(list NSF/ANSI certification)

Well Casing ID ____________________

Type of Casing ____________________

Type of Connection ____________________

Filter Pack/Size ____________________

Filter Pack Interval ____________________

Well Screen ID ____________________

Type of Screen ____________________

Slot Size ____________________

Screen Interval ____________________

Centralizers ____________________

Diameter of Borehole ____________________

Sump ____________________

Bottom of Boring ____________________

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Materials Used:	Screen:
Sand:	Bentonite:
Blank:	Monument:
Concrete:	Other:

Q:_ACAD Standards\Standard Details\Well Diagram.dwg

WELL DEVELOPMENT RECORD

WELL NUMBER:

Project Name:
Date:
Developed by:
Measuring Point of Well:
Screened Interval (ft. BGS):
Filter Pack Interval (ft. BGS):

Project Number:
Starting Water Level (ft TOC):
Casing Stickup (ft BGS):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume: ft Water x gpf =
Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf

DEVELOPMENT MEASUREMENTS

Elapsed Time (min)	Cumul. Vol. (gallons)	Purge Rate (gpm)	Temp. (C or F)	pH	Specific Conductance (µmhos/cm)	Turbidity (NTU)	Imhoff Cone (ml/L)	Comments

Total Discharge (gallons):
Total Casing Volumes Removed (gallons):

Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

METHODS

Cleaning Equipment:
Development Equipment:
Disposal of Discharged Water:
Observations/Comments:

Aspect CONSULTING

Sample number ____________________

GROUNDWATER SAMPLING RECORD

WELL NUMBER: _______ **Page:**____ **of** ____

Project Name: ____________________
Project Number: ____________________
Date: ____________________
Sampled by: ____________________
Measuring Point of Well: TOC
Screened Interval (ft. TOC) ____________________
Filter Pack Interval (ft. TOC) ____________________

Starting Water Level (ft TOC): ____________________
Casing Stickup (ft): ____________________
Total Depth (ft TOC): ____________________
Casing Diameter (inches): ____________________

Casing Volume ___________ (ft Water) x ___________ (Lpfv)(gpf) = ___________ (L)(gal)

Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): ___________

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments

Total Gallons Purged: ____________________
Total Casing Volumes Removed: ______________

Ending Water Level (ft TOC): ____________________
Ending Total Depth (ft TOC): ______________

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance		Remarks
						Color	Turbidity & Sediment	

METHODS

Parameters measured with (instrument model & serial number): ____________________

Purging Equipment: ____________________ Decon Equipment: ____________________

Disposal of Discharged Water: ____________________

Observations/Comments: ____________________

APPENDIX F

Site-Specific Health and Safety Plan

SITE-SPECIFIC HEALTH AND SAFETY PLAN
SOUTH PARK MARINA
REMEDIAL INVESTIGATION

Prepared for:
Aspect Consulting LLC

Prepared by:
EMB Consulting LLC

Revision date: November 11, 2020

EMB Consulting, LLC
22725 44th Avenue west, #203 * Mountlake Terrace, Washington 98043
206.915.2395 * emblackconsult@gmail.com

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FIGURES

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ATTACHMENTS

ATTACHMENT 1 COC REGULATORY LIMITS AND HEALTH HAZARDS
ATTACHMENT 2 TRAINING CERTIFICATES
ATTACHMENT 3 ASPECT COVID-19 REQUIREMENTS

ACRONYMS

2,3,7,8 TCDD	2,3,7,8-tetrachloro-p-dibenzo-dioxin
Aspect	Aspect Consulting
BEHP	bis(2-ethylhexyl)phthalate
CIH	Certified Industrial Hygienist
City	City of Seattle
COCs	Contaminants of Concern
cPAHs	Carcinogenic polynuclear aromatic hydrocarbons
CSE	Confined Space Entry
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DOSH	Washington State Division of Occupational Safety and Health
Ecology	Washington State Department of Ecology
EMB	EMB Consulting
EPA	Environmental Protection Agency
Hazwop	Hazardous Waste Site Operations
IARC	International Agency for Research on Cancer
LDW	Lower Duwamish Waterway
mg/m^3	milligrams per cubic meter of air
MTCA	Model Toxics Control Act
OEL	Occupational Exposure Limit
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCE	Perchloroethylene
PEL	Permissible Exposure Limit
PID	Photoionization Detector
Plan	Site-Specific Health and Safety Plan
PLPs	Potentially Liable Parties
Port	Port of Seattle
PPE	Personal Protective Equipment
ppm	parts per million
RI	Remedial Investigation
SDS	Safety Data Sheet
Site	South Park Marina Site
SHSO	Site Health and Safety Officer
SPM	South Park Marina Limited Partnership
STEL	Short-term exposure limit
SVOC	Semi-Volatile Organic Compounds
TCE	Trichloroethylene
TPH	Total Petroleum Hydrocarbons
TWA	Time-Weighted Average
VOCs	Volatile Organic Compounds
WAC	Washington Administrative Code
WHO	World Health Organization

Aspect Consulting LLC
Site-Specific Health and Safety Plan
Remedial Investigation
South Park Marina
8604 Dallas Avenue South
Seattle, Washington

Aspect Consulting LLC (Aspect) and EMB Consulting, LLC (EMB) have developed this Site-Specific Health and Safety Plan (Plan) for use by Aspect, its subcontractors, and visitors to the South Park Marina. Aspect and EMB claim no responsibility for its use by others. The Plan covers activities with the potential for exposure to contaminated environmental media during remedial investigation activities at the South Park Marina Remedial Investigation (RI) site (Site) at 8604 Dallas Ave South in Seattle, Washington. This Plan is written for the specific site conditions, operations, purposes, and personnel specified and must be amended if conditions change. The intent of this Plan is to meet the requirements of the Washington State Division of Occupational Safety and Health (DOSH) Hazardous Waste Site Operations (HAZWOP) regulation (WAC 296-843). It is not intended to address normal safety practices on construction sites, such as those covered in the DOSH Safety Standards for Construction Work (WAC 296-155).

Each subcontractor is still responsible for the health and safety of their own individual employees and subcontractors.

Plan Approval

PLAN PREPARED BY:

E. Black

	November 11, 2020
Elisabeth Black, CIH EMB Consulting, LLC	Date

PLAN ACCEPTED FOR ASPECT CONSULTING BY:

Jeremy Porter Project Manager Aspect Consulting LLC	Date

HEALTH AND SAFETY CONTACT INFORMATION

SITE LOCATION	**South Park Marina** 8604 Dallas Avenue South Seattle, Washington A Site figure is provided with this Plan in Section 2.
NEAREST MEDICAL FACILITIES	Harborview Medical Center (Emergency Room) 325 9th Street Seattle, Washington Phone: 206.744.3000 Sea Mar Seattle Medical Clinic (Walk-In Clinic) 8720 14th Ave S Seattle, Washington Phone: 206.762.3730 The routes from the Site to the medical facilities are provided at the end of this Plan.
EMERGENCY RESPONDERS	Seattle Police, Fire, and Ambulance 911
EMERGENCY CONTACTS	Jeremy Porter 206.790.2129 Project Manager Aspect Consulting Andrew Yonkofski 404.272.3488 Field Manager Site Health and Safety Officer (SHSO) Aspect Consulting Allison Crowley 206.719.8160 Client Contact Seattle City Light Elisabeth Black, CIH 206.915.2395 EMB Consulting, LLC
PROVIDE THE FOLLOWING INFORMATION TO EMERGENCY RESPONDERS	• Where You Are: Address, cross streets, or landmarks • Phone Number you are calling from • What Happened? Type of injury, accident • How many persons need help • What is being done for the victim(s) • You hang up last

1. INTRODUCTION

Aspect and its subcontractors are participating in the South Park Marina RI project in Seattle, Washington. The Site is located in the industrial South Park neighborhood of South Seattle, and is bound by the Duwamish Waterway to the north; Dallas Avenue South to the south; and South Thistle Street to the west. Residential developments are located across Dallas Avenue South to the south and east. Environmental investigations on the Site have identified the following contaminants of concern (COCs) on the Site, resulting from many decades of industrial activity in the project area: dioxins/furans, metals, semi-volatile organic compounds including polynuclear aromatic hydrocarbons, polychlorinated biphenyls, pesticides, petroleum hydrocarbons, and volatile organic compounds.

This Plan was developed specifically for, and is limited to, the portions of the Site in which contaminated soils, sediment, groundwater, surface water, and air may be impacted. This Plan is intended to be used in conjunction with the corporate health and safety programs of Aspect and their subcontractors, and will be used as the foundation for training personnel on Site.

This Plan is intended to be a "living" document. It will be reevaluated and updated periodically as needed in light of work progression and changing conditions. A copy of this Plan will be located on the work site. Table 1.1 includes a summary of project information.

TABLE 1.1
SUMMARY OF PROJECT INFORMATION

Project Name	South Park Marina - Remedial Investigation
Site Location	South Park Marina 8604 Dallas Avenue South Seattle, Washington (See Site map in Section 2)
Known Chemical Hazards	• Dioxins/Furans • Metals • Polynuclear Aromatic Hydrocarbons (PAHs) and carcinogenic PAHs (cPAHs) • Polychlorinated biphenyls (PCBs) • Pesticides/Herbicides • Petroleum Hydrocarbons • Volatile Organic Compounds (VOCs) • Semi-Volatile Organic Compounds (SVOCs)
Known Physical Hazards	Trucks, boats, and heavy machinery traffic, lifting, trips, falls, utilities (underground and overhead), drill rig, noise, confined space entry (CSE)
Field Activities	• Drilling and soil sampling (direct-push, hollow-stem auger, hand auger) • Monitoring well installation • Groundwater sampling • Catch basin solid sampling • Stormwater sampling • Erodible bank soil sampling • Intertidal sediment and porewater sampling

2. SITE INFORMATION

2.1 SITE BACKGROUND

The Washington State Department of Ecology (Ecology) has listed South Park Marina as a State Cleanup Site and identified the City of Seattle (City), The Port of Seattle (Port), and South Park Marina Limited Partnership (SPM) as potentially liable parties (PLPs) for investigation of the Site. The City, the Port and SPM (collectively “the PLPs”) are under an Agreed Order with Ecology to perform an RI under the Model Toxics Control Act (MTCA).

South Park Marina is located at 8604 Dallas Ave South in the South Park neighborhood of Seattle. The marina property covers approximately four acres on the west bank of the Lower Duwamish Waterway (LDW). Contaminants in the soil and groundwater at the Site may migrate into the river and may pose a risk to human health and the environment.

From approximately 1949 to 1960, A & B Barrel, formerly located on a small portion of the Site, cleaned and reconditioned used steel barrels. A & B Barrel discharged drum contents and wash water to a small pond on the property, located adjacent to the LDW. From the 1960s to the present day, the property has been used as a marina. The current owner of the marina, SPM, has owned the Site since 1993. Vehicle parking, boat storage and repair, a gasoline station, boat manufacturing and other activities associated with an active marina may have contributed to the Site contamination.

2.2 SITE MAP

The following map illustrates the Site location and boundaries.

Photo extracted from the Washington State Department of Ecology Toxics Cleanup page for the Site (https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=2858)

2.3 CONTAMINATION CHARACTERIZATION

Based on available environmental data, the COCs for this project are as follows:

TABLE 2.1
SUMMARY OF SPECIFIC COCs

COC	Specific Compounds
Dioxins/Furans	
Metals	arsenic, barium, cadmium, chromium, copper, lead, mercury, silver, zinc
PAHs/cPAHs	2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene
PCBs	
Pesticides/Herbicides	4,4'-DDD, 4,4'DDE, 4,4'DDT, aldrin, dieldrin, heptachlor, cis- and trans-chlordane
Petroleum Hydrocarbons and VOCs (non-chlorinated)	Gasoline, diesel, heavy oil, benzene, toluene, ethylbenzene
SVOCs (non-PAH)	Benzoic acid, benzyl alcohol, benzyl butyl phthalate, bis(2-ethylhexyl)phthalate (BEHP), dibenzofuran, dimethyl phthalate, di-n-butyl phthalate, 2,4-dinitrophenol, pentachlorophenol, phenol
VOCs (chlorinated)	1,2-dichlorobenzene, perchloroethylene (PCE), trichloroethylene (TCE), vinyl chloride

A table provided as Attachment 1 of this Plan includes a summary of the potential hazards and applicable worker exposure limits for the COCs.

Dioxins/Furans

Dioxins and furans is the abbreviated or short name for a family of toxic substances that all share a similar chemical structure. Most dioxins and furans are not man-made or produced intentionally, but are created when other chemicals or products are made. Of all of the dioxins and furans, one, 2,3,7,8-tetrachloro-p-dibenzo-dioxin (2,3,7,8 TCDD) is considered the most toxic.

Short-term exposure of humans to high levels of dioxins may result in skin lesions, such as chloracne and patchy darkening of the skin, and altered liver function. Long-term exposure is linked to impairment of the immune system, the developing nervous system, the endocrine system, and reproductive functions.

Chronic exposure of animals to dioxins has resulted in several types of cancer. TCDD has been evaluated by the World Health Organization (WHO) International Agency for Research on

Cancer (IARC). Based on animal data and on human epidemiology data, TCDD was classified by IARC as carcinogenic to humans.

There are currently no occupational exposure limits (OELs) for dioxins/furans in air.

Metals

Arsenic

Arsenic is a naturally occurring element widely distributed in the earth's crust. Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenate is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton fields and orchards.

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet. Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso. Skin contact with inorganic arsenic may cause redness and swelling.

The IARC has determined that inorganic arsenic is carcinogenic to humans.

The DOSH permissible exposure limit (PEL) for inorganic arsenic is 0.01 milligrams per cubic meter of air (mg/m^3).

Barium

Barium compounds are used to make drilling muds, paint, bricks, ceramics, glass, and rubber. Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness.

Barium and barium compounds have not been rated by the IARC for carcinogenicity.

The DOSH PEL for soluble barium is 0.5 mg/m^3 in air, with a short-term exposure limit (STEL) of 1.5 mg/m^3.

Cadmium

The major route of exposure to cadmium is via inhalation of dusts or fumes or through ingestion of dust. Cadmium dust exposure causes lung damage, kidney disease, and fragile bones.

Cadmium is a known human carcinogen. Ingestion of cadmium dust from swallowing inhaled dust or ingesting contaminated soil may also cause stomach irritation, vomiting, and diarrhea.

Cadmium and cadmium compounds are rated by the IARC as carcinogenic to humans.

The DOSH PEL for cadmium dust is 0.005 mg/m^3, with an action level of 0.0025 mg/m^3.

Chromium
Exposure to chromium occurs from ingesting contaminated food or drinking water or breathing contaminated workplace air. Chromium(VI) at high levels can damage the nose and cause cancer. Ingesting high levels of chromium(VI) may result in anemia or damage to the stomach or intestines. Chromium(III) is an essential nutrient.

Chromium VI is rated by the IARC as carcinogenic to humans. Other chromium compounds are not classified with respect to carcinogenicity.

The DOSH PEL for chromium metal is 0.5 to 0.005 mg/m^3 depending on the valence state.

Copper
Copper is used to make many different kinds of products like wire, plumbing pipes, and sheet metal. U.S. pennies made before 1982 are made of copper, while those made after 1982 are only coated with copper. Copper is also combined with other metals to make brass and bronze pipes and faucets. Copper compounds are commonly used in agriculture to treat plant diseases like mildew, for water treatment and, as preservatives for wood, leather, and fabrics.

High levels of copper can be harmful. Breathing high levels of copper can cause irritation of your nose and throat. Ingesting high levels of copper can cause nausea, vomiting, and diarrhea. Very-high doses of copper can cause damage to your liver and kidneys, and can even cause death.

Copper has not been rated by the IARC for carcinogenicity.

The DOSH PEL for copper dust is 1.0 mg/m^3 in air, with a STEL of 3.0 mg/m^3.

Lead
The major route of exposure to lead is via inhalation of dusts or fumes or through ingestion of dust. Prolonged absorption of lead or its compounds results in severe gastrointestinal disturbances and anemia; with more serious intoxication, there is neuromuscular dysfunction, and in the most severe exposures may result in encephalopathy.

Lead and its compounds have been rated by the IARC as probably carcinogenic to humans.

The Action Level for lead dust is 0.025 mg/m^3, the DOSH PEL is 0.05 mg/m^3, and there is no STEL.

Mercury
The nervous system is very sensitive to all forms of mercury. Elemental mercury primarily causes health effects when it is breathed as a vapor where it can be absorbed through the lungs. Exposure to vapors will increase in warm or poorly ventilated indoor spaces.

The immediate symptoms of exposure to elemental mercury vapors include lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation. Delayed symptoms include tremors, emotional changes (e.g., mood swings, irritability, nervousness, excessive shyness), insomnia, neuromuscular changes (such as weakness, muscle atrophy, twitching), headaches, disturbances in sensations, and changes in nerve responses. At very higher exposures there may be kidney effects, respiratory failure, and death.

Inorganic mercury has been listed as unclassifiable as to carcinogenicity in humans.

The DOSH PEL for elemental mercury vapor is 0.1 mg/m^3, with a STEL of 0.3 mg/m^3.

Silver
Exposure to high levels of silver for a long period of time may result in a condition called arygria, a blue-gray discoloration of the skin and other body tissues. Lower-level exposures to silver may also cause silver to be deposited in the skin and other parts of the body; however, this is not known to be harmful. Argyria is a permanent effect, but it appears to be a cosmetic problem that may not be otherwise harmful to health.

Exposure to high levels of silver in the air has resulted in breathing problems, lung and throat irritation, and stomach pains. Skin contact with silver can cause mild allergic reactions such as rash, swelling, and inflammation in some people.

Silver has not been rated by the IARC for carcinogenicity.

The DOSH PEL for silver is 0.01 mg/m^3, with a STEL of 0.03 mg/m^3.

Zinc
The major route of exposure to zinc is accidental ingestion. Zinc is an essential element, meaning our bodies need zinc to function properly. If too much zinc is ingested, health impacts such as stomach upset and anemia have been reported.

Zinc has not been rated by the IARC for carcinogenicity.

The DOSH PEL for zinc is 10 mg/m^3 with a STEL of 20 mg/ m^3.

<u>PAHs and cPAHs</u>

PAHs and cPAHs are organic compounds that contain three or more closed rings in their chemical structure. They appear primarily as black or dark brown amorphous residues that remain after redistillation of coal. Sources of PAHs are from emissions from coke ovens, coking of coal tar pitch, and thermal decomposition of organic materials (Bunker C). Uses of PAHs are as a base for coatings and paints, roofing and paving, and as a binder for carbon electrodes. PAHs include the following compounds: Acenaphthene; Acenaphthylene; Anthracene; Benz[a]anthracene; Benzo[b]fluoranthene; Benzo[k]fluoranthene; Benzo[ghi]perylene; Benzo[a]pyrene; Benzo[e]pyrene; Chrysene; Dibenz[a,h]anthracene; Fluoranthene; Fluorene; Indeno[1,2,3-cd]pyrene; Naphthalene; Phenanthrene; and Pyrene.

Exposure to these compounds can result in eye, skin, and respiratory irritation; headache, nausea, and confusion; blood system effects; liver and kidney damage; cataracts and other eye damage; dermatitis; and cancer. Seven of the higher molecular weight PAHs are considered to be suspected carcinogens (cPAHs) and include: Benz[a]anthracene; Benzo[b]fluoranthene; Benzo[k]fluoranthene; Benzo[a]pyrene; Chrysene; Dibenz[a,h]anthracene; and Indeno[1,2,3-cd]pyrene.

Most of these compounds do not have individual DOSH exposure limits established, however, an exposure limit is established for coal tar pitch volatiles (benzene or cyclohexane-soluble fraction) as a group of PAH compounds. The PEL for coal tar pitch volatiles (benzene or cyclohexane- soluble fraction) is 0.2 mg/m^3, with a STEL of 0.6 mg/m^3.

PCBs

PCBs are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals.

The IARC has determined that PCBs are carcinogenic to humans.

The DOSH PEL for PCBs containing 42% chlorine is 1.0 mg/m^3, with a STEL of 3.0 mg/m^3. For PCBs containing 54% chlorine, the PEL is 0.5 mg/m^3, with a STEL of 1.5 mg/m^3.

Pesticides/Herbicides

DDT, DDE, DDD

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned.

High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby.

DDT has been rated by the IARC as probably carcinogenic to humans.

The DOSH PEL for DDT is 1.0 mg/m^3, with a STEL of 3.0 mg/m^3. There are currently no PELs for DDE or DDD.

Aldrin/Dieldrin
Aldrin and dieldrin are insecticides with similar chemical structures. They are discussed together in this Plan because aldrin quickly breaks down to dieldrin in the body and in the environment. Neither substance occurs naturally in the environment.

From the 1950s until 1970, aldrin and dieldrin were widely used pesticides for crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, EPA banned all uses of aldrin and dieldrin in 1974, except to control termites. In 1987, EPA banned all uses.

Some workers exposed to moderate levels in the air for a long time had headaches, dizziness, irritability, vomiting, and uncontrolled muscle movements. Workers removed from the source of exposure rapidly recovered from most of these effects.

Dieldrin and aldrin metabolized to dieldrin has been rated by the IARC as probably carcinogenic to humans.

The DOSH PEL for aldrin and dieldrin is 0.25 mg/m^3, with a STEL of 0.75 mg/m^3.

Heptachlor
Heptachlor is a manufactured chemical that does not occur naturally. Heptachlor was used extensively in the past for killing insects in homes, buildings, and on food crops. These uses stopped in 1988.

There is no reliable information on health effects in humans. Liver damage, excitability, and decreases in fertility have been observed in animals ingesting heptachlor. The effects are worse when the exposure levels were high or when exposure lasted many weeks.

Heptachlor has been rated by the IARC as possibly carcinogenic to humans.

The PEL for heptachlor is 0.5 mg/m^3, with a STEL of 1.5 mg/m^3.

Cis- and Trans-Chlordane
Chlordane is a manufactured chemical that was used as a pesticide in the United States from 1948 to 1988. Technical chlordane is not a single chemical, but is actually a mixture of pure chlordane mixed with many related chemicals. It doesn't occur naturally in the environment. Chlordane has a mild, irritating smell. Until 1983, chlordane was used as a pesticide on crops like corn and citrus and on home lawns and gardens. Because of concern about damage to the environment and harm to human health, the Environmental Protection Agency (EPA) banned all uses of chlordane in 1983 except to control termites. In 1988, EPA banned all uses.

Chlordane affects the nervous system, the digestive system, and the liver in people and animals. Headaches, irritability, confusion, weakness, vision problems, vomiting, stomach cramps, diarrhea, and jaundice have occurred in people who breathed air containing high concentrations of chlordane or accidentally swallowed small amounts of chlordane.

Chlordane has been rated by the IARC as possibly carcinogenic to humans.

The PEL for chlordane is 0.5 mg/m^3, with a STEL of 1.5 mg/m^3.

Petroleum Hydrocarbons/VOCs

Petroleum distillate fuels are mixtures of aliphatic and aromatic hydrocarbons, the constituent concentrations of which can vary significantly dependent upon the crude feedstock, refining process, and seasonal variations. Predominant compounds in fuels are paraffins (e.g., pentane, hexane), naphthenes (e.g., cyclohexane), and aromatics (e.g., benzene, toluene, xylene, ethylbenzene). Gasoline contains about 80 percent paraffins, 6 percent naphthenes, and 14 percent aromatics. Fuel oils contain about 10 percent paraffin, up to 23 percent naphthenes, and up to 78 percent non-volatile aromatic hydrocarbons.

Petroleum distillate fuels exhibit relatively low acute inhalation and dermal toxicity. Concentrations of 160 to 270 ppm gasoline vapor have been reported to cause eye, nose, and throat irritation in people after several hours of exposure. Levels of 500 to 900 ppm have been reported to cause irritation and dizziness in one hour and 2,000 ppm has been reported to cause mild anesthesia in 30 minutes. Gasoline, kerosene, and some jet fuels will cause severe eye irritation on contact with the eye and low to moderate skin irritation on contact with the skin.

VOC Aromatics of greatest concern are a group known as BTEX (benzene, toluene, ethylbenzene and xylenes) due to their volatility and toxicity. Effects of the aromatics include kidney failure, liver damage, central nervous system damage and respiratory tract damage. Benzene and other aromatics can be absorbed through the respiratory tract and the skin, so both inhalation and dermal contact are routes of concern for exposure.

Petroleum distillate fuels are flammable. Under certain conditions, fire and explosion pose a greater risk than toxicity. Fuels are classified by the USDOT as flammable liquids if their flash points are 100 degrees F or less, which includes gasoline and No. 1 fuel oil.

The IARC has determined that benzene is carcinogenic to humans. Ethylbenzene is a possible carcinogen. Toluene and xylenes have not been classified. Gasoline is listed as a possible carcinogen.

The PEL for gasoline is 300 parts per million (ppm); benzene is 1 ppm; ethylbenzene, toluene, and xylenes all have a PEL of 100 ppm.

Semi-VOCs

The list of COCs classified as semi-VOCs for this Site include benzoic acid, benzyl alcohol, benzyl butyl phthalate, bis(2-ethylhexyl)phthalate (BEHP), dibenzofuran, dimethyl phthalate, di-n-butyl phthalate, 2,4-dinitrophenol, pentachlorophenol, phenol.

Bezoic Acid, Benzyl Alcohol, and dibenzofuran
These compounds do not appear to exhibit significant human health hazards and no OELs are available. The compounds are noted to cause potential irritation to skin, eyes, and mucous membranes. Precautions built into this Plan for other compounds should also be protective for these.

Pentachlorophenol
Pentachlorophenol is a manufactured chemical which is a restricted use pesticide and is used industrially as a wood preservative for utility poles, railroad ties, and wharf pilings. Exposure to high levels of pentachlorophenol can cause increases in body temperature, liver effects, damage to the immune system, reproductive effects, and developmental effects.

The IARC has determined that pentachlorophenol is carcinogenic to humans.

The current DOSH PEL-TWA for pentachlorophenol is 0.5 mg/m^3 with a STEL of 1.5 mg/m^3.

Other Phenols
Phenol is both a manufactured chemical and a natural substance. Phenol is used as a disinfectant and is found in a number of consumer products. Skin exposure to high amounts can produce skin burns, liver damage, dark urine, irregular heartbeat, and even death.

Phthalates
Phthalates, a family of industrial chemicals used to soften polyvinyl chloride (PVC) plastic and as solvents in cosmetics and other consumer products, can damage the liver, kidneys, lungs, and reproductive system.

Some phthalates are rated by the IARC as possible carcinogens for humans.

<u>VOCs (Chlorinated Solvents)</u>

1,2-Dichlorobenzene
1,2-dichlorobenzene has been found to be an eye and skin irritant.

1,2-dichlorobenzene has not been rated by the IARC for carcinogenicity.

There is no DOSH PEL for 1,2-dichlorobenzene.

PCE
PCE is most commonly used in industry as a dry cleaning solvent and metal degreaser. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor that can be detected at very low concentrations. High concentrations of PCE can cause dizziness, head- ache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Symptoms from low levels of exposure are not known, but long-term exposure may cause fertility problems and kidney and liver damage.

PCE is rated by the IARC as a probable human carcinogen.

The current DOSH PEL-TWA for PCE is 25 ppm with a STEL of 38 ppm.

TCE

TCE is a colorless liquid which is used as a solvent for cleaning metal parts. Drinking or breathing high levels of TCE may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death.

The IARC has determined that TCE is carcinogenic to humans.

The current DOSH PEL-TWA for TCE is 50 ppm with a STEL of 200 ppm.

Vinyl Chloride

The major route of vinyl chloride toxicity is via inhalation of vapor, with percutaneous absorption and ingestion of liquid playing lesser roles. Vinyl chloride can cause dizziness, drowsiness and fatigue, headache, euphoria and irritability, nervousness and sleep disturbances, nausea, visual and hearing disturbances, and loss of consciousness at high exposure levels. Chronic exposure to vapors via inhalation may cause liver damage or cancer.

The IARC has determined that vinyl chloride is carcinogenic to humans.

The current PEL-TWA for vinyl chloride is 1 ppm with a STEL of 5 ppm.

3. CHEMICAL HAZARD/RISK ANALYSIS

This Plan addresses only the chemical exposures that may occur when coming into contact with contaminated media. It is intended to be used in conjunction with the comprehensive safety and health program of Aspect and its subcontractors, in which physical work hazards of the construction industry are addressed.

Site activities which may involve chemical exposures include sampling of soil, sediment, soil gas, ground water, catch basin solids, and stormwater. Potential chemical hazards that may be encountered during Site work include exposure to the COCs described in Section 2.3 of this Plan. Workers could be exposed through the following routes:

- Inhalation of airborne dust during soil disturbance
- Inhalation of chemical vapors during project activities
- Skin absorption following exposure to soils, sediments, or water during Site activities
- Accidental ingestion of contaminated soil, sediment, or water

Health risks for the known chemical contamination on this Site are low if appropriate controls are implemented. However, unknown contamination is always a possibility. Any unexpected contamination should be treated with caution and reported for evaluation at the soonest opportunity. On sites contaminated with flammable COCs, hazardous atmospheres can develop in spaces with limited ventilation.

4. AIR MONITORING

As of this writing, air monitoring may be required for two types of work, to include monitoring for VOCs during soil disturbance activities and ambient air monitoring during confines space entry (CSE). The two types of monitoring will be addressed separately below.

4.1 AIR MONITORING FOR VOCS

The type and frequency of air monitoring will change based on the phase of the project and the potential for worker and community exposure. During excavation, trenching, and demolition in soils known to contain petroleum contamination, the work will be monitored using a direct-read photoionization detector (PID) for detection of VOCs. In addition, if odors are detected in other areas of the site during excavation, trenching, or demolition, the PID will be used to determine if the odor may represent a release of site contaminants to workplace or community air, even in areas where contamination has not been previously documented.

ACTION LEVELS FOR VOCs FOR WORKER PROTECTION

PID Readings in ppm	Action	Personal Protective Equipment
< or = 5 ppm	Continued periodic monitoring	Level D
> or = 5 ppm but < 20 ppm *sustained for one minute*	Inform site workers of potentially high VOC levels. Increase existing engineering controls, such as fans. Site workers must wear half-face air-purifying respirators with particulate/organic vapor filter until monitoring data shows that levels are below the project Action Limit.	Level C Add ½ mask with P100/VOC cartridges and chemically protective clothing.
> or = 20 ppm *sustained for one minute*	**STOP WORK; notify SSP.**	**If work is resumed, upgrade PPE as specified by Project CIH**

VOCs = volatile organic compounds
PID = photoionization detector
ppm = parts per million

4.2 AIR MONITORING FOR CONFINED SPACE ENTRY

Confined space entry (CSE) may be required during catch basin or stormwater sampling for this project. If CSE is necessary, air monitoring will be conducted as prescribed under the Aspect CSE Program.

5. RESPONSIBILITIES AND LINES OF AUTHORITY

5.1 SITE ORGANIZATIONAL STRUCTURE

Team Member	**Function**
Jeremy Porter	Project Manager
Andrew Yonkofski	Field Manager Site Health and Safety Officer
Elisabeth Black, CIH	Project Certified Industrial Hygienist

5.2 RESPONSIBILITIES

Duties of the Project Manager include:

- Ensure employer's responsibilities for safety and health are being implemented
- Ensure that field staff have the appropriate level of training and medical clearance for the tasks assigned
- Ensure that field staff have the appropriate equipment required to conduct the work safely
- Consult with CIH regarding new or unanticipated Site hazards.

Duties of the SHSO include:

- Ensure employer's responsibilities for safety and health are being implemented by daily inspections.
- Implement Site safety and health requirements in the field.
- Monitor Site conditions during work activities where hazardous compounds may be present.
- Record any variances in conditions.
- Record any illness, disease, injury, pulmonary disorder, or death of any person on the Site.
- Communicate requirements to field personnel and subcontractors.
- Perform safety record keeping.
- Verify that medical monitoring and training have been performed.

Duties of the Certified Industrial Hygienist include:

- Develop and coordinate the Site-Specific Health and Safety Plan (this Plan).
- Communicate requirements to the Project Manager.
- Respond to field requests for assistance in safety and health from Aspect and the SHSO.

Duties of the Site Workers include:

- Read and follow this Plan.
- Check all personal safety equipment to ensure it is in good working condition prior to entering the exclusion zone.
- Immediately report any accidents/illness, spills, unsafe conditions, any unusual smells or chemical smell to the SHSO.
- Incidents must be reported on a daily basis in detail for spills or accidents.
- Immediately report any symptoms of exposure.

5.3 SUBCONTRACTORS

The SHSO will ensure the Subcontractor's personnel are briefed on the procedures in this Plan and are aware of its location should it be needed for reference. Subcontractors will be responsible for the safety and health of their own personnel. The SHSO will have the authority to ensure Subcontractors follow the health and safety procedures set forth in the Plan. All subcontractors on Site must follow Site restrictions.

6. TRAINING

6.1 GENERAL HAZARDOUS WASTE OPERATIONS TRAINING

At a minimum, all personnel who may come into direct contact with impacted environmental media will meet the requirements of WAC 296-843, related to HAZWOP training. This training requires a 40-hour initial class followed by 8-hour annual refresher training. Those who are in a supervisory position on Site are also required to have the 8-hour supervisor course. Workers who are on Site, but would have limited exposure to Site COCs may take the 24 hour initial course, but would still be required to have the 8 hour refresher. All supervisory personnel (and at least two persons on-Site whenever work is performed) will be CPR/First Aid trained.

Workers who do not have HAZWOP training may enter the Site as long as they do not enter an exclusion zone and are not at any time in contact with contaminated media (soil, sediment, solids, air, water). Barriers may be created to provide a walkway for untrained workers so that they can access a non-contaminated area of the Site. If workers will disturb contaminated media by digging or otherwise displacing soil or water, they will be required to follow HAZWOP training requirements. All workers must receive Site-specific training.

6.2 SITE-SPECIFIC TRAINING

A pre-work safety conference will be held prior to commencement of field activities and attended by all field personnel. This meeting will be conducted by the SHSO to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment, including the hazards related to the COCs on Site.

Daily Site-wide pre-work meetings will be held to further assist Site personnel in conducting their activities safely. A briefing will be provided when changes in work practices must be implemented due to new information made available or if Site environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices when conformances with these practices are not being followed or if deficiencies are identified during safety inspections.

Personnel who may potentially wear respirators will have had training in the use of respirators, fit tested, undergone a baseline medical exam, and have been cleared to wear respirators.

Information concerning the hazards associated with the COCs shall be communicated to employees according to the requirements of the Hazard Communication Standard (WAC 296-800-170). This information shall include but not be limited to health effects, PPE requirements, the requirements concerning warning signs and labels, safety data sheets (SDSs), and the contents of this Plan. Training shall include:

- The specific nature of operations which could result in exposure to COCs;
- Routes of exposure and signs and symptoms of exposure;
- The specific PPE, engineering controls and work practices associated with the employee's job assignments, including training of employees to follow relevant good work practices; and
- The employee's right of access to records under part B, chapter 296-62 WAC.

Employee training records shall be maintained by the employer for the duration of employment plus two (2) years.

Training certificates for Aspect personnel on the Site will be maintained with this Plan in Attachment 2.

7. PERSONAL PROTECTIVE EQUIMENT (PPE)

This PPE program has been implemented to ensure that no personnel have dermal or airborne exposures to the COCs. In addition, Aspect has implemented PPE requirements for protection during the COVID-19 pandemic. The COVID-19 protection requirements are included with this Plan as Attachment 3.

A modified Level D PPE ensemble will be used with the main objective to prevent unnecessary dermal exposure. The SHSO will be consulted to up- or downgrade the PPE requirements. Personnel operating heavy equipment are also required to wear PPE while operating that equipment. The following PPE is required, unless conditions change:

PPE Required	General site work	Soil boring	Monitoring well install	Groundwater sampling	Catch Basin and Stormwater Sampling	Erodible Bank / Sediment / Pore Water Sampling
Hard Hat		X	X			
Safety Glasses/Goggles	X	X	X	X	X	X
Ear Plugs	Av	X	Av	Av	Av	Av
Gloves:						
Nitrile	X	X	X	X	X	X
Tyvek Coverall (permeable)		X	X	X	X	X
High-visibility Vest	X	X	X	X	X	X
PFD						X
Steel-Toe Boots	X	X	X	X	X	X
½ face air-purifying respirator (P100/OV)		Av	Av	Av	Av	Av
Face Mask (1)	X	X	X	X	X	X

X = PPE Required
Av = Have available at work site, use as needed
Glove Types = Nitrile, Vinyl, Neoprene, Butyl
(1) = See Attachment 3 for Aspect's COVID protection program documents.

7.1 PPE PROGRAM

The PPE program of contractors on Site will comply with WAC 296-800-160 and the respiratory protection requirements of WAC 296-842. As per WAC 296-800-160, protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, will be provided, used, and maintained in a sanitary and reliable condition whenever it is necessary by reason of hazards of processes or environment, chemical hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact.

7.2 ANTICIPATED LEVELS OF PROTECTION

During the initial phase of field activities, all personnel on site will wear Level D PPE. Level D should be used when the workplace atmosphere is below odor indicators for respiratory protection and work functions preclude the potential for unexpected inhalation hazards or dermal contact with hazardous levels of any chemical.

Level D Personal Protective Equipment will include the following:

- Safety shoes or boots
- High-visibility safety vest
- Safety glasses or goggles
- Hard hat, as necessary
- Work gloves, as appropriate
- Ear plugs when conditions require hearing protection (>85 dBA)
- Rain gear, as necessary
- Face mask, as necessary (see Attachment 3)

Level D will be modified to include a Tyvek or similar chemical resistant coveralls when coming in direct contact with contaminated media.

Level C PPE is not anticipated for this project, but may be required in air monitoring with a PID indicates VOCs greater than or equal to 5 ppm sustained for one minute, as described in Section 4. Level C Personal Protective Equipment will include the following:

- Half-face air-purifying respirator with P-100/organic vapor cartridges
- Tyvek coveralls (poly-coated if in contact with liquids or mud) or chemical-resistant rain gear
- Safety shoes or boots
- High-visibility safety vest
- Safety glasses or goggles
- Hard hat, as necessary
- Chemical resistant Nitrile inner and outer gloves
- Ear plugs when conditions require hearing protection (>85 dBA)

7.3 MAINTENANCE AND STORAGE

PPE must be maintained and stored properly to prevent damage or malfunction due to exposure to dust, moisture, sunlight, damaging chemicals, extreme temperatures, and impact. PPE on Site will be stored in a designated area within the personnel/office trailer, or if no job site trailer is available, they will be properly stored in the SHSO's or employee's vehicle in such a way as to prevent damage.

- Potentially contaminated clothing will be stored in an area separate from street clothing.
- Potentially contaminated clothing will be stored in a well-ventilated area, with good airflow around each item, if possible.
- Protective clothing will be folded or hung in accordance with manufacturers' recommendations.

7.4 DECONTAMINATION AND DISPOSAL

Potentially contaminated clothing will be washed separately from street clothes or thrown away depending on the severity of the contamination. Used Tyvek® suits will be disposed of, at a minimum, at the end of each shift, or when damaged. Tyvek® suits will not be reused.

7.5 TRAINING AND FITTING

Training will be completed prior to actual PPE use in the field. The training will delineate the user's responsibilities and explain the following:

- DOSH requirements as delineated in WAC 296-800-160.
- The proper use and maintenance of the selected PPE, including capabilities and limitations.
- The nature and the hazards and the consequences of not using the PPE.
- The human factors influencing PPE performance.
- Instruction in inspecting, donning, checking, fitting, and using PPE.
- The user's responsibility (if any) for decontamination, cleaning, maintenance, repair of PPE.
- Emergency procedures and self-rescue in the event of PPE failure.

Individualized employee fit testing will be conducted prior to arrival on Site. Any other person needing PPE will be fitted on Site outside the exclusion and contamination reduction zone.

7.6 EQUIPMENT DONNING

Proper procedures for dressing prior to entering the regulated areas will minimize the potential for contaminants to bypass the protective clothing and escape decontamination. In general, all fasteners will be fully used (i.e., zippers fully closed, all buttons used, all snaps closed, etc.). Gloves and boots will be tucked under the sleeves and legs of outer clothing, and hoods (if not attached) will be worn outside the collar. Another pair of tough outer gloves may be worn over the sleeves. All punctures will be temporarily taped to prevent contaminants from running inside the gloves, boots, and jackets (or suits, if one-piece construction). Torn PPE will be replaced.

Prior to each use, the PPE will be checked to ensure that it contains no cuts or punctures that could expose workers to wastes. Similarly, any injuries to the skin surface, such as cuts and scratches, may enhance the potential for chemicals to penetrate into the body. Particular care should be taken to protect these areas. Workers with large areas of damaged skin will be kept from working on Site until the skin heals.

Donning Level D PPE will include the following:

- Inspect clothing before donning
- Don coveralls or raingear appropriate for activities where contaminated media may be disturbed (i.e., no exposed skin).
- Put on safety shoes or boots
- Put on safety glasses or goggles
- Put on hardhat, if required
- Don work gloves

Donning Level C PPE will include the following:

- Inspect clothing before donning
- Don disposable Tyvek® coveralls or equivalent
- Put on safety shoes or boots
- Don half mask or full-face respirator, as required, and adjust it to be secure, but comfortable, make sure cartridges are securely attached, and perform negative and positive respirator seal test
- Put on hardhat, if required
- Don inner and outer chemical resistant gloves

8. MEDICAL SURVEILLANCE

8.1 MEDICAL EXAMINATION REQUIREMENTS

Personnel working directly with the potential COCs within the Site boundaries will have undergone a medical examination prior to participation in fieldwork that complies with WAC 296-843-210. The medical examination is conducted by a board-certified occupational health physician. The physician is made familiar with the job-related duties of each worker examined. Personnel who may potentially wear respirators will have undergone the medical exam and have been cleared to wear respirators.

Each employee who has received full medical monitoring shall be provided with a copy of the physician's written opinion within five working days of the receipt of the results.

Physicians Written Opinion

The physician will address the employee's ability to perform hazardous remediation work and will contain the following:

- The physician's recommended limitations, if any, upon the employee's assigned work and/or PPE usage.
- The physician's opinion about increased risk to the employee's health resulting from work; and
- A statement that the employee has been informed and advised about the results of the examination.

8.2 RECORDKEEPING

All medical monitoring and surveillance records shall be maintained by the employer for the duration of employment plus 30 years.

9. PERSONAL HYGIENE AND DECONTAMINATION

Personnel entering the work area or otherwise exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids will adhere to the following personal hygiene and decontamination provisions. Decontamination will be at the edge of the work zone prior to leaving the work area. Employees will be trained in the procedures that will be enforced throughout Site operations.

9.1 DECONTAMINATION FACILITIES

A portable restroom, including a hand wash station, soap and paper towels, will be provided on-site for the duration of the project, if onsite facilities are not available to workers. Workers will wash hands and face before breaks, lunch, and before leaving the job Site.

9.2 PERSONNEL DECONTAMINATION PROCEDURES

To minimize personnel contact with waste and thus the potential for contamination, Contractors will follow these Standard Operating Procedures:

- Implement work practices that minimize contact with hazardous substances (e.g., do not walk through areas of obvious contamination, do not directly touch potentially hazardous substances).

- Gloves and boots will be tucked under the sleeves and legs of outer clothing and hoods (if not attached) will be worn outside the collar.

- All punctures will be temporarily taped to prevent contaminants from running inside the gloves, boots, and jackets. Torn PPE will be replaced.

All personnel, clothing, equipment, and samples leaving the contaminated area of a site must be decontaminated to remove any chemicals or dust that may have adhered to them:

- Boots and hard hats will be washed with detergent and rinsed with water

- Gloves will be removed and disposed of in a trash barrel lined with plastic

All personnel will be trained in decontamination procedures to minimize contact with possible contaminants and maximize worker protection. These procedures will be enforced throughout Site operations.

9.3 VEHICLE DECONTAMINATION

If necessary, vehicles will be decontaminated as follows: all vehicles exiting the Site following the commencement of site activities will be swept clean of gross soil particles.

10. SITE MANAGEMENT

Effective Site management is critical in controlling the migration of chemical contaminants, eliminating physical hazards, and enforcing Site security. Some areas of the Site are known to contain contaminants in environmental media, and other areas may be considered "clean", or free of identified contaminants. Workers in areas that are determined to be "clean" are not required to comply with the provisions of this Plan, unless and until Site COCs are identified in those areas. This section addresses areas of the Site known to contain contaminated environmental media.

The purpose of contaminated area boundaries (a.k.a "exclusion zones") is twofold: to define contaminated areas for field investigators and to prevent unauthorized personnel from entering the area. Barrier tape, traffic cones or some other means (locked fences, in some cases) will be used to establish an exclusion zone. The following paragraph briefly discusses required site management procedures for contaminated areas.

Workers who do not have HAZWOP training may enter the Site as long as they do not enter an exclusion zone and are not at any time in contact with contaminated media (soil, solids, sediment, air, water). This may be accomplished in some instances by putting down visqueen or another barrier material between the workers' boots and contaminated soil, as soil is the only contaminated media in that area. If workers will disturb contaminated media by digging or otherwise displacing soil or water, they will be required to follow HAZWOP training requirements.

10.1 WORK ZONES

A traditional approach to designating areas in hazardous waste work sites is to be used in areas of suspected or confirmed contamination. To reduce the accidental spread of Site by workers and equipment and to assure that the proper PPE is worn, whenever feasible, the following work zones are delineated while engaging in exploration activities or any activity that may disturb contaminated media. Work zones are not required when field activities are limited to reconnaissance inspections, surveying without disturbing soils or water, or work on uncontaminated soils or water.

10.1.1 Exclusion Zone

The exclusion zone (EZ) may or may not be mobile, depending upon the task. EZ dimensions will be determined based on the size of the work area, Site limitations, and the potential for exposure to contaminated soils or other media.

Contaminated areas where work is being conducted shall have controlled entrance and accessible exit areas. The edges of the work area shall be marked in some way to identify the exclusion zone. Decontamination will be conducted in or near the entrance/exit area.

The outer boundary of the EZ initially will be established by contamination sampling and/or data from initial or previous Site surveys. Other factors, such as distances needed to prevent fire or an explosion from affecting personnel outside the zone, the physical area necessary to conduct Site operations, and the potential for airborne Site to reach non-contaminated areas shall be considered.

10.2 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone (CRZ) shall provide a buffer to ensure that the physical transfer of Site by personnel, equipment, or through the air is limited by a combination of decontamination, distance between the EZ and population, air dilution, zone restrictions, and work functions. The CRZ will be physically marked or well defined by barrier tape, signs, or physical barriers (e.g., chains, fences, ropes, etc.). Personnel entering the CRZ will wear prescribed PPE for each task to be performed. Prior to reentering the Support Zone (see below), personnel will remove any PPE worn in the CRZ. The CRZ will begin a safe distance from the activities in contaminated media.

A plastic waste bag or other designated receptacle will be available for all disposable outer boots, gloves, and external PPE and will be located within the CRZ adjacent to the access control point from the EZ into the CRZ.

10.3 SUPPORT ZONE

This is the outermost area of the Site and is considered to be a non-contaminated or clean area. Access is restricted to authorized Site personnel and visitors. Because normal work clothes are appropriate within this zone, potentially contaminated personnel clothing, equipment, and samples are not permitted until they are decontaminated, if necessary, in the CRZ. Functions performed in the Support zone include the following:

- Administration
- Sanitary facilities (toilets and hand-washing station)
- Equipment and supply storage
- Sample storage

The location of support facilities in the Support Zone must be easily accessible. (It should have an adequate view of activities in the EZ and CRZ.) Support facilities will be located upwind of the EZ. However, shifts in wind direction and other conditions may be such that an ideal location determined on the basis of wind direction alone does not exist. Distance can neutralize this factor.

SITE-SPECIFIC HEALTH AND SAFETY PLAN

South Park Marina
8604 Dallas Avenue South
Seattle, Washington

REVIEW SIGNATURE SHEET

Health and Safety Plan Certification: This Site-Specific Health and Safety Plan is written in compliance with industry standards and the requirements of WAC 296-843 for application at the subject Site in Seattle, Washington for the tasks specified in this Plan.

E. Black   November 11, 2020

Elisabeth Black, CIH   Date
EMB Consulting LLC

We, the undersigned, have reviewed this Plan, are familiar with its contents, and agree to abide by all the provisions herein:

Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date

ATTACHMENT 1: COC REGULATORY LIMITS AND HEALTH HAZARDS

COC Regulatory Limits and Health Hazards
Southpark Marina
Remedial Investigation

Chemical Name	DOSH PELs		Health Impacts	
	8-hr TWA	STEL	Chronic Health Hazards / Target Organs	Symptoms of Overexposure
Dioxins/Furans			Known human carcinogen, Immune system impairment, nervous system impacts, reproductive system, endocrine system	Skin lesions, altered liver function
Metals				
Arsenic	0.01 mg/m^3		Known human carcinogen. Skin, liver, bladder, and lung cancer	Sore throat, lung irritation, nausea, vomiting, stomach pain, diarrhea
Barium (soluble)	0.5 mg/m^3	1.5 mg/m^3	Not likely carcinogenic.	Stomach upset, muscle weakness
Cadmium	0.005 mg/m^3		Known human carcinogen. Skin, liver, bladder, and lung cancer	Lung damage, kidney disease, fragile bones
Chromium (metal)	0.5 mg/m^3		Known human carcinogen (hexavalent chromium)	Stomach upset,anemia, damage to nose tissues
Copper (dust)	1.0 mg/m^3	3.0 mg/m^3	Unknown if carcinogenic. Liver and kidney damage.	Skin, nose, and throat irritant, nausea, vomiting, diarrhea
Lead	0.05 mg/m^3		Probable human carcinogen. Central nervous system damage, reproductive health	Gastrointestinal disturbance, anemia
Mercury (inorganic)	0.1 mg/m^3	0.3 mg/m^3	Unknown if carcinogenic. Tremor, emotional changes, insomnia, headaches, nerve damage	Lung damage, nausea, vomiting, diarrhea, rash, eye irritation
Silver (dust)	0.01 mg/m^3	0.03 mg/m^3	Not likely carcinogenic. Arygria (skin discoloration)	Lung and throat irritation, stomach pain
Zinc (oxide)	10.0 mg/m^3	20.0 mg/m^3	Not likely carcinogenic.	Stomach upset, anemia
PAHs/cPAHs (as coal tar pitch volatiles)	0.2 mg/m^3	0.6 mg/m^3	Some PAHs are confirmed human carcinogens. Blood and liver abnormalities.	Eye and respiratory tract irritant. Skin irritation.
PCBs				
42% Chlorine	1.0 mg/m^3	3.0 mg/m^3	Probable human carcinogen. Liver damage. Immunological changes.	Skin irritation or rash
54% Chlorine	0.5 mg/m^3	1.5 mg/m^3		
Pesticides/Herbicide				
DDT	1.0 mg/m^3	3.0 mg/m^3	Probably human carcinogen. Reproductive toxin	Central nervous system, excitability, tremors, seizures
Aldrin	0.25 mg/m^3	0.75 mg/m^3	Unknown if carcinogenic.	Central nervous system, headache, dizziness, irritability, vomiting, involuntary muscle movement
Dieldrin	0.25 mg/m^3	0.75 mg/m^3		

COC Regulatory Limits and Health Hazards
Southpark Marina
Remedial Investigation

Chemical Name	DOSH PELs		Health Impacts	
	8-hr TWA	STEL	Chronic Health Hazards / Target Organs	Symptoms of Overexposure
Heptachlor	0.5 mg/m^3	1.5 mg/m^3	Possible human carcinogen	Unknown
cis/trans-chlordane (chlordane)	0.5 mg/m^3	1.5 mg/m^3	Unknown if carcinogenic. Liver and possibly reproductive toxin	Nervous system, digestive system, liver
Petroleum Hydrocarbons/VOCs (non-chlorinated)				
Benzene	1 ppm	5 ppm	Known human carcinogen. Leukemia, central nervous system depressant	Headache, nausea, dizziness, incoordination, and vomiting
Ethylbenzene	100 ppm	125 ppm	Possible human carcinogen	Central nervous system, headache, dizziness
Toluene	100 ppm	150 ppm	Unknown if carcinogenic.	Central nervous system, headache, dizziness
Xylenes	100 ppm	150 ppm	Unknown if carcinogenic.	Central nervous system, headache, dizziness
Gasoline	300 ppm	500 ppm	Probable human carcinogen	Central nervous system, headache, dizziness
Semi-VOCs				
Pentachlorophenol	0.5 mg/m^3	1.5 mg/m^3	Probable human carcinogen	Skin irritation or rash
Other phenols			Unknown if carcinogenic. Liver and possibly reproductive toxin	Skin irritation or rash
Phthalates			Unknown if carcinogenic. Liver and possibly reproductive toxin	Unknown
VOCs (chlorinated)				
Perchloroethylene	25 ppm	38 ppm	Possible human carcinogen. Liver, kidney, central nervous system toxin	Skin, eye, respiratory irritant and motor-neuro effects
Trichloroethylene	50 ppm	200 ppm	Heart, liver, kidney toxin, reproductive toxin in men, likely carcinogenic	Headache, nausea, dizziness
1,2-Dichloroethylene	200 ppm	250 ppm	Unknown if carcinogenic. Liver and lung	Nervous system effects, cardiac toxin
Vinyl Chloride	1 ppm	2 ppm	Known human carcinogen - liver cancer, finger	Dizziness, fatigue, headache, euphoria,

DOSH = Washington State Division of Occupational Safety and Health
8-hr TWA = Eight-hour time-weighted average
STEL = Short-term exposure limit
mg/m^3 = milligrams per cubic meter of air
ppm = parts per million

ATTACHMENT 2: TRAINING CERTIFICATES

ATTACHMENT 3: ASPECT COVID-19 REQUIREMENTS

May 1, 2020

Covid-19 Supplement to Aspect's Health and Safety Plan (or Job Hazard Assessment)

1.0 Background and Overriding Principles

As of March 24, 2020, all Aspect Health and Safety Plans and Job Hazard Assessments require a supplement related to COVID-19 virus protection. This includes special hygiene and social distancing protocols to help Aspect employees manage sanitation, safety, and distances with respect to the COVID-19 virus. Specific protocols are outlined in *Sections 4.4 and 6* of Aspect's Health and Safety Plans (HASPs). Section 4.4 is a general section applicable to all HASPs, while Section 6 requires addressing project- or task-specific actions.

This memorandum outlines the framework of the Aspect COVID-19 health and safety response so that field workers have guidance to conduct their work safely. Aspect's rationale for this relies on the guidance from the Occupational Safety and Health Administration's (OSHA's) LOW EXPOSURE RISK category.

Some overriding principles are:

1) **If a worker is feeling sick – stay home. Make appropriate arrangements with project manager (PMs).**
2) **If a worker finds themselves in large crowds, do not enter that environment, stop work, and call the PM.**
3) **All workers need to individually drive to and from the field site.**
4) **All workers need to have nitrile gloves, hand sanitizer and wipes available for use at all times.**
5) **All workers will maintain a 6-foot work radius around other individuals.**

The following provides details from OSHA's COVID-19 guidance that all Aspect field staff must adopt.

2.0 Worker Hygiene Practices (S*pecial COVID-19 Virus Prevention Actions*)

Along with normal hygiene practices commonly exercised by Aspect employees, workers must practice recommended infection prevention measures to avoid exposure and spreading of the COVID-19 virus. The Center for Disease Control (CDC) indicates that: *"COVID-19 is a respiratory illness that can spread from person to person."* Therefore, worker hygiene and distancing are critical elements to managing the virus' spread. The following is guidance that was used to develop this section of the HASP.

- Occupational Safety and Health Administration (OSHA) https://www.osha.gov/Publications/OSHA3990.pdf

- Centers for Disease Control (CDC) https://www.cdc.gov/coronavirus/2019-ncov/downloads/community-mitigation-strategy.pdf)

- World Health Organization (WHO) https://www.who.int/emergencies/diseases/novel-coronavirus-2019

Most COVID-19 guidance is geared toward protecting workers in office settings, whereas there is limited guidance for field work settings. Therefore, Aspect has adopted and enhanced the COVID-

May 1, 2020

19 procedures outlined by OSHA under their guidelines for "Low Exposure Risk" work (https://www.osha.gov/Publications/OSHA3990.pdf). OSHA states that:

> *"The Occupational Safety and Health Administration (OSHA) developed this COVID-19 planning guidance based on traditional infection prevention and industrial hygiene practices. It focuses on the need for employers to implement engineering, administrative, and work practice controls and personal protective equipment (PPE), as well as considerations for doing so.*"

OSHA outlines three categories of Exposure Risk. Aspect personnel will evaluate each project under these three OSHA Risk Exposure Categories and follow the "ACTION" outlined below.

1) ***High or Very High Exposure Risk*** are those that are generally in the health profession and have a higher possibility of direct exposure to patients or those who are sick.

    a. ***ACTION. NO ASPECT WORK FALLS INTO THE HIGH OR VERY HIGH EXPOSURE RISK CATEGORY. NO ASPECT WORKERS SHOULD BE FOUND IN THE HIGH OR VERY HIGH EXPOSURE RISK WORK SITUATION.***

2) ***Medium Exposure Risk*** OSHA states that "Medium Exposure Risk" jobs are ones that *"that require frequent and/or close contact with (i.e., within 6 feet of) people who may be infected, but who are not known or suspected COVID-19 patients."* OSHA goes on to indicate that this includes *"areas where there is ongoing community transmission, workers in this category may have contact with the general public (e.g., in schools, high-population-density work environments, and some high-volume retail settings)."* The Puget Sound area (and Washington State and all states in the USA) fall into this category definition as of March 2020.

    a. ***ACTION. Aspect's field work (and workers) should not be completed in high-population-density settings. If this occurs and work meets the criteria of "Medium Exposure Risk" based on population density, the field worker should stop work and contact the PM and Principal immediately to see if there are engineering or administrative controls to reduce the risk to "Low Exposure Risk." If controls cannot be established, workers will not enter this project area. The "Low Exposure Risk" setting outlined below is the category that Aspect field workers will be eligible to conduct work.***

3) ***Low Exposure Risk.*** OSHA states that **"**Lower exposure risk (caution) jobs are those that do not require contact with people known to be, or suspected of being, infected with COVID-19 nor frequent close contact with (i.e., within 6 feet of) the general public. Workers in this category have minimal occupational contact with the public and other coworkers."

    a. ***ACTION.*** Aspect personnel will use the following hygiene practices while working on site to maintain Low Exposure Risk. Note that OSHA indicates for this category, that *"Additional PPE is not recommended for workers in the lower exposure risk group. Workers should continue to use the PPE, if any, that they would ordinarily use for other job tasks."* With this said, Aspect employees will use the following protocols to comply with established social distancing and sanitary hygiene directives.

3.0 Distancing Procedures

1. Workers, if working in a team, will take separate vehicles to the job site.

2. Workers will not congregate in groups of more than four other individuals

3. Workers will not be permitted to enter the site if they feel sick; exhibit any symptoms common to cold, flu, or COVID-19; or knowingly come into close contact with someone who is ill e.g., friend or family member.

4. A minimum distance of six feet should be maintained from other individuals.

5. No person will eat, drink, chew gum or tobacco in potentially contaminated areas or around other people. Drinking replacement fluids for heat stress control will be permitted only in areas that are free from contamination, except in emergency situations. Lunch should be eaten in a car or away from other individuals.

6. All personnel leaving potentially contaminated areas will wash their hands and face prior to entering any new area; particularly eating areas.

4.0 Hygiene Procedures

1. Nitrile gloves will always be worn and changed as often as needed.
2. Frequently touched objects (e.g., car doors, outhouse doors, gate lock) will be disinfected at least at the beginning and end of each day when workers are on site.
3. Workers will avoid sharing unsanitized equipment, including phones and laptop screens.
4. Hands should be washed with soap and water, or otherwise sanitized with hand-sanitizer after using the restroom, before and after lunch breaks, and after co-handling objects.
5. Smoking is prohibited except in designated areas of the site.

5.0 Overnight Accommodations

1. There are four questions that should be evaluated before overnight stays are conducted.
    - First – Can the work be postponed until after the Stay at Home Order is lifted?
    - Second – Can additional staff be put on the task to complete the job in a day?
    - Third – Does Aspect have local staff available to complete the work?
    - Fourth – Does the Aspect employee feel they can accomplish the work safely and agree to comply with social distancing and safety expectations outlined.

If the answer to these questions is NO, then proceed with the following overnight stay protocol.

2. Make sure Aspect employee is comfortable with the work assignment. And if not, see if the protocol outlined below will increase the comfort level. The key to this protocol is reducing the potential risk of exposure (just like is done when a job is taken on near a local office where overnight stays are not needed)
3. If overnight stay is deemed essential, request Hotel COVID-19 procedures and attach to the HASP. For example, ask the hotel how often they sanitize common areas, clean rooms, and work to reduce exposures. If the hotel has no COVID-19 exposure procedures, evaluate another hotel. Aspect's field staff, PM and Principal in Charge (as needed) work to evaluate the hotel procedures in order to make an informed decision to stay there.
4. Aspect employees will follow all hygiene procedures above with the addition of disinfecting all door handles, and horizontal surfaces in the hotel room and wear gloves or wipe all exterior doors and card readers before entering building.
5. Avoid common areas in the hotel and use side entrances as appropriate.
6. All decisions regarding overnights stays must be elevated to the Principal -in-Charge in consultation with the Corporate Safety Officer and documented; similar to the go/no go procedure used to evaluate taking on a new project pursuit.

6.0 Face Coverings

A cloth face covering should be worn whenever people are in a community setting, especially in situations where you may be near people. These settings include grocery stores and pharmacies. These face coverings are not a substitute for social distancing. Cloth face coverings are especially important to wear in public in areas of widespread COVID-19 illness. Please adhere to the following best practices for face coverings:

- All employees on a site should cover their mouth and nose with a cloth face cover when around others.

- If someone has trouble breathing or has a medical reason why they can't wear a face covering, they should notify their supervisor. The CDC has issued guidance on facial coverings:

- Continue to keep about 6 feet between yourself and others. The cloth face cover is not a substitute for social distancing.

- Avoid touching your face and face cloth at all times.

- A clean facial covering should be worn each day and be able to be laundered and machine dried without damage or change to shape.

- Wash your hands before putting your covering on and immediately after taking it off. Individuals should be careful not to touch their eyes, nose, and mouth when removing their face covering.

- Cloth face coverings should fit snugly but comfortably against the side of the face and allow for breathing without restriction.
- Protection such as N95 respirators should be reserved for our health care providers.

7.0 Phase 1 Construction Restart

Attached is COVID-19 Job Site Requirements list with links to regulations, guidance, and recommendations from federal state and local agencies.

The Master Building Association (MBA) has provided guidance and a tool kit to meet the Phase 1 Startup requirements which Aspect will adopt as our own guidance (https://www.mbakscovid19.org/phase-1-toolkit/). Aspect project managers will prepare, and field staff will possess, appropriate paperwork to comply with these actions (see below). It is important to recognize that Aspect operates in two modes on construction/remediation/project sites: as either prime- or sub-consultants. In situations where Aspect is **prime,** we will lead the actions outlined by the MBA. In situations where Aspect is a **sub**, or as a representative on an owner's construction site, we will follow the Health & Safety protocols outlined by the General Contractor (which we assume will be similar to those outlined by the MBA).

In situations where Aspect is a sub, or as a representative on an owner's construction site, we will follow the Health & Safety protocols outlined by the General Contractor (which we assume will be similar to those outlined by the MBA). The following documents (7 of 11 elements) from the MBA toolkit (https://www.mbakscovid19.org/phase-1-toolkit/) must be completed by Aspect project managers and field staff for each specific project. We have produced packets for field personnel that will include item # 5 Safety Posters and # 9 DOSH references and directives and the Governor's proclamations. Copies are available at the Bainbridge office and the Annex. Item 1 of the MBA protocol relates to FAQs while item 6 summarizes PPE needed.

- 2 – Phase I Construction Restart: COVID-19 Jobsite Requirements for Control, Mitigation, and Recovery Plan
- 3 – Phase 1 Project Description
- 4 – Subcontractor Agreement
- 7 – Safety Stand-Down/Toolbox Talk
- 8 – Daily Onsite Task Checklist
- 10 – Daily Attendance Log
- 11 – Safety Data Sheet for Disinfectants used on site

Aspect realizes that some job sites may not require this level effort but until additional guidance becomes available we will follow this plan of action

Aspect will continue to monitor the CDC guidance for businesses (https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-business-response.html) and mitigation strategies (https://www.cdc.gov/coronavirus/2019-ncov/downloads/community-mitigation-strategy.pdf) as new information becomes available. This site-specific health and safety plan will be updated accordingly to reflect current information and recommendations.

These guiding principles and approach are subject to change as conditions change; Aspect clients request more stringent, or supplemental protocols; and/or local, state ,or federal government orders different protocols, outside what is represented in the OSHA guidance (which Aspect has modeled this safety approach after).

Phase 1 Construction Restart
COVID-19 Job Site Requirements

<u>Phase 1:</u>* *Low-risk construction work resumes.

Any existing construction projects complying with the points below may resume only those work activities that do not require workers to be closer than six-feet together. If a work activity requires workers to be closer than six-feet, it is not considered low-risk and is not authorized. Adherence to the physical distancing requirement and the health and safety points below will be strictly enforced.

Prior to recommencing work all contractors are required to develop and post at each job site a comprehensive COVID-19 exposure control, mitigation, and recovery plan. The plan must include policies regarding the following control measures: PPE utilization; on-site social distancing; hygiene; sanitation; symptom monitoring; incident reporting; site decontamination procedures; COVID-19 safety training; exposure response procedures; and a post-exposure incident project wide recovery plan. A copy of the plan must be available on each job site during any construction activities and available for inspection by state and local authorities. Failure to meet posting requirements will result in sanctions up to and including the job being shut down.

All Contractors are required to post at each job site written notice to employees, subcontractors and government officials the Phase 1 work that will be performed at that job site and signed commitment to adhere to the requirements listed in this document.

All contractors have a general obligation to keep a safe and healthy worksite in accordance with state and federal law. Failure to follow these requirements will be considered a violation of these duties and be penalized accordingly. Under RCW 49.17.060, “each employer shall furnish to each of their employees a place of employment free from recognized hazards that are causing or likely to cause serious injury or death to his or her employees and shall comply with the rules, regulations, and orders promulgated under this chapter.” The Washington State Department of Labor and Industries’ Division of Occupational Safety and Health (DOSH) is responsible for workplace safety and health, including inspections and enforcement, consultation, technical assistance, training, education and grants.

All contractors are also required to comply with the following COVID-19 worksite-specific safety practices, as outlined in Gov. Jay Inslee’s “Stay Home, Stay Healthy” Proclamation 20-25, and in accordance with the Washington State Department of Labor and Industries General Coronavirus Prevention Under Stay Home-Stay Healthy Order (DOSH Directive 1.70: https://www.lni.wa.gov/safety-health/safety-rules/enforcement-policies/DD170.pdf) and the Washington State Department of Health Workplace and Employer Resources & Recommendations at https://www.doh.wa.gov/Coronavirus/workplace:

COVID-19 Site Supervisor

1. A site-specific COVID-19 Supervisor shall be designated by the contractor at every job site to monitor the health of employees and enforce the COVID-19 job site safety plan. A designated COVID-19 Supervisor must be present at all times during construction activities, except this requirement only applies on single-family residential job sites whenever there are 7 or more people on the site.

COVID-19 Safety Training

2. A Safety Stand-Down/toolbox talk/tailgate training must be conducted on all job sites on the first day of returning to work, and weekly thereafter, to explain the protective measures in place for all workers. Social distancing must be maintained at all gatherings.
3. Attendance will be communicated verbally and the trainer will sign in each attendee.
4. COVID-19 safety requirements shall be visibly posted on each jobsite.

Social Distancing

5. Social distancing of at least 6 feet of separation must be maintained by every person on the worksite at all times.
6. Gatherings of any size must be precluded by taking breaks and lunch in shifts. Any time two or more persons must meet, ensure minimum 6 feet of separation.
7. Identify "choke points" and "high-risk areas" on job sites where workers typically congregate and control them so social distancing is always maintained.
8. Minimize interactions when picking up or delivering equipment or materials, ensure minimum 6-foot separation.
9. To the extent practical allow only one trade/subcontractor at a time on a jobsite and maintain 6-foot separation social distancing for each member of that trade. If more than one trade/subcontractor must be on the job to complete the job then at a minimum all trades and subcontractors must maintain social distancing policies in accordance with this guidance.

Personal Protective Equipment (PPE) – Employer Provided

10. Provide personal protective equipment (PPE) such as gloves, goggles, face shields and face masks as appropriate, or required, for the activity being performed.
11. Masks, in accordance with Washington Department of Health guidelines (https://www.doh.wa.gov/Portals/1/Documents/1600/coronavirus/ClothFacemasks.pdf), or as required by Washington Department of Labor and Industries (L&I) safety rules, must be worn at all times by every employee on the worksite.
12. Eye protection must be worn at all times by every employee while on worksite.

13. Gloves must be worn at all times by every employee while on worksite. The type of glove worn should be appropriate to the task. If gloves are not typically required for the task, then any type of glove is acceptable, including latex gloves.

14. If appropriate PPE cannot be provided, the worksite must be shut down.

Sanitation and Cleanliness

15. Soap and running water shall be abundantly provided on all job sites for frequent handwashing. Workers should be encouraged to leave their workstations to wash their hands regularly, before and after going to the bathroom, before and after eating and after coughing, sneezing or blowing their nose.

16. When running water is not available, portable washing stations, with soap, are required, per WAC 296-155-140 2(a) – (f). Alcohol-based hand sanitizers with greater than 60% ethanol or 70% isopropanol can also be used, but are not a replacement for the water requirement.

17. Post, in areas visible to all workers, required hygienic practices, including not to touch face with unwashed hands or with gloves; washing hands often with soap and water for at least 20 seconds; use hand sanitizer with at least 60% alcohol; cleaning and disinfecting frequently touched objects and surfaces such as workstations, keyboards, telephones, handrails, machines, shared tools, elevator control buttons, and doorknobs; covering the mouth and nose when coughing or sneezing as well as other hygienic recommendations by the U.S. Centers for Disease Control (CDC).

18. Make disinfectants available to workers throughout the worksite and ensure cleaning supplies are frequently replenished.

19. Frequently clean and disinfect high-touch surfaces on job sites and in offices, such as shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets. If these areas cannot be cleaned and disinfected frequently, the jobsite shall be shut down until such measures can be achieved and maintained.

20. When the worksite is an occupied home, workers should sanitize work areas upon arrival, throughout the workday and immediately before they leave, and occupants should keep a personal distance of at least 10 feet.

21. If an employee reports feeling sick and goes home, the area where that person worked should be immediately disinfected.

Employee Health/Symptoms

22. Create policies which encourage workers to stay home or leave the worksite when feeling sick or when they have been in close contact with a confirmed positive case. If they develop symptoms of acute respiratory illness, they must seek medical attention and inform their employer.

23. Have employees inform their supervisors if they have sick family member at home with COVID-19. If an employee has a family member sick with COVID-19, that employee must follow the isolation/quarantine requirements as established by the State Department of Health.

24. Screen all workers at the beginning of their shift by taking their temperature and asking them if they have a fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell. Thermometers used shall be 'no touch' or 'no contact' to the greatest extent possible. If a 'no touch' or 'no contact' thermometer is not available, the thermometer must be properly sanitized between each use. Any worker with a temperature of 100.4°F or higher is considered to have a fever and must be sent home.
25. Instruct workers to report to their supervisor if they develop symptoms of COVID-19 (e.g., fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell). If symptoms develop during a shift, the worker should be immediately sent home. If symptoms develop while the worker is not working, the worker should not return to work until they have been evaluated by a healthcare provider.
26. Failure of employees to comply will result in employees being sent home during the emergency actions.
27. Employees who do not believe it is safe to work shall be allowed to remove themselves from the worksite and employers must follow the expanded family and medical leave requirements included in the Families First Coronavirus Response Act or allow the worker to use unemployment benefits, paid time off, or any other available form of paid leave available to the worker at the workers discretion.
28. Any worker coming to work on a construction site in Washington from any state that is not contiguous to Washington must self-quarantine for 14 days to become eligible to work on a job site in Washington.
29. If an employee is confirmed to have COVID-19 infection, employers should inform fellow employees of their possible exposure to COVID-19 in the workplace but maintain confidentiality as required by the Americans with Disabilities Act (ADA). The employer should instruct fellow employees about how to proceed based on the CDC Public Health Recommendations for Community-Related Exposure.

Job Site Visitors

30. A daily attendance log of all workers and visitors must be kept and retained for at least four weeks. The log must include the name, phone number, and email address of all workers and visitors.

Failure to comply with these requirements, or to provide the materials, schedules and equipment required to comply, will result in shutting down operations on the worksite until the contractor can meet and maintain all requirements.

All contractors shall post on each job site written compliance with these requirements prior to performing any work. Under the authority of the Washington Industrial Safety and Health Act (WISHA), L&I's Division of Occupational Safety and Health (DOSH) will enforce these COVID-19 jobsite safety and health requirements. Complaints may be submitted to the L&I Call Center (1-800-423-7233) or via e-mail to Linda Adame at adag235@lni.wa.gov.

These Phase 1 COVID-19 job site safety practices are required as long as the “Stay Home, Stay Healthy” Gubernatorial Proclamation 20-25 is in effect or if adopted as rules by a federal, state or local regulatory agency.

PHASE 1
PROJECT DESCRIPTION

MASTER BUILDERS ASSOCIATION of King and Snohomish Counties

Attention: Phase 1 Construction Work is being completed on this jobsite. All workers and visitors to this jobsite must adhere to **Phase 1 Construction Restart: COVID-19 Jobsite Requirements for Control, Mitigation, and Recovery Plan**. A copy of this plan is posted for review.

The work being completed in Phase 1 is described as follows:

Remedial investigation pursuant to MTCA.

Please direct all questions to our COVID-19 Site Supervisor ____________________ or Company Representative listed below.

Aspect Consulting, LLC
Company Name

____
Company Representative (Print name)

____
Company Representative (Signature)

MBAKS is providing this information for general information only. This information does not constitute the provision of legal advice or professional consulting of any kind nor should it be construed as such. The information provided herein should not be used as a substitute for consultation with professional legal, or other competent advisers.

Last Updated 4/24/20

Failure of anyone on a jobsite to comply with the Phase I Comprehensive COVID-19 Exposure Preparedness, Control, Mitigation, and Recovery Plan (the "Plan") can result in closure of the jobsite. Because of the nature of the general contractor/subcontractor relationship, the tradition of subcontractors providing Personal Protective Equipment ("PPE") for their employees, and the severe penalties that could result from non-compliance, **we recommend that general contractors consider requiring all subcontractors to join in agreeing to follow and enforce the Plan. Here is a template for your consideration. We recommend obtaining legal advice to tailor this to your needs.**

Subcontractor's Agreement to Comply with Phase I Comprehensive COVID-19 Exposure Preparedness, Control, Mitigation, and Recovery Plan (the "Plan")

for South Park Marina posted by Aspect Consulting "Contractor" at the jobsite.______________________________ "Subcontractor" hereby agrees:

- It has been provided a copy of the Plan;
- It will comply with the Plan, including but not limited to the following:
  - Subcontractor will provide training to all its employees about COVID-19, how it spreads, and how to protect themselves from the virus;
  - Subcontractor will require all its employees to maintain a minimum distance of six feet from all other persons on the jobsite, including at all trainings, meal times, and breaks;
  - Subcontractor will require its employees to stagger breaks and meal times;
  - Subcontractor will require all its employees and visitors on the jobsite to fully complete the daily jobsite attendance log;
  - Subcontractor will provide all PPE required by the Plan to Subcontractor's employees on the jobsite and will either daily take its employees temperature or require that employees do so;
  - Subcontractor will require Subcontractor's employees to wear the required PPE at all times on the jobsite;
  - Subcontractor will provide employees with a thermometer for their individual use or will make one available on site along with disinfecting materials and instructions;
  - Subcontractor will pose to each employee each day all the health questions required by the State or local health department and will send home any employee who fails the questionnaire;
  - If appropriate PPE can't be provided, or if the employee has a temperature of 100.4 or higher, Subcontractor agrees to send its employees home from the jobsite;
  - Subcontractor will monitor Subcontractor's employees for signs of COVID-19, and ask required heath questions daily;
  - Subcontractor will require its employees to immediately report any known or suspected cases of COVID-19 and will immediately report any known or suspected cases of COVID-19 on the jobsite to Contactor; and
  - Subcontractor will set a good example by following the Plan at all times.

Subcontractor has read and agrees to the forgoing.
Name of Subcontractor: ______________________________________
Name of Authorized Signer:___________________________________
Title: ____Date:________________ __

MBAKS is providing this information for general information only. This information does not constitute the provision of legal advice or professional consulting of any kind nor should it be construed as such. The information provided herein should not be used as a substitute for consultation with professional legal, or other competent advisers.

DAILY ATTENDANCE LOG

MASTER BUILDERS ASSOCIATION of King and Snohomish Counties

JOBSITE: South Park Marina

Company: Aspect Consulting **Date:** ____________

Site Supervisor or designee should sign in all workers/visitors to jobsite.

NAME	TASK	PHONE #	EMAIL	TEMPERATURE/ SYMPTOM CHECK
				☐
				☐
				☐
				☐
				☐
				☐

Last Updated 4/24/20

				☐
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DAILY TASKS ON JOBSITE

MASTER BUILDERS ASSOCIATION of King and Snohomish Counties

- ☐ Make sure there is adequate PPE for everyone on jobsite.
- ☐ Make sure there are adequate cleaning/disinfecting supplies.
- ☐ Make sure there is adequate soap and disposable towels at the handwashing stations.
- ☐ Make sure tepid water is available in plentiful supply for all handwashing stations on the work site.
- ☐ Make sure trash cans are empty and tissues are stocked.
- ☐ Frequently clean and disinfect high-touch surfaces on jobsites and in offices, such as shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets.
- ☐ Remind workers to take their temperature and self-identify symptoms of cough, shortness of breath or difficulty breathing, or at least two of these symptoms: fever, chills, repeated shaking with chills, muscle pain, headache, sore throat, or new loss of taste or smell each day, before the shift, mid-shift, and at home.
- ☐ Ask each employee screening questions required by Washington State Department of Health, the Governor, or any local Health Department. Questions can be found on page 5 of the Plan (Version 2 or later) or in Exhibit B if using an earlier version of the Plan. Send home anyone who fails.
- ☐ Make sure there is a designated COVID-19 Site Supervisor required to be present at all times during construction activities, except on single-family residential job sites with six or fewer people on the site.
- ☐ A daily attendance log of all workers and visitors must be kept and retained for at least four weeks.

Last Updated 4/30/20

SAFETY STAND-DOWN/ TOOLBOX TALK

MASTER BUILDERS ASSOCIATION of King and Snohomish Counties

- Must be conducted on all jobsites on the first day of returning to work, and weekly thereafter, to explain the protective measures in place for all workers.
- Meetings are limited to less than 10 people, and everyone must always maintain six-foot spacing.
- Attendance will be communicated verbally, and the trainer will sign in each attendee.

TEMPLATE:

Welcome! We are thankful to have you here and to be back to work building. Aspect Consulting, LLC takes the health and safety of our employees very seriously. With the spread of the coronavirus, or "COVID-19," we all must remain vigilant in mitigating risk.

In order to be safe and maintain operations, we wanted to remind everyone on the jobsite of several things:

- You must practice social distancing at all times. Stay six feet away from other individuals, no exceptions. If you can't stay six feet apart to safely complete the work, then you must stop.
- It is critical that everyone wear the appropriate personal protective equipment (PPE) at all times. This means masks, eye protection, gloves, in accordance and as required by the Washington Department of Health guidelines and Washington Department of Labor and Industries (L&I) safety rules and dictated by the task you are working on. Quickly:
  - Face masks must be worn at all times on jobsite.
  - Eye protection must be worn at all times on jobsite.
  - Gloves must be worn at all times on the jobsite. The type of glove worn should be appropriate to the task. If gloves are not typically required for the task, then any type of glove is acceptable, including latex gloves.
- Breaks and mealtimes must be staggered and groups cannot form. Six feet of separation must be maintained at all times on the jobsite. Because masks must be worn by all persons at all times on the jobsite, we recommend that meals not be eaten on the jobsite.
- Do not share food, beverages, or PPE.
- Avoid sharing tools whenever possible. If tools must be shared, we will provide alcohol-based wipes to disinfect shared tools before and after use.
- Workers are discouraged from ridesharing.

- When the jobsite is an occupied home, the work site needs to be sanitized upon arrival, throughout the workday, and immediately before departure. You should ask other occupants to keep a personal distance of 10 feet at a minimum.
- Frequently wash your hands with soap and water for at least 20 seconds.
- Avoid touching your eyes, nose, or mouth.
- Cover coughs and sneezes.
- Avoid contact with people who are sick
- Familiarize yourselves with the symptoms of COVID-19:
  - Coughing
  - Shortness of breath or difficulty breathing
  - Or at least two of these symptoms:
    - Fever
    - Chills
    - Repeated shaking with chills
    - Muscle pain
    - Headache
    - Sore throat
    - New loss of taste or smell
- Everyone will need to have their temperature taken daily. We don't need to record it but if you have a fever of 100.4°F or higher you may not work. Note: the protocols on temperature are still in the works. The MBAKS COVID-19 site will be updated with the latest information. You might need to take everyone's temperature in the morning, or it might be possible for workers to take it from home. Again, check mbakscovid19.org for the latest details on this.
- Everyone will need to pass a verbal health screening each morning. The list of questions is found in the Plan on page five (Version 2 or later) or Exhibit B for those who downloaded and filled out the first version of the Plan. If you develop a fever and symptoms of respiratory illness, such as cough or shortness of breath, DO NOT GO TO WORK. Call your healthcare provider right away and notify your supervisor. Likewise, contact your healthcare provider if you come in contact with someone showing these symptoms.
- If you have any questions, talk to our COVID-19 Site Supervisor ____________________. Any worker who does not believe they are safe to work are allowed to remove themselves from the jobsite. Aspect Consulting, LLC has put the following protective measures in place for all workers:

  - PPE is being provided by the Company for your safety.
  - Verbally specify to everyone onsite where one of the following can be accessed: Soap and running water or portable washing stations.

- Please leave your workstations to wash your hands regularly before and after:
  - Going to the bathroom
  - Eating
  - Coughing
  - Sneezing
  - Blowing your nose
- When running water is not available, alcohol-based hand sanitizers with greater than 60% ethanol or 70% isopropanol can also be used but are not a replacement for the water requirement.
- You'll observe we posted required hygienic practices on this jobsite as a reminder.
- Disinfectants are available and cleaning supplies will be frequently replenished.
- Tissues and trash cans are provided on this jobsite.
- Frequent cleaning and disinfecting of high-touch surfaces such as any shared tools, machines, vehicles and other equipment, handrails, doorknobs, and portable toilets will be taking place.
- We will keep a daily attendance log of all persons on our jobsite.
- To the extent practical, we are only allowing one trade or subcontractor at a time on the jobsite. They must maintain a minimum of six feet of separation for each member of that trade. If more than one trade or subcontractor must be on the jobsite to complete the job, then at a minimum, all persons are required to maintain social distancing.
- If a worker on the jobsite tests positive for COVID-19 or goes home feeling ill, the Company will immediately disinfect those areas of the jobsite the sick individual may have come into contact with.
- Any worker coming from another state must self-quarantine for 14 days before working on this site.
- Again, if you have any questions, talk to our COVID-19 Site Supervisor ______________________________.

List N: Products with Emerging Viral Pathogens AND Human Coronavirus claims for use against SARS-CoV-2
Date Accessed: 04/17/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
72372-1	Hydrogen peroxide	B-Cap™ 35 Antimicrobial Agent	PeroxyChem LLC	Use this product for sterilization as instructed in the Bioquell Hydrogen Peroxide Vapor (HPV) User's Equipment Manual	Consult user manual	Vapor (use in conjunction with VHP generator)	Hard nonporous; Porous	Institutional	Yes	04/16/2020
777-126	Hydrogen peroxide	Angel	Reckitt Benckiser LLC	Rotavirus; Rhinovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
4822-594	Quarternary ammonium	Valhalla	S.C. Johnson & Son Inc	Rotavirus	5	RTU	Hard nonporous	Institutional; Residential	Yes	04/16/2020
89833-4	Hydrogen peroxide	D7 Part 2	Decon7 Systems LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
1677-254	Sodium hypochlorite	XHC-E	Ecolab Inc	Poliovirus	5	RTU	Hard nonporous	Healthcare; Institutional	Yes	04/16/2020
5741-28	Sodium hypochlorite	Tulmult	Spartan Chemical Company Inc	Feline calicivirus; Norovirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
706-65	Quaternary ammonium	Claire Disinfectant Bathroom Cleaner	Claire Manufacturing Company	Adenovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
70144-5	Quaternary ammonium; Ethanol	Opti-cide Max	Micro-Scientific LLC	Rotavirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
3573-77	Sodium hypochlorite	CSP-3002-3	The Proctor & Gamble Company	Norovirus; Poliovirus	1	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
3573-96	Quaternary ammonium	Malibu Concentrate	The Proctor & Gamble Company	Feline calicivirus; Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
1839-215	Quaternary ammonium	SC-NDC-128	Stepan Company	Rotavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
1839-233	Quaternary ammonium	SC-5:64N	Stepan Company	Simian rotavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
6836-233	Quaternary ammonium	BARDAC 205M-50	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
70627-35	Quaternary ammonium	Envy Foaming Disinfectant Cleaner	Diversey Inc	Poliovirus	3	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	04/16/2020
1839-225	Quaternary ammonium	SC-RTU-TB	Stepan Company	Rhinovirus	3	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020
70144-2	Quarternary ammonium; Isopropanol	Opti-Cide 3® Wipes	Micro-Scientific LLC	Rotavirus; Rhinovirus	3	Wipe	Hard nonporous	Healthcare; Institutional	Yes	04/09/2020
1677-259	Dodecylbenzenesulfonic acid; Lactic acid	CW32A-RTU	Ecolab Inc	Norovirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
1677-260	Dodecylbenzenesulfonic acid; Lactic acid	S&S Sanitizer	Ecolab Inc	Norovirus	0.5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
91899-2	Hydrogen peroxide	MDF-200 Part B	Span-World LLC	Feline calicivirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	04/09/2020
91899-1	Quarternary ammonium	MDF-200 Part	Span-World	Feline	10	Dilutable	Hard	Healthcare;	Yes	04/09/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
		A	LLC	calicivirus			nonporous	Institutional		
34810-35	Citric acid	Cleancide	Wexford Labs Inc	Feline calicivirus	5	RTU	Hard nonporous	Healthcare; Institutional	Yes	04/09/2020
9804-1	Chlorine dioxide	Oxine	Bio-Cide International Inc	Canine parvovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	04/09/2020
58779-4	Hydrogen peroxide	Vaprox Hydrogen Peroxide Sterilant	Steris Corporation	Use this product for sterilization as instructed in the Vaporized Hydrogen Peroxide (VHP®) User's Equipment Manual	Consult user manual	Vapor (use in conjunction with VHP generator)	Hard nonporous; Porous	Institutional	Yes	04/09/2020
58232-2	Sodium hypochlorite	Sodium Hypochlorite 8.25%	Hasa Inc	Rhinovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
4822-593	L-Lactic Acid	Windex Disinfectant Cleaner	S.C. Johnson & Son Inc	Rhinovirus	5	RTU	Hard nonporous	Institutional; Residential	Yes	04/09/2020
66251-2	Citric acid; Thymol	SBT 2 to 1 Concentrate	Melaleuca Inc	Rhinovirus, Poliovirus	10	Dilutable	Hard nonporous	Residential	Yes	04/09/2020
71700-2	Chlorine dioxide; Quaternary ammonium	SNiPER	Global Environmental Restoration Inc	Canine parvovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
9150-2	Chlorine dioxide	Anthium Dioxcide	International Dioxcide Inc	Canine parvovirus	15	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	04/09/2020
66171-103	Peroxyacetic acid; Hydrogen peroxide	Peraside A Peroxyacetic Acid-Based Sanitizer/	Preserve International	Murine norovirus	2	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	04/09/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
		Disinfectant								
3573-54	Citric acid	Comet Disinfecting Bathroom Cleaner	The Proctor & Gamble Company	Feline calicivirus; Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
39967-138	Potassium peroxymonosulfate; Sodium choride	Rely+On Multipurpose Disinfectant Cleaner	Lanxess Corporation	Hepatitis A virus; Feline calicivirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
1839-246	Quaternary ammonium	SC-5:128HN	Stepan Company	Rotavirus; Feline calicivirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
1839-86	Quaternary ammonium	BTC 2125 M 10% Solution	Stepan Company	Adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
1839-166	Quaternary ammonium	BTC 885 NDC-128	Stepan Company	Rotavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/09/2020
8383-13	Hydrogen peroxide; Peroxyacetic Acid	Peridox RTU ™	Contec Inc	Feline calicivirus	2	RTU	Hard nonporous	Healthcare; Institutional	Yes	04/09/2020
84683-3	Thymol	Benefect Botanical Daily Cleaner Disinfectant Spray	Cleanwell LLC	Rhinovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/02/2020
88897-2	Quaternary ammonium; Isopropanol; Ethanol	Panther Disinfectant	Maxill Inc	Adenovirus; Feline calicivirus	3	RTU	Hard nonporous	Healthcare; Institutional	Yes	04/02/2020
42048-4	L-Lactic Acid	Sani-Cide EX3 (10X) RTU	Celeste Industries Corp	Feline calicivirus	10	RTU	Hard nonporous	Institutional	Yes	04/02/2020
66171-7	Quaternary ammonium; Glutaraldehyde	Synergize	Preserve International	Feline calicivirus	10	Dilutable	Hard nonporous	Institutional	Yes	04/02/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
85837-4	Hydrogen peroxide	Proxi Home General Disinfectant Cleaner Spray	Innovasource LLC	Rhinovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/02/2020
498-179	Quaternary ammonium; Ethanol	Champion Sprayon Spray Disinfectant Formula 3	Chase Products Co	Rhinovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/02/2020
1839-236	Quaternary ammonium	SC-5:128N	Stepan Company	Rotavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/02/2020
70385-6	Quaternary ammonium	QGC	Prorestore Products	Feline calicivirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/02/2020
1043-87	Phenolic	Vesphene II se	Steris Corporation	Adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/26/2020
1043-91	Phenolic	LpH®	Steris Corporation	Adenovirus	10	Dilutable	Hard nonporous	Institutional	Yes	03/26/2020
1839-100	Quaternary ammonium	Veterinarian Type Disinfectant	Stepan Company	Feline calicivirus; Norovirus	10	Dilutable	Hard nonporous	Residential	Yes	03/26/2020
1839-95	Quaternary ammonium	NP 4.5 (D & F) Detergent/ disinfectant	Stepan Company	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
4091-20	Quaternary ammonium	Phoenix 2	W.M. Barr & Company Inc	Rotavirus; Feline calicivirus; Rhinovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
44446-67	Phenolic; Ethanol	Concept Hospital Disinfectant Deodorant	Quest Specialty Corp	Adenovirus; Canine hepatitis virus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
45745-11	Hydrogen peroxide	HP2O2	Midlab	Rotavirus; Norovirus;	5	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/26/2020

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				Rhinovirus						
56392-8	Sodium hypochlorite	Dispatch	Clorox Professional Products Company	Adenovirus	1	Towelette	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
65402-9	Peroxyacetic acid; Hydrogen Peroxide	VigorOx 15/10 Antimicrobial Agent	PeroxyChem LLC	Feline calicivirus	5	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/26/2020
67619-40	Sodium hypochlorite	TNT	Clorox Professional Products Company	Murine norovirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
70060-19	Sodium chlorite; Sodium dischloroisocyanurate dihydrate	Aseptrol S10-Tab	BASF Corporation	Feline calicivirus	10	Solid	Hard nonporous	Healthcare; Institutional	Yes	03/26/2020
70144-4	Quaternary ammonium; Ethanol	Opti-cide Max Wipes	Micro-Scientific LLC	Rotavirus	1	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
70271-13	Sodium hypochlorite	Pure Bright Germicidal Ultra Bleach	KIK International LLC	Adenovirus; Rotavirus; Canine parvovirus; Feline panleukopenia virus; Hepatitis A virus; Norovirus; Poliovirus; Rhinovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
70271-31	Sodium hypochlorite	Nova	KIK International LLC	Rhinovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
777-131	Hypochlorous acid	Cousteau	Reckitt	Rhinovirus	10	RTU	Hard	Healthcare;	Yes	03/26/2020

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			Benckiser				nonporous	Institutional; Residential		
82972-1	Chlorine dioxide; Quaternary ammonium	Vital Oxide	Vital Solutions LLC	Adenovirus; Canine parvovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
84198-1	Hydrogen peroxide	Peroxy HDOX	Earth Laboratories Inc	Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/26/2020
84683-4	Thymol	Benefect Botanical Daily Cleaner Disinfectant Towelette	Cleanwell LLC	Rhinovirus	10	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
89833-3	Quaternary ammonium	D7 Part 1	Decon7 Systems LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
89900-2	Quaternary ammonium	Scrubbing Bubbles Disinfectant Restroom Cleaner II	S.C. Johnson Professional	Rotavirus	5	RTU	Hard nonporous	Institutional; Residential	Yes	03/26/2020
89900-3	Quaternary ammonium	Fantastik Multi-Surface Disinfectant Degreaser	S.C. Johnson Professional	Rotavirus	5	RTU	Hard nonporous	Institutional; Residential	Yes	03/26/2020
91399-2	Sodium chlorite	Biotab7	Advanced Biocide Technologies Inc	Feline calicivirus; Norovirus	1	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
92108-1	Hypochlorous acid	Excelyte Vet	PCT LTD	Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
92987-1	Sodium chlorite; citric	Tristel Duo for	Tristel	Adenovirus;	0.5	RTU	Hard	Healthcare;	Yes	03/26/2020

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	acid	Surfaces	Solutions LTD	Feline calicivirus; Poliovirus			nonporous	Institutional		
93040-1	Sodium chloride	Force of Nature Activator Capsule	HCl Cleaning Products LLC	Feline calicivirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/26/2020
1130-15	Quaternary ammonium; Isopropanol	Weiman Germicidal Solution	Weiman Products LLC	Rotavirus	3	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
1677-233	Quaternary ammonium	Multi-Purpose Disinfectant Cleaner	Ecolab Inc	Feline calicivirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
5813-120	Sodium hypochlorite	CRB	The Clorox Company	Canine parvovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
675-55	Citric acid	Lysol Bathroom Cleaner	Reckitt Benckiser LLC	Poliovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
70144-1	Quaternary ammonium; Isopropanol	Opti-Cide 3	Micro-Scientific LLC	Rotavirus; Rhinovirus Type 14	2	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
706-111	Quaternary ammonium	Claire Disinfectant Spray Q	Claire Manufacturing Company	Poliovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
84526-6	Hydrogen peroxide; Silver	Halomist	Halosil International Inc	Feline calicivirus; Minute virus of men	10	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/19/2020
85134-1	Hypochlorous acid	Envirocleanse A	Envirocleanse LLC	Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
87518-6	Sodium hypochlorite	Sporex	HSP USA LLC	Norovirus;	1	RTU	Hard	Healthcare;	Yes	03/19/2020

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				Canine parvovirus			nonporous	Institutional; Residential		
90150-2	Hydrogen peroxide	Binary Ionization Technology (BIT) Solution	Tomi Environmental Solutions Inc	Feline calicivirus	15	Fog; Mist	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
91582-1	Hypochlorous acid	Danolyte	Danolyte Global Inc	Adenovirus; Rhinovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
9480-4	Quaternary ammonium; Isopropanol	Super Sani-Cloth Germicidal Disposable Wipe	Professional Disposables International Inc	Rhinovirus 39; Adenovirus	2	Wipe	Hard nonporous	Healthcare; Institutional	Yes	03/19/2020
9480-8	Sodium hypochlorite	Sani-Cloth Bleach Germicidal Disposable Wipe	Professional Disposables International Inc	Adenovirus; Rotavirus; Canine parvovirus; Hepatitis A virus; Poliovirus Type 1; Rhinovirus Type 37; Feline calicivirus	1	Wipe	Hard nonporous	Healthcare; Institutional	Yes	03/19/2020
9480-9	Quaternary ammonium	AF3 Germicidal Disposable Wipe	Professional Disposables International Inc	Rotavirus; Adenovirus	3	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/19/2020
1677-250	Hydrogen peroxide; Peroxyoctanoic acid; Peroxyacetic acid	Synergex	Ecolab Inc	Reovirus	5	Dilutable	Hard nonporous	Institutional	Yes	03/13/2020
1839-212	Quaternary ammonium	SC-AHD-256	Stepan Company	Feline calicivirus; Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	04/16/2020

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37549-1	Sodium hypochlorite	Micro-kill Bleach Germicidal Bleach Wipes	Medline Industries Inc	Norovirus	0.5	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
37549-2	Sodium hypochlorite	Micro-kill Bleach Solution	Medline Industries Inc	Norovirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
44446-23	Quaternary ammonium	Germ Away	Quest Specialty Corp	Canine parvovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
46781-12	Quaternary ammonium; Ethanol; Isopropanol	Cavicide 1	Metrex Research	Adenovirus; Rotavirus; Feline Calicivirus	3	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
46781-13	Quaternary ammonium; Ethanol; Isopropanol	Caviwipes 1	Metrex Research	Adenovirus	3	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
46781-14	Sodium hypochlorite	Caviwipes Bleach	Metrex Research	Feline calicivirus	3	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
46781-15	Sodium hypochlorite	Cavicide Bleach	Metrex Research	Poliovirus; Rhinovirus	3	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
5813-100	Sodium hypochlorite	Puma	The Clorox Company	Canine parvovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
5813-102	Sodium hypochlorite	CGB1	The Clorox Company	Canine parvovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
5813-109	Quaternary ammonium	Say Q	The Clorox Company	Rotavirus	10	RTU	Hard nonporous	Institutional; Residential	Yes	03/13/2020
5813-113	Quaternary ammonium	CDW	The Clorox Company	Rotavirus	4	Wipe	Hard nonporous	Institutional; Residential	Yes	03/13/2020

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5813-118	Quaternary ammonium	Dash	The Clorox Company	Rotavirus	10	RTU	Hard nonporous	Residential	Yes	03/13/2020
5813-58	Quaternary ammonium	Spruce-ups	The Clorox Company	Rotavirus	0.25	Wipe	Hard nonporous	Institutional; Residential	Yes	03/13/2020
6659-3	Quaternary ammonium	Spray Nine	ITW Permatex Inc	Norovirus; Rhinovirus; Poliovirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
67619-20	Quaternary ammonium	Rex	Clorox Professional Products Company	Hepatitis A virus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
67619-26	Sodium hypochlorite	Boris	Clorox Professional Products Company	Canine parvovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
67619-35	Peracetic acid; Hydrogen peroxide	Blacksmith	Clorox Professional Products Company	Rhinovirus	1	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/13/2020
67619-41	Quaternary ammonium	PPD Dash	Clorox Professional Products Company	Rotavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
67619-9	Quaternary ammonium	PJW-622	Clorox Professional Products Company	Rotavirus	3	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-136	Quaternary ammonium	Lonza Formulation S-18F	Lonza LLC	Feline calicivirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-139	Quaternary ammonium	Lonza Formulation R-82F	Lonza LLC	Feline calicivirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020

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6836-277	Quaternary ammonium	BARDAC 205M-1.30	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-303	Quaternary ammonium	BARDAC 205M-5.2	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-346	Quaternary ammonium	Lonzagard RCS-256	Lonza LLC	Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-347	Quaternary ammonium	Lonzagard RCS-128	Lonza LLC	Feline calicivirus; Enterovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-348	Quaternary ammonium	Lonzagard RCS-128 PLUS	Lonza LLC	Feline calicivirus; Enterovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-362	Quaternary ammonium	Nugen MB5A-128	Lonza LLC	Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-363	Quaternary ammonium	Nugen MB5A-64	Lonza LLC	Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
6836-366	Quaternary ammonium	Nugen MB5N-64	Lonza LLC	Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
74559-1	Hydrogen peroxide	Accel TB	Virox Technologies Inc	Poliovirus; Feline Calicivirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
74559-10	Hydrogen peroxide	Oxy-1 Wipes	Virox Technologies Inc	Poliovirus	0.5	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
74559-3	Hydrogen peroxide	Accel TB Wipes	Virox Technologies Inc	Poliovirus	1	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020

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74559-4	Hydrogen peroxide	Accel (Concentrate) Disinfectant Cleaner	Virox Technologies Inc	Poliovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
74559-9	Hydrogen peroxide	Oxy-1 RTU	Virox Technologies Inc	Poliovirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
777-114	Quaternary ammonium	Lysol® Disinfecting Wipes (All Scents)	Reckitt Benckiser	Rotavirus	10	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
83614-1	Quaternary ammonium	Byotrol 24	Byotrol Inc	Feline calicivirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
84150-2	Ethanol	Mitersaw	GOJO Industries Inc	Feline calicivirus	5	Wipe	Hard nonporous	Institutional; Residential	Yes	03/13/2020
87742-1	Thymol	Thymox Disinfectant Spray	Laboratorie M2	Norovirus	4	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/13/2020
1677-129	Hydrogen peroxide; Peroxyacetic acid	Oxonia Active	Ecolab Inc	Poliovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
1677-226	Hydrogen peroxide; Octanoic acid; Peroxyacetic acid	Virasept	Ecolab Inc	Norovirus; Rhinovirus	4	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
1677-235	Sodium hypochlorite	Bleach Disinfectant Cleaner	Ecolab Inc	Murine Norovirus; Poliovirus; Rhinovirus	1	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
1677-237	Hydrogen peroxide; Peroxyacetic acid	Oxycide Daily Disinfectant Cleaner	Ecolab Inc	Feline Calicivirus; Rhinovirus	3	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
1677-238	Hydrogen peroxide	Peroxide Multi Surface	Ecolab Inc	Norovirus	2	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020

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		Cleaner and Disinfectant								
1677-249	Isopropanol	Klercide 70/30 IPA	Ecolab Inc	Rhinovirus	5	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
1677-251	Hydrogen peroxide	Peroxide Disinfectant And Glass Cleaner Rtu	Ecolab Inc	Norovirus	0.75	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
1839-220	Quaternary ammonium	SC-RTU Disinfectant Cleaner	Stepan Company	Poliovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
1839-248	Quaternary ammonium	Stepan Spray Disinfectant Concentrate	Stepan Company	Rhinovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
1839-83	Quaternary ammonium	Detergent Disinfectant Pump Spray	Stepan Company	Canine Parvovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
4091-21	Quaternary ammonium	Condor 2	W.M. Barr & Company Inc	Rotavirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
4091-22	Quaternary ammonium; Citric acid	Raptor 5	W.M. Barr & Company Inc	Rhinovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
42182-9	Quaternary ammonium; Ethanol	Firebird F130	Microban Products Company	Poliovirus; Norovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
47371-129	Quaternary ammonium	Formulation HWS- 256	H&S Chemicals Division of Lonza LLC	Adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
47371-130	Quaternary ammonium	Formulation HWS-128	H&S Chemicals Division of	Adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020

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			Lonza, LLC							
47371-131	Quaternary ammonium	HWS-64	H&S Chemicals Division of Lonza LLC	Adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
47371-192	Quaternary ammonium	Formulation HWS-32	H&S Chemicals Division of Lonza LLC	Adenovirus	10	Dilutable	Hard nonporous	Institutional; Residential	Yes	03/03/2020
56392-7	Sodium hypochlorite	Clorox Healthcare® Bleach Germicidal Cleaner Spray	Clorox Professional Products Company	Canine Parvovirus; Feline Panleukopenia Virus; Hepatitis A Virus; Norovirus; Poliovirus; Rhinovirus	1	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
5813-105	Sodium hypochlorite	Clorox Multi Surface Cleaner + Bleach	The Clorox Company	Rhinovirus; Canine Parvovirus; Feline Panleukopenia Virus; Norovirus; Poliovirus	1	RTU	Hard nonporous	Residential	Yes	03/03/2020
5813-110	Hydrogen peroxide	Clorox Pet Solutions Advanced Formula Disinfecting Stain & Odor Remover	The Clorox Company	Enterovirus D68; Norovirus; Rhinovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
5813-111	Sodium hypochlorite	Clorox Disinfecting	The Clorox Company	Canine Parvovirus;	10	Dilutable	Hard nonporous	Healthcare; Institutional;	Yes	03/03/2020

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		Bleach2		Feline Parvovirus				Residential		
5813-114	Sodium hypochlorite	Clorox Performance Bleach1	The Clorox Company	Canine Parvovirus; Feline Parvovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
5813-115	Quaternary ammonium	Clorox Scentiva Bathroom Disinfecting Foam Cleaner	The Clorox Company	Rotavirus	5	RTU	Hard nonporous	Residential	Yes	03/03/2020
5813-21	Sodium hypochlorite	Clorox Clean Up Cleaner + Bleach	The Clorox Company	Norovirus; Poliovirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
5813-40	Quaternary ammonium	Clorox Disinfecting Bathroom Cleaner	The Clorox Company	Rhinovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
5813-79	Quaternary ammonium	Clorox Disinfecting Wipes	The Clorox Company	Rotavirus	4	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
5813-89	Sodium hypochlorite	Clorox Toilet Bowl Cleaner with Bleach	The Clorox Company	Rhinovirus; Rotavirus	10	RTU	Hard nonporous	Institutional; Residential	Yes	03/03/2020
63761-10	Quaternary ammonium; Sodium carbonate Peroxyhydrate	Sterilex Ultra Step	Sterilex	Feline Calicivirus; Rotavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
63761-8	Quaternary ammonium; Hydrogen peroxide	Sterlex Ultra Disinfectant Cleaner Solution 1	Sterilex	Feline Calicivirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
675-54	Quaternary ammonium	Lysol Brand Heavy Duty	Reckitt Benckiser LLC	Rotavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020

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		Cleaner Disinfectant Concentrate								
67619-12	Sodium hypochlorite	Clorox Healthcare® Bleach Germicidal Wipes	Clorox Professional Products Company	Canine Parvovirus; Feline Parvovirus	3	Wipe	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
67619-16	Sodium hypochlorite	Clorox Commercial Solutions® Toilet Bowl Cleaner with Bleach1	Clorox Professional Products Company	Rotavirus; Rhinovirus 39	10	RTU	Hard nonporous	Institutional; Residential	Yes	03/03/2020
67619-17	Sodium hypochlorite	Clorox Commercial Solutions® Clorox® Clean-Up Disinfectant Cleaner with Bleach1	Clorox Professional Products Company	Norovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
67619-21	Quaternary ammonium; Ethanol	Clorox Commercial Solutions® Clorox® Disinfecting Spray	Clorox Professional Products Company	Coxsackie Virus; Echovirus; Feline Calicivirus; Hepatitis A Virus; Poliovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
67619-24	Hydrogen Peroxide	Clorox Commercial Solutions® Hydrogen Peroxide Cleaner	Clorox Professional Products Company	Norovirus; Rhinovirus; Rotavirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020

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		Disinfectant								
67619-25	Hydrogen peroxide	Clorox Commercial Solutions® Hydrogen Peroxide Cleaner Disinfectant Wipes	Clorox Professional Products Company	Norovirus	2	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
67619-29	Ethanol	Saginaw	Clorox Professional Products Company	Coxsackievirus; Hepatitis A Virus; Rhinovirus; Rotavirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
67619-30	Sodium hypochlorite	GNR	Clorox Professional Products Company	Coxsackievirus; Feline Calicivirus; Feline Panleukopenia Virus; Minute virus of mice; Poliovirus; Rhinovirus Type 37	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
67619-31	Quaternary ammonium	Clorox Commercial Solutions® Clorox® Disinfecting Wipes	Clorox Professional Products Company	Rotavirus	4	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
67619-32	Sodium hypochlorite	CloroxPro™ Clorox® Germicidal Bleach	Clorox Professional Products Company	Canine Parvovirus; Coxsackievirus B3 Virus;	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020

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				Enterovirus D68; Norovirus; Feline Parvovirus; Hepatitis A Virus; Murine Norovirus; Poliovirus; Rhinovirus						
67619-33	Hydrogen peroxide	Clorox Commercial Solutions® Clorox® Disinfecting Biostain & Odor Remover	Clorox Professional Products Company	Enterovirus, Norovirus; Rhinovirus Type 37	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
67619-37	Quaternary ammonium	Clorox Healthcare® VersaSure® Wipes	Clorox Professional Products Company	Norovirus	5	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
67619-38	Quaternary ammonium	CloroxPro™ Clorox Total 360® Disinfecting Cleaner1	Clorox Professional Products Company	Coxsackievirus Type B3	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-140	Quaternary ammonium	Lonza Formulation S- 21F	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-152	Quaternary ammonium	Lonza Formulation DC-103	Lonza LLC	Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-266	Quaternary ammonium	BARDAC 205M-10	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020

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6836-278	Quaternary ammonium	BARDAC 205M- 14.08	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-289	Quaternary ammonium	BARDAC 205M RTU	Lonza LLC	Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-302	Quaternary ammonium	BARDAC 205M-2.6	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-305	Quaternary ammonium	BARDAC 205M-23	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-313	Quaternary ammonium	Lonza Disinfectant Wipes	Lonza LLC	Rotavirus	10	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-340	Quaternary ammonium	Lonza Disinfectant Wipes Plus 2	Lonza LLC	Norovirus	10	Wipe	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
6836-349	Quaternary ammonium	Lonzagard RCS- 256 Plus	Lonza LLC	Enterovirus D68; Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-361	Quaternary ammonium	Nugen MB5A-256	Lonza LLC	Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-364	Quaternary ammonium	Nugen MB5N-256	Lonza LLC	Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-365	Quaternary ammonium	Nugen MB5N-128	Lonza LLC	Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-70	Quaternary ammonium	BARDAC 205M-7.5	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020

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6836-75	Quaternary ammonium	Lonza Formulation S-21	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-77	Quaternary ammonium	Lonza Formulation S- 18	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
6836-78	Quaternary ammonium	Lonza Formulation R- 82	Lonza LLC	Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
70627-24	Quaternary ammonium	Virex™ II / 256	Diversey Inc	Adenovirus Type 2	10	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
70627-56	Hydrogen peroxide	Oxivir Tb	Diversey Inc	Norovirus; Rhinovirus; Poliovirus Type 1	1	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
70627-58	Hydrogen peroxide	Oxy-Team™ Disinfectant Cleaner	Diversey Inc	Canine Parvovirus; Feline Picornavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
70627-60	Hydrogen peroxide	Oxivir™ Wipes	Diversey Inc	Norovirus; Poliovirus Type 1; Rhinovirus Type 14	1	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
70627-72	Sodium hypochlorite	Avert Sporicidal Disinfectant Cleaner	Diversey Inc	Canine Parvovirus; Norovirus; Hepatitis A; Poliovirus Type 1	1	Dilutable	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
70627-74	Hydrogen peroxide	Oxivir 1	Diversey Inc	Canine Parvovirus; Enterovirus Type D68	1	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020

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70627-77	Hydrogen peroxide	Oxivir 1 Wipes	Diversey Inc	Enterovirus Type D68	1	Wipe	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
71847-6	Sodium dichloro-S-triazinetrione	Klorsept	Medentech LTD	Hepatitis A virus; Coxsackievirus B3	1	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
71847-7	Sodium dichloro-S-triazinetrione	Klorkleen	Medentech LTD	Hepatitis A virus; Coxsackievirus B3	1	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
777-127	Quaternary ammonium; Ethanol	Lysol® Disinfectant Max Cover Mist	Reckitt Benckiser LLC	Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
777-132	Hydrochloric acid	Lysol Brand Power Plus Toilet Bowl Cleaner	Reckitt Benckiser LLC	Poliovirus Type 1	10	RTU	Hard nonporous	Healthcare; Residential	Yes	03/03/2020
777-70	Quaternary ammonium	Lysol Brand Cling & Fresh Toilet Bowl Cleaner	Reckitt Benckiser LLC	Rotavirus	0.5	RTU	Hard nonporous	Institutional; Residential	Yes	03/03/2020
777-81	Hydrochloric acid	Lysol Brand Lime & Rust Toilet Bowl Cleaner	Reckitt Benckiser LLC	Poliovirus Type 1; Hepatitis A virus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
777-83	Sodium hypochlorite	Lysol Brand Bleach Mold And Mildew Remover	Reckitt Benckiser LLC	Rhinovirus; Norovirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
777-89	Quaternary ammonium	Lysol Brand Clean & Fresh Multi-surface	Reckitt Benckiser LLC	Rotavirus WA	3	Dilutable	Hard nonporous	Institutional; Residential	Yes	03/03/2020

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		Cleaner								
777-99	Quaternary ammonium; Ethanol	Lysol® Disinfectant Spray	Reckitt Benckiser LLC	Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
84150-1	Ethanol	PURELL Professional Surface Disinfectant Wipes	GOJO Industries Inc	Norovirus	5	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
84368-1	Ethanol	Urthpro	Urthtech LLC	Hepatitis A virus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
88494-3	Quaternary ammonium; Ethanol	Peak Disinfectant	North American Infection Control Ltd	Poliovirus Type 1; Rhinovirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
88494-4	Quaternary ammonium; Ethanol	Peak Disinfectant Wipes	North American Infection Control Ltd	Poliovirus Type 1; Rhinovirus	1	Wipe	Hard nonporous	Healthcare; Institutional; Residential	Yes	03/03/2020
9480-10	Quaternary ammonium; Ethanol; Isopropanol	Sani-Prime Germicidal Spray	Professional Disposables International Inc	Feline Calicivirus	3	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
9480-12	Quaternary ammonium; Ethanol; Isopropanol	Sani-Cloth Prime Germicidal Disposable Wipe	Professional Disposables International Inc	Feline Calicivirus	3	Wipe	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020
9480-14	Hydrogen Peroxide	Sani-HyPerCide Germicidal Spray	Professional Disposables International Inc	Norovirus	1	RTU	Hard nonporous	Healthcare; Institutional	Yes	03/03/2020

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39967-137	Potassium peroxymonosulfate; Sodium choride	Virkon S	Lanxess Corporation	Feline calicivirus	10	Dilutable	Hard nonporous	Institutional	No	04/02/2020
954-11	Quaternary ammonium	Barbicide	King Research Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	No	04/02/2020
11346-3	Sodium hypochlorite	Clorox HW	The Clorox Company	Feline calicivirus; Norovirus	1	Towelette	Hard nonporous	Healthcare; Residential	No	03/26/2020
11346-6	Sodium hypochlorite	Clorox HS	The Clorox Company	Feline calicivirus; Norovirus	1	RTU	Hard nonporous	Healthcare; Residential	No	03/26/2020
1677-21	Quaternary ammonium	Mikro-Quat	Ecolab Inc	Feline calicivirus; Norovirus	10	Dilutable	Hard nonporous	Healthcare	No	03/26/2020
1677-216	Sodium chlorite	Exspor Base Concentration	Ecolab Inc	Feline calicivirus; Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/26/2020
1839-174	Quaternary ammonium	Stepan Towelette	Stepan Company	Feline calicivirus; Norovirus	10	Towelette	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
1839-80	Quaternary ammonium	NP 12.5 Detergent/ Disinfectant	Stepan Company	Adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
1839-97	Quaternary ammonium	NP 12.5 (D&F) Detergent/ Disinfectant	Stepan Company	Adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
34810-21	Phenolic	Ready To Use Wex-Cide	Wexford Labs Inc	Rhinovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
34810-25	Thymol	Ready to Use Thymol	Wexford Labs Inc	Feline calicivirus; Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020

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34810-36	Citric acid	CleanCide Wipes	Wexford Labs Inc	Feline calicivirus; Norovirus	5	Towelette	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
3862-179	Phenolic	Opti-Phene	ABC Compounding Co Inc	Human adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
3862-181	Quaternary ammonium	Foaming Disinfectant Cleaner	ABC Compounding Co Inc	Poliovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
61178-2	Quaternary ammonium	Public Places	Microgen Inc	Feline calicivirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
63761-5	Quaternary ammonium; Sodium carbonate peroxyhydrate	Sterilex Ultra Powder	Sterilex	Feline calicivirus; Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
64240-44	Sodium hypochlorite	Soft Scrub with Bleach	Combat Insect Control Systems	Rhinovirus	3	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
64240-65	Lactic acid	WC Complete	Combat Insect Control Systems	Rhinovirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
65402-3	Peroxyacetic acid; Hydrogen peroxide	VigorOx SP-15 Antimicrobial Agent	PeroxyChem LLC	Feline calicivirus; Norovirus	5	Dilutable	Hard nonporous	Institutional	No	03/26/2020
675-30	Quaternary ammonium	Roccal II 10%	Reckitt Benckiser	Adenovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/26/2020
6836-245	Quaternary ammonium	CSP-46	Lonza LLC	Feline calicivirus; Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
6836-333	Quaternary ammonium	MMR-4U	Lonza LLC	Feline calicivirus; Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020

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6836-379	Quaternary ammonium	Nugen NR Disinfecant Wipes	Lonza LLC	Feline calicivirus; Norovirus	5	Towelette	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
70271-15	Sodium hypochlorite	2% Sodium Hypochlorite Spray	KIK International, Inc.	Rhinovirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
70271-24	Sodium hypochlorite	Tecumseh B	KIK International LLC	Feline calicivirus; Norovirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
70590-1	Sodium hypochlorite	Hype-Wipe	Current Technologies Inc	Feline calicivirus; Norovirus	1	Towelette	Hard nonporous	Healthcare; Institutional	No	03/26/2020
70627-33	Quaternary ammonium	Envy Liquid Disinfectant Cleaner	Diversey, Inc.	Canine parvovirus	5	RTU	Hard nonporous	Healthcare; Institutional	No	03/26/2020
71847-2	Sodium dichloroisocyanurate	Klor-Kleen	Medentech LTD	Feline calicivirus; Norovirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/26/2020
73232-1	Isopropyl alcohol; Quaternary ammonium	Alpet D2	Best Sanitizers Inc	Feline calicivirus; Norovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
777-102	Sodium hypochlorite	Lysol Brand Toilet Bowl Cleaner with Bleach	Reckitt Benckiser LLC	Rhinovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
777-104	Hypochloric acid	Vanity GP	Reckitt Benckiser LLC	Poliovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
777-71	Quaternary ammonium	Lysol Brand Foaming Disinfectant Basin Tub & Tile Cleaner II	Reckitt Benckiser LLC	Feline calicivirus; Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020

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84526-1	Hydrogen peroxide; Silver	HaloSpray	Halosil International Inc	Feline calicivirus; Norovirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
87518-1	Hypochlorous acid	Hsp2O	HSP USA LLC	Feline calicivirus; Norovirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
88089-2	Hydrogen peroxide; Peroxyacetic acid	Peridox	BioMed Protect LLC	Feline calicivirus; Norovirus	2	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
88089-4	Hydrogen peroxide; Peroxyacetic acid	PeridoxRTU	BioMed Protect LLC	Canine parvovirus	3	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
88494-2	Ethyl alcohol; Quaternary Ammonium	Wedge Disinfectant Wipes	North American Infection Control Ltd	Poliovirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
9480-11	Quaternary ammonium	BackSpray RTU	Professional Disposables International Inc	Feline calicivirus; Norovirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/26/2020
10324-59	Quaternary ammonium	Maquat 64	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/19/2020
777-128	Quaternary ammonium	Lysol® Laundry Sanitizer	Reckitt Benckiser	Human coronavirus	5	Dilutable (laundry pre-soak only)	Porous (laundry presoak only)	Residential	No	03/19/2020
10324-105	Quaternary ammonium	Maquat 128 PD	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-108	Quaternary ammonium	Maquat 256-MN	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020

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10324-112	Quaternary ammonium	Maquat 128-MN	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-113	Quaternary ammonium	Maquat 64-MN	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-114	Quaternary ammonium	Maquat 32-MN	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-115	Quaternary ammonium	Maquat 750-M	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-117	Quaternary ammonium	Maquat 710-M	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous; Porous (laundry presoak only)	Healthcare; Institutional; Residential	No	03/13/2020
10324-140	Quaternary ammonium	Maquat MQ2525M-CPV	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-141	Quaternary ammonium	Maquat 256-NHQ	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-142	Quaternary ammonium	Maquat MQ2525M-14	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-154	Quaternary ammonium	Maquat 64-NHQ	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-155	Quaternary ammonium	Maquat 128-NHQ	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020

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10324-156	Quaternary ammonium	Maquat 512-NHQ	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-157	Quaternary ammonium	Maquat 32-NHQ	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-164	Quaternary ammonium	Maquat 256 PD	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-166	Quaternary ammonium	Maquat 32	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-167	Quaternary ammonium	Maquat 32 PD	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-177	Quaternary ammonium	Maquat 705-M	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous; Porous (laundry presoak only)	Healthcare; Institutional; Residential	No	03/13/2020
10324-194	Quaternary ammonium	Maquat 2420-10	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-198	Quaternary ammonium	Maquat 702.5-M	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous; Porous (laundry presoak only)	Healthcare; Institutional; Residential	No	03/13/2020
10324-214	Hydrogen peroxide; Peroxyacetic acid	Maguard 5626	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020

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10324-230	Hydrogen peroxide; Peroxyacetic acid	Maguard 1522	Mason Chemical Company	Human coronavirus	1	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-57	Quaternary ammonium	Maquat 42	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-58	Quaternary ammonium	Maquat 128	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-63	Quaternary ammonium	Maquat 10	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-71	Quaternary ammonium	Maquat 280	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-72	Quaternary ammonium	Maquat 615-HD	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-80	Quaternary ammonium	Maquat 5.5-M	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-81	Quaternary ammonium	Maquat 7.5-M	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous; Porous (laundry presoak only)	Healthcare; Institutional; Residential	No	03/13/2020
10324-85	Quaternary ammonium	Maquat 86-M	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-93	Quaternary ammonium	Maquat 64-PD	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020

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10324-94	Quaternary ammonium	Maquat 20-M	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-96	Quaternary ammonium	Maquat 50-DS	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10324-99	Quaternary ammonium	Maquat 10-PD	Mason Chemical Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10492-4	Quaternary ammonium; Isopropanol	Discide Ultra Disinfecting Towelettes	Palermo Healthcare LLC	Human coronavirus	0.5	Wipe	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
10492-5	Quaternary ammonium; Isopropanol	Discide Ultra Disinfecting Spray	Palermo Healthcare LLC	Human coronavirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
11346-4	Quaternary ammonium	Clorox QS	The Clorox Company	Human coronavirus	2	RTU	Hard nonporous	Healthcare; Residential	No	03/13/2020
1672-65	Sodium hypochlorite	Austin A-1 Ultra Disinfecting Bleach	James Austin Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1672-67	Sodium hypochlorite	Austin's A-1 Concentrated Bleach 8.25%	James Austin Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1677-204	Octanoic acid	65 Disinfecting Heavy Duty Acid Bathroom Cleaner	Ecolab Inc	Human coronavirus	2	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/13/2020
1677-241	Sodium hypochlorite	Hydris	Ecolab Inc	Human coronavirus	5	RTU	Hard nonporous	Healthcare; Institutional	No	03/13/2020
1677-256	Quaternary ammonium	FSC 35K	Ecolab Inc	Human	5	Dilutable	Hard	Healthcare;	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
				coronavirus			nonporous	Institutional		
1839-155	Quaternary ammonium	BTC 2125M 20% Solution	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-167	Quaternary ammonium	BTC 885 Neutral Disinfectant Cleaner-256	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-168	Quaternary ammonium	BTC 885 NDC-32	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-169	Quaternary ammonium	BTC 885 Neutral Disinfectant Cleaner-64	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-176	Quaternary ammonium	Liquid-pak Neutral Disinfectant Cleaner	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-190	Quaternary ammonium	Stepan Disinfectant Wipe	Stepan Company	Human coronavirus	10	Wipe	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-211	Quaternary ammonium	SC-AHD-64	Stepan Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-213	Quaternary ammonium	SC-AHD-128	Stepan Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-214	Quaternary ammonium	SC-NDC-256	Stepan Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-235	Quaternary ammonium	SC-5:256N	Stepan Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional;	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
								Residential		
1839-244	Quaternary ammonium	SC -5:64HN	Stepan Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-245	Quaternary ammonium	SC-5:256HN	Stepan Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-78	Quaternary ammonium	NP 3.2 Detergent/ disinfectant	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-79	Quaternary ammonium	NP 4.5 Detergent/ disinfectant	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-81	Quaternary ammonium	NP 9.0 Detergent/ disinfectant	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-94	Quaternary ammonium	NP 3.2 (D & F) Detergent/ disinfectant	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
1839-96	Quaternary ammonium	NP 9.0 (D & F) Detergent/ disinfectant	Stepan Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
34810-31	Phenolic	Wex-cide 128	Wexford Labs Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
3862-191	Quaternary ammonium	Assure	ABC Compounding Co Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
4091-23	Sodium hypochlorite; Sodium carbonate	Mold Armor Formula 400	W.M. Barr & Company Inc	Human coronavirus	0.5	RTU	Hard nonporous	Institutional; Residential	No	03/13/2020
42964-17	Quaternary ammonium; Ethanol	Asepticare	Airkem professional	Human coronavirus	2	RTU	Hard nonporous	Healthcare; Institutional;	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
			products					Residential		
46781-6	Quaternary ammonium; Isopropanol	Cavicide	Metrex Research	Human coronavirus	2	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
4822-548	Triethylene glycol; Quaternary ammonium	Combo	S.C. Johnson & Son Inc	Human coronavirus	5	Pressurized liquid	Hard nonporous	Residential	No	03/13/2020
4822-606	L-Lactic Acid	Fangio	S.C. Johnson & Son Inc	Human coronavirus	10	RTU	Hard nonporous	Institutional; Residential	No	03/13/2020
4822-607	Quaternary ammonium	Lauda	S.C. Johnson & Son Inc	Human coronavirus	5	RTU	Hard nonporous	Institutional; Residential	No	03/13/2020
4822-608	L-Lactic acid	Gurney	S.C. Johnson & Son Inc	Human coronavirus	5	RTU	Hard nonporous	Institutional; Residential	No	03/13/2020
4822-609	Quaternary ammonium	Stewart	S.C. Johnson & Son Inc	Human coronavirus	3	RTU	Hard nonporous	Institutional; Residential	No	03/13/2020
4822-613	Quaternary ammonium	Gertrude	S.C. Johnson & Son Inc	Human coronavirus	5	RTU	Hard nonporous	Residential	No	03/13/2020
54289-4	Peroxyacetic acid	Peraclean 15 (Peroxyacetic Acid Solution)	Evonik Corporation	Human coronavirus	1	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/13/2020
56392-10	Sodium hypochlorite	Caltech Swat 200 9B	Clorox Professional Products Company	Human coronavirus	2	RTU	Hard nonporous	Healthcare; Institutional	No	03/13/2020
5813-103	Sodium hypochlorite	Cgb3	The Clorox Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
5813-104	Sodium hypochlorite	Cgb4	The Clorox Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
5813-106	Sodium hypochlorite	Axl	The Clorox Company	Human coronavirus	1	RTU	Hard nonporous	Residential	No	03/13/2020
5813-50	Sodium hypochlorite	Ultra Clorox	The Clorox	Human	5	Dilutable	Hard	Healthcare;	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
		Brand Regular Bleach	Company	coronavirus			nonporous	Institutional; Residential		
5813-73	Quaternary ammonium	Clorox Everest	The Clorox Company	Human coronavirus	0.5	RTU	Hard nonporous	Institutional; Residential	No	03/13/2020
5813-86	Glycolic acid	CBW	The Clorox Company	Human coronavirus	10	Impregnated materials	Hard nonporous	Residential	No	03/13/2020
5813-93	Glycolic acid	Show	The Clorox Company	Human coronavirus	10	Impregnated materials	Hard nonporous	Residential	No	03/13/2020
5813-98	Sodium hypochlorite	Lite	The Clorox Company	Human coronavirus	1	RTU	Hard nonporous	Institutional; Residential	No	03/13/2020
5813-99	Sodium hypochlorite	Wave	The Clorox Company	Human coronavirus	1	Wipe	Hard nonporous	Institutional; Residential	No	03/13/2020
61178-1	Quaternary ammonium	D-125	Microgen Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
61178-5	Quaternary ammonium	CCX-151	Microgen Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
6198-4	Quaternary ammonium	Q. A. Concentrated Solution	National Chemicals Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
62472-2	Quaternary ammonium	Kennelsol HC	Alpha Tech Pet Inc.	Human coronavirus	10	Dilutable	Hard nonporous	Institutional; Residential	No	03/13/2020
67619-10	Quaternary ammonium	CPPC Everest	Clorox Professional Products Company	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
67619-11	Sodium hypochlorite	CPPC Shower	Clorox Professional Products Company	Human coronavirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
67619-13	Sodium hypochlorite	CPPC Storm	Clorox	Human	1	RTU	Hard	Healthcare;	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
			Professional Products Company	coronavirus			nonporous	Institutional; Residential		
67619-27	Sodium hypochlorite	Buster	Clorox Professional Products Company	Human coronavirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
67619-28	Sodium hypochlorite	Milo	Clorox Professional Products Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
67619-8	Sodium hypochlorite	CPPC Ultra Bleach 2	Clorox Professional Products Company	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
6836-336	Quaternary ammonium	Lonza Disinfectant Wipes Plus	Lonza LLC	Human coronavirus	4	Wipe	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
6836-372	Quaternary ammonium	Nugen 2m Disinfectant Wipes	Lonza LLC	Human coronavirus	2	Wipe	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
6836-381	Quaternary ammonium	Lonzagard R-82G	Lonza LLC	Human coronavirus	1	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
6836-382	Quaternary ammonium	Nugen Low Streak Disinfectant Wipes	Lonza LLC	Human coronavirus	4	Wipe	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
70590-2	Sodium hypochlorite	Bleach-rite Disinfecting Spray With Bleach	Current Technologies Inc	Human coronavirus	1	RTU	Hard nonporous	Healthcare; Institutional	No	03/13/2020
70627-15	Quaternary ammonium	Warrior	Diversey Inc	Human	10	Dilutable	Hard	Healthcare;	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
				coronavirus			nonporous	Institutional		
70627-2	Quaternary ammonium	Disinfectant D.C. 100	Diversey Inc	Human coronavirus	2	RTU	Hard nonporous	Healthcare; Institutional	No	03/13/2020
70627-23	Quaternary ammonium	Virex II/ 64	Diversey Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/13/2020
70627-6	Phenolic	Phenolic Disinfectant HG	Diversey Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/13/2020
70627-62	Hydrogen peroxide	Phato 1:64 Disinfectant Cleaner	Diversey Inc	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/13/2020
70627-63	Quaternary ammonium	512 Sanitizer	Diversey Inc	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/13/2020
70627-75	Sodium hypochlorite	Avert Sporicidal Disinfectant Cleaner Wipes	Diversey Inc	Human coronavirus	1	Wipe	Hard nonporous	Healthcare; Institutional	No	03/13/2020
70627-78	Hydrogen peroxide	Suretouch	Diversey Inc	Human coronavirus	5	RTU	Hard nonporous	Healthcare; Institutional	No	03/13/2020
72977-3	Silver ion; Citric acid	Axen(R) 30	ETI H2O Inc	Human coronavirus	3	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
72977-5	Silver ion; Citric acid	Sdc3a	ETI H2O Inc	Human coronavirus	1	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
74559-6	Hydrogen peroxide	Oxy-res (Concentrate)	Virox Technologies Inc	Human coronavirus	5	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
74559-8	Hydrogen peroxide	Accel 5 RTU	Virox Technologies Inc	Human coronavirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
74986-4	Sodium chlorite	Selectrocide	Selective	Human	10	Dilutable	Hard	Healthcare;	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
		2L500	Micro Technologies LLC	coronavirus			nonporous	Institutional		
74986-5	Sodium chlorite	Selectrocide 5g	Selective Micro Technologies LLC	Human coronavirus	10	Solid	Hard nonporous	Healthcare; Institutional	No	03/13/2020
777-130	Quaternary ammonium	Caterpillar	Reckitt Benckiser	Human coronavirus	2.5	Wipe	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
777-136	Ethanol	Lysol Neutra Air® 2 in 1	Reckitt Benckiser	Human coronavirus	0.5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
777-66	Quaternary ammonium	Lysol® Brand All Purpose Cleaner	Reckitt Benckiser	Human coronavirus	2	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
777-82	Quaternary ammonium	Lysol Brand Deodorizing Disinfectant Cleaner	Reckitt Benckiser	Human coronavirus	10	Dilutable	Hard nonporous	Institutional; Residential	No	03/13/2020
777-91	Quaternary ammonium	Lysol® Kitchen Pro Antibacterial Cleaner	Reckitt Benckiser	Human coronavirus	2	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
8383-12	Hydrogen peroxide; Peroxyacetic acid	Peridox	Contec Inc	Human coronavirus	2	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/13/2020
8383-14	Hydrogen peroxide; Peroxyacetic acid	Peridoxrtu (Brand) One-step Germicidal Wipes	Contec Inc	Human coronavirus	0.5	Wipe	Hard nonporous	Healthcare; Institutional	No	03/13/2020
8383-3	Phenolic	Sporicidin (Brand)	Contec Inc	Human coronavirus	5	RTU	Hard nonporous	Healthcare; Institutional;	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
		Disinfectant Solution (Spray)						Residential		
8383-7	Phenolic	Sporicidin (Brand) Disinfectant Towelettes	Contec Inc	Human coronavirus	5	Wipe	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
85343-1	Quaternary ammonium	Teccare Control	Talley Environmental Care Limited	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
87508-3	Sodium chlorite	Performacide	Odorstart LLC	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional	No	03/13/2020
88494-1	Quaternary ammonium; Ethanol	Wedge Disinfectant	North American Infection Control LTD	Human coronavirus	1	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
89896-2	Hypochlorous acid	Cleansmart	Simple Science Limited	Human coronavirus	10	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
89900-1	Hydrogen peroxide	Nathan 2	S.C. Johnson Professional	Human coronavirus	5	RTU	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
90287-1	Quaternary ammonium	Maquat 25.6-PDX	VI-JON INC	Human coronavirus	10	Dilutable	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
9402-14	Hydrogen peroxide; Ammonium carbonate; Ammonium bicarbonate	Hitman Spray	Kimberly-Clark Global Sales LLC	Human coronavirus	5	RTU	Hard nonporous	Institutional; Residential	No	03/13/2020
9402-15	Hydrogen peroxide; Ammonium carbonate; Ammonium bicarbonate	Victor Spray	Kimberly-Clark Global Sales LLC	Human coronavirus	5	Pressurized liquid	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020
9402-17	Hydrogen peroxide; Ammonium carbonate;	Hitman Wipe	Kimberly-Clark Global Sales	Human coronavirus	6	Wipe	Hard nonporous	Institutional; Residential	No	03/13/2020

EPA Registration Number	Active Ingredient(s)	Product Name	Company	Follow the disinfection directions and preparation for the following virus	Contact Time (in minutes	Formulation Type	Surface Types for Use	Use Site	Emerging Viral Pathogen Claim?	Date Added to List N
	Ammonium bicarbonate		LLC							
9480-5	Quaternary ammonium	Sani-cloth Germicidal Disposable Cloth	Professional Disposables International Inc	Human coronavirus	3	Wipe	Hard nonporous	Healthcare; Institutional; Residential	No	03/13/2020

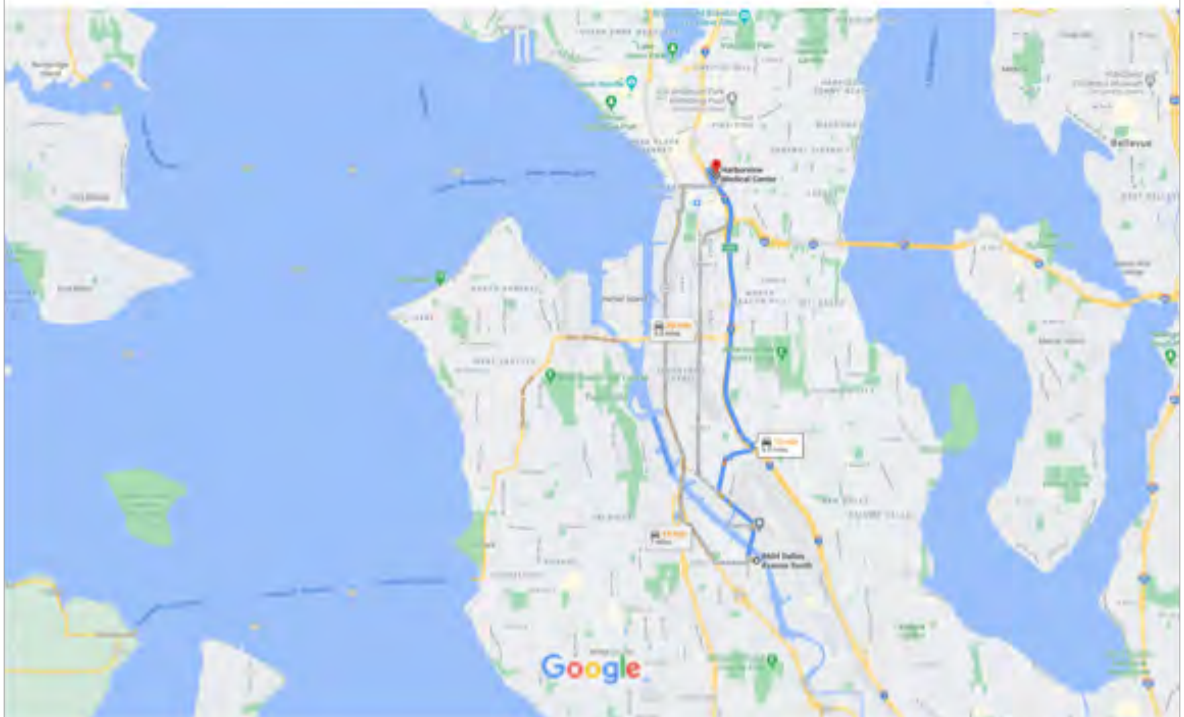
Figure 1: DIRECTIONS TO HOSPITAL

Google Maps

8604 Dallas Ave S, Seattle, WA 98108 to Harborview Medical Center

Drive 6.5 miles, 15 min

Route to Hospital



Map data ©2020 Google 2000 ft

via I-5 N	Fastest route, despite the usual traffic	15 min, 6.5 miles
via 4th Ave S	Lighter traffic than usual	20 min, 6.5 miles
via Hwy 99 N	Some traffic, as usual	19 min, 7.0 miles

Explore Harborview Medical Center

Figure 2: DIRECTIONS TO WALK-IN MEDICAL CLINIC

Google Maps

8604 Dallas Ave S, Seattle, WA 98108 to Sea Mar Seattle Medical Clinic

Drive 0.3 mile, 3 min

Route to Walk-In Clinic

Map data ©2020   500 ft

🚗	via Dallas Ave S and 14th Ave S Best route, despite the usual traffic	3 min 0.3 mile
🚗	via 16th Ave S and S Donovan St	2 min 0.2 mile

Explore Sea Mar Seattle Medical Clinic

Restaurants   Hotels   Gas stations   Parking Lots   More

APPENDIX G

Archaeological Monitoring and Inadvertent Discovery Plan

Archaeological Monitoring and Inadvertent Discovery Plan (MIDP)

South Park Marina Remedial Investigation Phase I

January 2021

Prepared by
Willamette Cultural Resources Associates, Ltd.

Prepared for:
Seattle City Light
Seattle, Washington

WILLAMETTE
CULTURAL RESOURCES ASSOCIATES, LTD.

1 Background

The City of Seattle, the Port of Seattle, and the South Park Marina are the potential responsible parties (PLPs) on a Department of Ecology Model Toxics Control Act (MTCA) Agreed Order No. DE-16185 and involved in the investigation and cleanup of contaminated soil and groundwater at the South Park Marina adjacent to the Duwamish Waterway. The Project Area is South Park Marina, 8604 Dallas Avenue South, Seattle, WA (King County parcels #0001600001, 2185600025, and 2185600070) (Figure 1 and Figure 2). The Remedial Investigation (RI) will be performed over two phases of field work confined to the Site Area shown on Figure 2. Phase I is an investigatory phase of work which will include advancing borings, monitoring wells, shallow test pits, and hand augers on the property. The borings will reach 20 to 30 feet below ground surface with a diameter of 4-8 inches, depending on equipment. The cleanup project is funded by the PLPs. Because the PLPs have applied for a Remedial Action Grant from the Washington State Department of Ecology (Ecology), the project is subject to Governor's Executive Order 05-05. Ecology is taking the lead on consultation with the Department of Archaeology and Historic Preservation (DAHP) and affected Tribes. The work is being completed under FERC Reporting Code 92551.

The property is on the western shore of the Lower Duwamish Waterway just south of the Seattle city limits in unincorporated King County. The upland portion of the property is currently in use as a Marina, a marine maintenance and repair shop, boat storage and repair, and residences. Borings previously advanced on the property indicate that it is capped with several feet of fill. The project area is considered sensitive for precontact archaeological resources (Schultze et al. 2013). The project area is also known to have four previous buildings including a barrel shop, boat manufacturer, radiator repair shop, and gas station; these were all removed by 1972 (Ecology 2019). Much of the project area is part of a former oxbow of the Duwamish River.

This MIDP defines procedures to ensure compliance with Washington state laws, including the Archaeological Sites and Resources (RCW 27.53), Indian Graves and Records (RCW 27.44), Human Remains (RCW 68.50), and Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60). It is important that any "discovered" human remains and associated cultural materials and deposits be treated with care and respect and be protected from further disturbance and exposure to weather. Compliance with all applicable laws pertaining to archaeological resources and with human remains is required. Failure to comply with these requirements could result in possible misdemeanor or civil penalties and/or constitute a Class C felony.

2 Goal of Archaeological Monitoring During Phase I

Archaeological monitoring is defined as the observation by a professional archaeologist of ground disturbing construction activities conducted by others. The goal of archaeological monitoring during Phase I is to identify depth of fill, presence of native sediments or buried surfaces, and presence or absence of archaeological material. This information will be used to develop a monitoring approach for future phases of cleanup work.

Because of the nature of the investigations—limited diameter borings and monitoring wells for the purpose of identifying contaminated soil and groundwater—work will <u>not</u> be halted if archaeological resources are identified. If human remains are identified, work will be halted.

3 Archaeological Team Qualifications and Structure

The Project Archaeologist will oversee the implementation of the MIDP and the day-to-day coordination of monitoring during Phase I. The Project Archaeologist shall meet the National Park Service, Department of the Interior qualifications for professional archaeologists set forth in the *Federal Register* (1983, Volume 48, No. 190:44739). The Project Archaeologist will report to the Seattle City Light Cultural Resources Coordinator (CRC).

The Project Archaeologist will oversee an Archaeological Monitor. The Archaeological Monitor will have 40-hour HAZWOPER certification.

4 On-Site Procedures

To ensure compliance with Washington statutes, the following procedures have been developed to address potential inadvertent discoveries of archaeological resources (as defined in RCW 27.53) during ground-disturbing activities at the project location.

An Archaeological Monitor will be present to observe all ground disturbance. The Archaeological Monitor will have 40-hour HAZWOPER certification and will work under the supervision of a professional archaeologist who meets the Secretary of the Interior's professional qualification standards for Archaeology.

The Archaeological Monitor will keep daily monitoring logs and take photographs to document the borings. The Archaeological Monitor will inspect samples as they are removed. The Archaeological Monitor will photograph and make notes on the composition and depth of each sample. If cultural deposits are observed or suspected, the Archaeological Monitor will describe the deposits including soil description, the interface between cultural and sterile soils, and measure the cultural layers. The Archaeological Monitor may screen suspected or confirmed cultural material through ¼" mesh unless the sample is suspected to be contaminated and it would not be best practice to agitate the sample. Artifacts will be described and photographed but no artifacts or samples will be collected.

4.1 Archaeological Discovery

If the Archaeological Monitor observes evidence of archaeological materials, they will provide the Project Archaeologist with notification of the discovery by the end of the day and include a description and photographs of the discovery, as well as any indication of whether the archaeological materials are disturbed or intact. The Project Archaeologist will notify the CRC of the discovery via email. The CRC will notify the City of Seattle, the Port of Seattle, the South Park Marina, and Ecology of the discovery. If warranted, Ecology will consult with DAHP and affected Tribes regarding project effects to the archaeological discovery.

If the Archaeological Monitor determines that a potential human burial has been encountered, the provisions in **Section 4.2** will be followed.

4.1.1 Materials NOT Requiring Notification

The following types of materials are presumed to not be protected under state law, and would not require notification:

- Isolated historic debris;
- Items less than 50 years old;
- Remains of infrastructure including abandoned utilities;
- Loose bricks, mortar, or other architectural debris; and

- Historic-era artifacts within unstratified fill that are not associated with a feature or stable surface.

The archaeologist will note the presence of these items in daily monitoring logs.

4.2 Discovery of Human Remains

In the event that human remains are encountered at any time, state law (RCW 27.44.055) requires all activity to cease that may cause further disturbance to those remains, and the area of the find secured and protected from further disturbance. The following protocol will be followed:

- **Stop** immediately all ground disturbing activity within 50 feet of the discovery.
- **Secure** the site immediately from any possible disturbance. The remains will be immediately covered and not removed from the sample unless necessary to prevent damage.
- **Ensure** at all times that any discovered human remains are treated with dignity and respect.
- **Contact** the Project Manager immediately: The Archaeological Monitor will immediately report to the SCL Project Manager and SCL CRC that human skeletal remains have been identified.

The SCL CRC will contact the King County Medical Examiner and the King County Sheriff in the most expeditious manner possible. If the SCL CRC is not immediately available, the Project Archaeologist will initiate those contacts. The remains will not be touched, moved, or further disturbed. The Medical Examiner will assume jurisdiction over the human skeletal remains and determine whether those remains are forensic or non-forensic. If the Medical Examiner determines the remains are non-forensic, they will then report that finding to the DAHP, who will then take jurisdiction over the remains. The DAHP will notify any appropriate cemeteries and all affected tribes of the find. The State Physical Anthropologist will determine whether the remains are Indian or Non-Indian and report that finding to any appropriate cemeteries and the affected tribes. The DAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

5 Reporting

The Archaeological Monitor will complete daily monitoring logs and photographic records of monitoring observations. If archaeological resources are identified, an Archaeological Site Form will be prepared. The Project Archaeologist will direct preparation of a draft report with the results of the monitoring for SCL review; the site form (if necessary) will be included as an appendix. The monitoring report will include recommendations for level of monitoring for future phases of cleanup activities. SCL will provide comments on the draft monitoring report and the Project Archaeologist will finalize the monitoring report for and upload to the Washington Information System for Architectural and Archaeological Records Data (WISAARD) for review by DAHP and Tribes.

6 Bibliography

Schultze, Carol, Brent A. Hicks, Shari Maria Silverman, and Jennifer Gilpin.
2013 *45KI815 Archaeological Data Recovery, South Park Bridge Replacement Project, King County, Washington.* Prepared for King County Road Services Division. Submitted to HNTB Corporation, Inc. Prepared by Historical Research Associates, Inc., Seattle, Washington.

State of Washington Department of Ecology (Ecology)
2019 *Agreed Order No. DE 16185*. On file with City of Seattle.

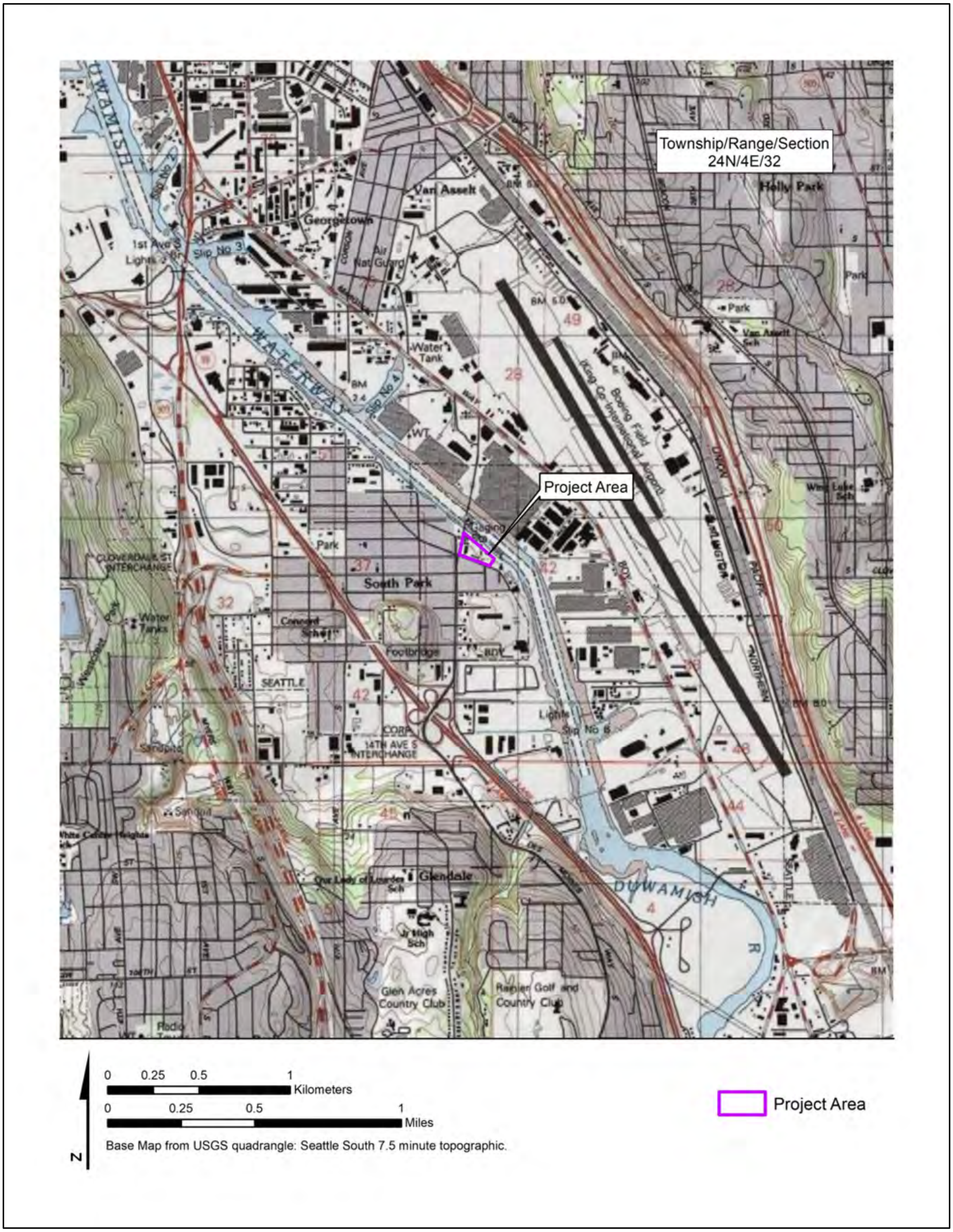


Figure 1. USGS Topographic Map of the Project Area.

Figure 2. Aerial photograph of the Project Area.

Contact Information for Monitoring and Inadvertent Discovery Plan

(to be finalized before start of construction)

Tribe/Agency/Organization	Contact Name	Email Address	Phone Number
Seattle City Light Project Manager	Allison Crowley	allison.crowley@seattle.gov	(206) 684-3167
Port of Seattle Project Manager	Roy Kuroiwa	Kuroiwa.r@portseattle.org	(206) 787-3814
Washington State Department of Ecology Site Manager	Mark Adams	mada461@ecy.wa.gov	(425) 515-5992
Washington State Department of Ecology Cultural Resources Coordinator	Lucy McInerney	lucy.mcinerney@ecy.wa.gov	(425) 649-7272 (425) 410-1400
Seattle City Light Cultural Resources Coordinator	Amber Earley	amber.earley@seattle.gov	(206) 402-2143
Seattle City Light Cultural Resources Coordinator (alternate)	Andrea Weiser	andrea.weiser@seattle.gov	(206) 858-1287
TIG (Agent for South Park Marina)	Betsy Wing	bwing@intell-group.com	(520) 270-6534
Aspect Consulting (Contractor) Project Manager	Jeremy Porter	jporter@aspectconsulting.com	(206) 790-2129
On site Contractor Holt Services	Dale Abernathy	dabernathy@holtservicesinc.com	(253) 604-4878
Willamette Cultural Resources Associates, Ltd. (Project Archaeologist)	Paula Johnson	paula@willamettecra.com	(206) 706-1659 (cell)
Willamette Cultural Resources Associates, Ltd. (Archaeological Monitor)	TBD	TBD	TBD

Tribe/Agency/Organization	Contact Name	Email Address	Phone Number
DAHP Local Government Archaeologist	Stephanie Jolivette	Stephanie.Jolivette@dahp.wa.gov	(360) 586-3088
State Physical Anthropologist	Dr. Guy Tasa	Guy.Tasa@dahp.wa.gov	(360) 586-3534
King County Sheriff	Non-emergency contact	-	(206) 296-3311
King County Medical Examiner	Richard Harruff, MD, Ph.D.	-	(206) 731-3232, ext. 5
King County Historic Preservation Program Archaeologist	Philippe D. LeTourneau, Ph.D.	Philippe.leTourneau@kingcounty.gov	(206) 477-4529
Duwamish Tribe	Cecile Hansen, Chair	cecile@duwamishtribe.com	(206) 431-1582
Muckleshoot Indian Tribe	Laura Murphy, Archaeologist	Laura.murphy@muckleshoot.nsn.us	(253) 876-3272
Snoqualmie Indian Tribe	Steve Mullen-Moses, Director Archaeology and Historic Preservation	steve@snoqualmietribe.us	(425) 292-0249, ext. 2010 (425) 495-6097 (cell)
Stillaguamish Tribe of Indians	Kerry Lyste, THPO	klyste@stillaguamish.com	(360) 652-7362, ext. 226
Suquamish Tribe	Dennis Lewarch, THPO	dlewarch@Suquamish.nsn.us	(360) 394-8529
Tulalip Tribes	Richard Young, Cultural Resources	ryoung@tulaliptribes-nsn.gov	(360) 716-2652 (425) 239-0182 (cell)
Confederated Tribes and Bands of the Yakama Nation	Kate Valdez, THPO	kate@yakama.com	(509) 865-1068

APPENDIX H

Report Limitations and Guidelines for Use

REPORT LIMITATIONS AND USE GUIDELINES

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on this report or the product of our services without the express written consent of Aspect Consulting, LLC (Aspect). This limitation is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual conditions or limitations and guidelines governing their use of the report. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and recognized standards of professionals in the same locality and involving similar conditions.

Services for Specific Purposes, Persons and Projects

Aspect has performed the services in general accordance with the scope and limitations of our Agreement. This report has been prepared for the exclusive use of the Client and their authorized third parties, approved in writing by Aspect. This report is not intended for use by others, and the information contained herein is not applicable to other properties.

This report is not, and should not, be construed as a warranty or guarantee regarding the presence or absence of hazardous substances or petroleum products that may affect the subject property. The report is not intended to make any representation concerning title or ownership to the subject property. If real property records were reviewed, they were reviewed for the sole purpose of determining the subject property's historical uses. All findings, conclusions, and recommendations stated in this report are based on the data and information provided to Aspect, current use of the subject property, and observations and conditions that existed on the date and time of the report.

Aspect structures its services to meet the specific needs of our clients. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and subject property. This report should not be applied for any purpose or project except the purpose described in the Agreement.

This Report Is Project-Specific

Aspect considered a number of unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you
- Not prepared for the specific purpose identified in the Agreement
- Not prepared for the specific real property assessed
- Completed before important changes occurred concerning the subject property, project or governmental regulatory actions

If changes are made to the project or subject property after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

Geoscience Interpretations

The geoscience practices (geotechnical engineering, geology, and environmental science) require interpretation of spatial information that can make them less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Use Guidelines" apply to your project or site, you should contact Aspect.

Discipline-Specific Reports Are Not Interchangeable

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the subject property.

Environmental Regulations Are Not Static

Some hazardous substances or petroleum products may be present near the subject property in quantities or under conditions that may have led, or may lead, to contamination of the subject property, but are not included in current local, state or federal regulatory definitions of hazardous substances or petroleum products or do not otherwise present potential liability. Changes may occur in the standards for appropriate inquiry or regulatory definitions of hazardous substance and petroleum products; therefore, this report has a limited useful life.

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time (for example, Phase I ESA reports are applicable for 180 days), by events such as a change in property use or occupancy, or by natural events, such as floods, earthquakes, slope failure or groundwater fluctuations. If more than six months have passed since issuance of our report, or if any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Historical Information Provided by Others

Aspect has relied upon information provided by others in our description of historical conditions and in our review of regulatory databases and files. The available data does not provide definitive information with regard to all past uses, operations or incidents affecting the subject property or adjacent properties. Aspect makes no warranties or guarantees regarding the accuracy or completeness of information provided or compiled by others.